

Precede-and-Command Revisited*

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Abstract

The relation of c-command (Reinhart 1976, 1983) is widely believed to be *the* fundamental relation in syntax, underlying such diverse phenomena as coreference (the Binding Principles), scope and variable binding, syntactic movement, and so on. Precedence is generally held to be irrelevant. This paper argues that this view is mistaken. Syntax does not involve c-command at all, but rather a much coarser notion of command, *phase-command*, where only phasal nodes matter, not every node in the tree. Precedence also plays an important role. The paper argues this point in detail for the Binding Principles, and shows that the relation that is required is *precede-and-command* (Langacker 1969, Jackendoff 1972, Lasnik 1976), where command is phase-command. It revisits Reinhart's arguments for c-command and against precedence, and shows that those arguments do not go through. Finally, precede-and-command does not need to be stipulated, but follows from a view of grammar and processing where sentences are built in a left-to-right fashion.

Keywords: c-command, precedence, dominance, binding, coreference, phrase structure, constituency, phrase structure paradoxes

1 Introduction

It is always a good idea to reexamine one's assumptions and beliefs from time to time, especially those that everyone believes to be true. I undertake such a reexamination here, of the fundamental notion of c-command. This relation, typically defined as follows, is widely believed to play a pivotal role in coreference (the Binding Principles), quantification and quantificational binding, licensing (of negative polarity items, e.g.), movement, agreement and case assignment, and other phenomena:¹

(1) C-Command

A c-commands B iff the first branching node dominating A also dominates B.

A huge literature exists that tries to derive c-command from the fundamental workings of the grammar, based on the widespread belief in its ubiquitous importance (e.g., Epstein 1999, Chomsky 2000, Frank and Vijay-Shanker 2001, Schlenker 2005b, Hornstein 2009).

However, since Reinhart (1976, 1983) argued that c-command was *the* relation in syntax, and precedence was irrelevant, many problems have accumulated for that view. For instance, there have always been numerous counterexamples to the claim that quantificational binding requires c-command; see Barker (2012)

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¹For a more rigorous formal definition of c-command (and other types of command), see Barker and Pullum (1990).

for an overview. There are also numerous problems for a c-command condition on the licensing of negative polarity items (e.g., Hoeksema 2000). Additionally, numerous conflicts between c-command and tests for constituency have been identified, as documented extensively in Pesetsky (1995), Phillips (2003), Lechner (2003). The response of most of the literature to such problems has not been to reject c-command; rather, it has been to attempt reanalyses of all the problematic cases (see the works cited). However, there is a truly *fundamental* problem with the relation of c-command, which I take as my starting point here: This is that the “c” in “c-command” stands for “constituent,” and, if c-command is truly the right notion, *conflicts between c-command and tests for constituency simply should not exist*. The fact that they do indicates that c-command is not actually the relation that all of the phenomena listed above are sensitive to.

I argue this point in detail for the Binding Principles, which regulate coreference. I claim that the relation that is involved is actually the one that Reinhart argued against, namely *precede-and-command* (Langacker 1969, Jackendoff 1972, Lasnik 1976).² This relation is the conjunction of two relations: precedence, a purely linear relation, and command, a hierarchical one. The particular version of command that I argue for is *phase-command*, defined as follows:³

- (2) 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.
- (3) Phasal nodes: CP, vP, NP

Phase theory posits that particular nodes are of special importance in syntax, being involved in cyclicity, spellout, successive-cyclic movement, and locality constraints on agreement (see Chomsky 2000 and much subsequent literature). These nodes consist of maximal VPs (what I call vP here, following Chomsky 1995 and much other work), maximal clauses (CP), and maximal nominal projections (which I will refer to as NP, but DP would work as well for the data discussed here). The idea behind phase-command is that these same nodes are what syntactic relations like coreference are sensitive to. Typical tests for constituency, in contrast, like movement, can target potentially any node in the tree (although there may be additional constraints, like the commonly assumed constraint that only maximal projections may undergo phrasal movement).

Phase-command and c-command embody very different views concerning the sensitivity of syntax to hierarchical relations. C-command is the view that every node in the tree (every constituent) matters for hierarchical relations. Phase-command, in contrast, says that only certain nodes do, namely, the phasal nodes. As I will show, phase-command plus precedence achieves vastly superior empirical coverage over c-command. C-command is fundamentally flawed: most of the nodes that are relevant to constituency turn out to be irrelevant to command.

I start by giving a brief illustration of how precede-and-command accounts for Principle C effects (section 2). I then show in detail the fundamental problem with c-command: that very few of the nodes that define constituents actually matter for command (section 3). In every case, precede-and-command, where only phasal nodes matter, makes exactly the right predictions. In section 4, I consider a reformulation of

²Historical note: While the dominant view in the literature since Reinhart seems to have been that precedence is not relevant, there have always been many publications arguing that precedence is required. These include Barss and Lasnik 1986, Jackendoff 1990, Napoli 1992, Kuno and Takami 1993, Ernst 1994, Bresnan 1998, among others. None of these have a precede-and-command type of theory with cyclic nodes, however, which appears to have disappeared from the literature subsequent to Reinhart’s work. Napoli’s Linear Precedence Principle with her notion of *paesani* comes close, where *paesani* are all the arguments and adjuncts of a theta-assigning head (Napoli 1992, 847–848). The technical implementation differs from phase-command, however, and it is also not clear how her theory would distinguish VP-level adjuncts from IP-level adjuncts, discussed below.

³Stated in the formalism of Barker and Pullum (1990):

- (i) DEFINITION 1: Phase-command is the command relation C_{P1} where $P1$ is given by
- (ii) $P1 = \{a \mid \text{LABEL}(a) \in \{CP, vP, NP\}\}$

See their definition of K-command, page 12.

c-command, due to Reinhart (1976), which permits adjoined nodes to be invisible to c-command. I show that this amendment still fails to capture the facts. Section 5 then revisits Reinhart’s (1976, 1983) arguments against precedence, and shows that they do not go through. In fact, precedence is necessary. Throughout the discussion, PP nodes play a particularly important role. It is important to the account that they are *not* phasal nodes. Section 6 addresses this issue directly, confronting the line of research from van Riemsdijk (1978) through Abels (2012) which argues that PPs are phasal nodes. The conclusion of section 6 is that they are not. In section 7, I show that precedence plus phase-command does not need to be stipulated in coreference, but follows as a consequence from a view of grammar where sentences are built left-to-right, phase-by-phase. Section 8 turns from Principle C to Principles A and B, and incorporates them into the account. The particular formulation that is proposed solves several outstanding problems for theories of anaphora, including that of Reinhart and Reuland (1993). Finally, section 9 concludes with some discussion of other phenomena that are thought to make reference to c-command; in every case, there are reasons to think that they do not, and c-command should be expunged from the theory of grammar.

Throughout, I mostly concentrate on English data, but I assume as a null hypothesis that the corresponding phenomena will be regulated by the same principles in every language, subject of course to details of analysis. Some data from other languages brought in along the way (in section 6 in particular) are consistent with this assumption.

2 Brief Illustration: Principle C

Before showing all of the problems for c-command, I first give a quick illustration of how precede-and-command captures some of the basic command data, so that the reader can see how precede-and-command accounts for all of the data that are problematic for c-command. Here and through most of the paper, I illustrate with Principle C, the condition that bans coreference between an R-expression and a commanding antecedent. Rather than c-command, precede-and-command is the relevant notion (which is precedence plus phase-command):⁴

- (4) Binding Principle C
An R-expression may not be bound.
- (5) Binding
A binds B iff A and B are coindexed and A precedes and phase-commands B.

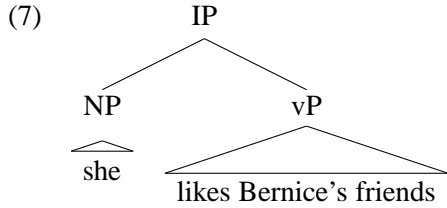
The definition of phase-command is stated above. Precedence is left-to-right order (see, e.g., Partee, ter Meulen, and Wall 1990, 441–442). Note that the exact formulation of binding in terms of coindexation, covaluation, or something else is not important here. I will simply assume for the moment that Principle C is not reducible to a pragmatic or semantic constraint that bans coreference wherever binding is possible, as in work stemming from Reinhart 1983, but will come back to the issue in section 7, where I will also reformulate Principle C.

We can now see how precede-and-command accounts for Principle C effects. Take the following contrast:

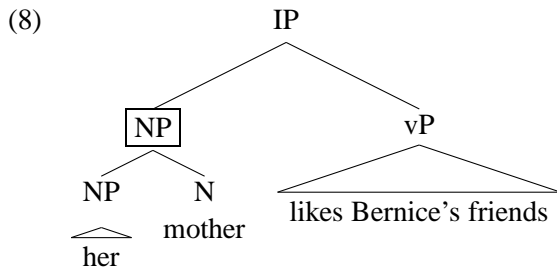
- (6) a. *She₁ likes Bernice₁’s friends.
- b. Her₁ mother likes Bernice₁’s friends.

In (6a), the pronoun precedes-and-commands the R-expression because it precedes it and there is no vP, CP, or NP that dominates the pronoun but does not dominate the R-expression:

⁴To keep things simple, I use the simplest possible formulation of Principle C, which is adequate for English. In other languages, R-expressions can sometimes bind other R-expressions, which necessitates referring to binding by referentially dependent items. See Lasnik 1989 and much subsequent literature.



In contrast, in (6b), there is such a node, namely, NP:



The NP node dominates the pronoun but does not dominate the R-expression. Therefore the pronoun does not bind the R-expression, and coreference is permitted.

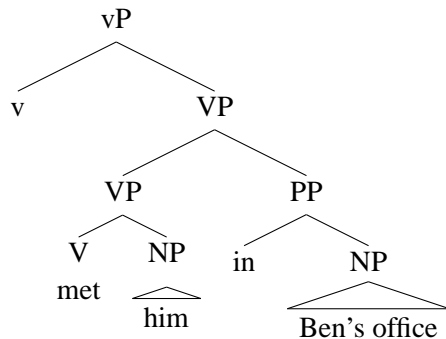
The same is true of a pronoun embedded in a CP adjunct:

- (9) Whenever he₁ comes to town, Ben₁ gets arrested. (based on (Reinhart 1976, 16, (14a))

There is a phasal node, namely CP, that dominates the pronoun but does not dominate the R-expression.

Coreference is banned between an object and an R-expression contained in a PP that is adjoined to VP:

- (10) * I met him₁ in Ben₁'s office. (Reinhart 1976, 155, (15a))



So long as the NP and the PP are in the same phase (the maximal VP, which I will call vP, following Chomsky 2000), the NP will precede-and-command the PP.

Before moving on, I should also address cases of apparent lack of precedence. It is well-known that surface precedence is not always required for binding:

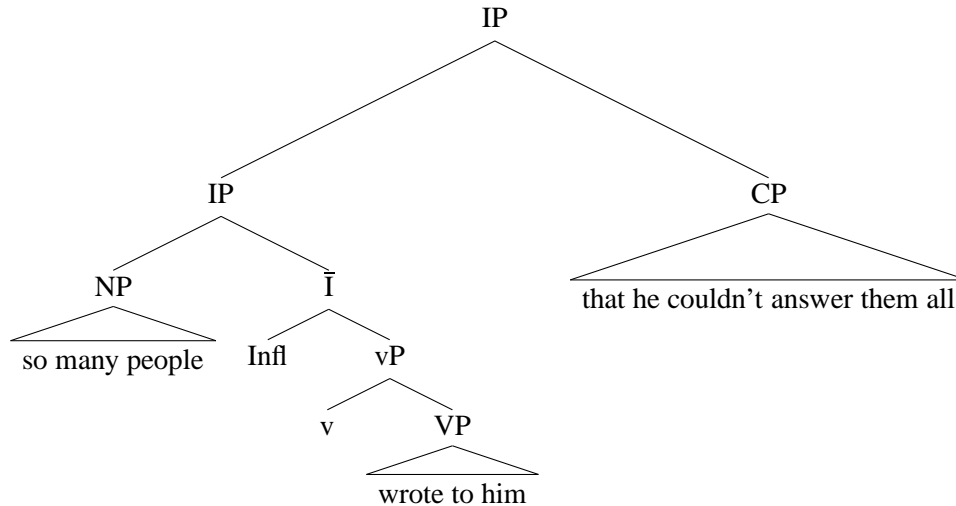
- (11) Himself₁, Ralph₁ will like.

I assume, as is standard, that binding can be satisfied at points of the derivation other than the surface structure. Here, *himself* will be bound in its base position, where it is preceded by its antecedent. I assume that binding holds at LF following reconstruction of the anaphor (see Chomsky 1993, Fox 1999). See below for more on reconstruction.

3 Problems for Constituent-Command

As noted above, the “c” in c-command stands for “constituent.” The idea is that every node that is relevant for constituency is also relevant for command. The expectation, then, is that if constituency tests pick out a branching node X that dominates Y, Y will not command anything outside of X (i.e., not dominated by X). This seems to be correct for some cases, for instance adjuncts that appear to be adjoined outside of VP. In (12a), the adjunct CP in square brackets cannot be fronted with VP in (12b) but instead must be stranded (12c), meaning that there is (at least) a node VP that excludes it:

- (12) a. So many people wrote to him [CP that he couldn't answer them all].
 b. * ... and write to him [CP that he couldn't answer them all], so many people did.
 c. ... and write to him, so many people did [CP that he couldn't answer them all].
 d.



(I show the adjunct adjoined to IP, because, as I show below, that is where constituency tests put it.)

Since the prepositional object in this sentence is dominated by (at least) a VP node that does not dominate the adjunct, a c-command account of Principle C predicts that a pronoun in the VP will be able to be coreferential with an R-expression contained in the adjunct. This is correct:

- (13) So many people wrote to him₁ [CP that Brando₁ couldn't answer them all]. (Reinhart 1976, 47, (63))

Note that precede-and-command correctly predicts this, as well: there is a phasal node, namely vP, that dominates the pronoun but does not dominate the R-expression.

Similarly, constituency tests like clefting reveal an NP node in examples like the following:

- (14) a. People think that [NP his integrity] is more important to him than his position.
 b. It's [NP his integrity] that people think *t* is more important to him than his position.

As expected by the c-command account, elements dominated by this NP node do not command out of the NP, as shown by Principle C:

- (15) People think that [NP his₁ integrity] is more important to that official₁ than his position.

Note again that precede-and-command also correctly accounts for cases like this, as was shown in the previous section.

In addition to these successes, however, there are numerous cases where c-command makes incorrect predictions. I begin with PPs.

3.1 PPs

Reinhart (1976) already noted some of the problems that coreference within the VP raised for her definition of c-command. She noted that objects of prepositions act the same as objects of verbs in having VP material on their right in their command domain:

- (16) (Reinhart 1976, 155–156, (14b, 16b, 20c))
- a. * It didn't occur to her₁ that Rosa₁ has failed the exam.
 - b. * Someone should point out to her₁ that Rosa₁'s driving is dangerous.
 - c. ?? We talked with her₁ about Rosa₁'s son.

Further examples were added by Pesetsky (1995), who discussed the discrepancies between constituency and c-command in some detail:⁵

- (17) (Pesetsky 1995, 177, (459))
- a. * Sue spoke to him₁ about Bill₁'s mother.
 - b. * Mary danced in it₁ with the owner of the hall₁.
 - c. * Mary played quartets with them₁ at [John and Sue]₁'s party.
 - d. * I threw the ball to him₁ on Friday during John₁'s speech.

All tests for constituency pick out a branching node containing only the preposition and its object. This constituent can be fronted, it can be clefted, it can be replaced by a pro-form (if the NP is inanimate), it can be questioned and answered as a fragment, it can be conjoined, and so on:

- (18)
- a. In the hall, Mary danced with her secret admirer.
 - b. It was in the hall that Mary danced with her secret admirer.
 - c. Did Mary dance in the hall with her secret admirer? She did dance there with her secret admirer. (there=in the hall)
 - d. Q: In which building did Mary dance with her secret admirer? A: In the hall.
 - e. Mary danced [in the hall] and [in the ballroom] with her secret admirer.

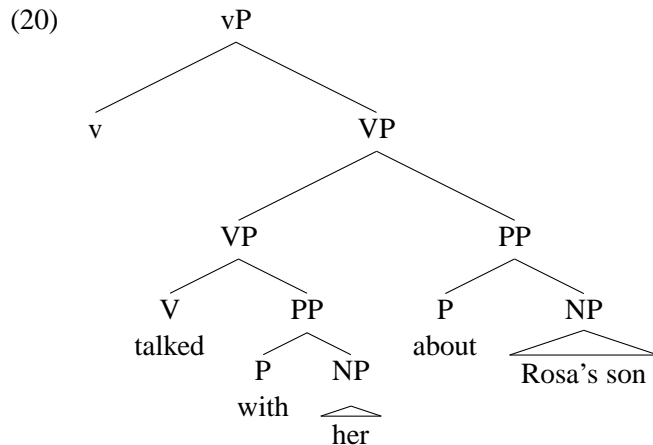
C-command does not seem to be the right relation for Principle C, then. A c-command account of Principle C predicts that there should be no Principle C effect in (16–17), contrary to fact. If c-command were the correct relation for Principle C, there would have to be a branching node consisting of the object of the preposition on the left and subsequent material on the right. However, nothing but coordination picks out this string as a constituent (see below on the exceptionality of coordination):

- (19)
- a. * The hall with her secret admirer Mary danced in.
 - b. * It was the hall with her secret admirer that Mary danced in.
 - c. Mary danced in there. (there≠the hall with her secret admirer)
 - d. * Q: Which building with her secret admirer did Mary dance in? A: *The hall with her secret admirer.
 - e. Mary danced in [the hall with her secret admirer] and [the lodge with her ex-boyfriend].

⁵I have changed example (17d) from Pesetsky's version; he had *John* as the subject, too, clearly a mistake.

C-command is obviously not the right relation for PPs, then. In this case, at least, the syntax is not hypersensitive, as c-command predicts; as far as command phenomena go, the syntax simply ignores the PP node.

Note that the data follow from a precede-and-command theory, where vP is a phasal node but PP is not. In the following structure, the object of the preposition precedes-and-commands but does not c-command the R-expression *Rosa*:



There is no phasal node that dominates *her* but does not dominate *Rosa*.

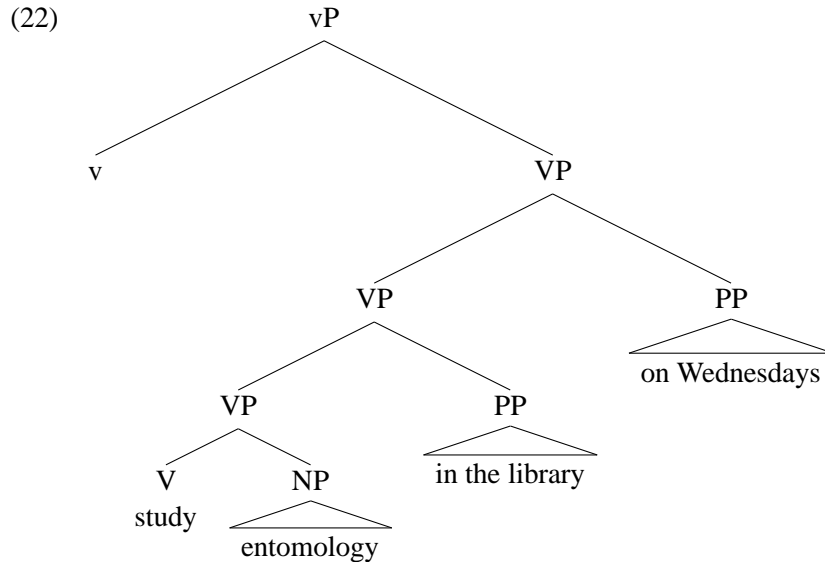
I come back to PPs below (section 6), and investigate claims that they do sometimes matter for binding. In that section I also address a line of research that argues that PPs are phasal nodes. I show that there is no evidence for either assertion, and PPs must not be phasal nodes, based on their binding behavior.

3.2 VP Adjuncts

With VP adjuncts, constituency tests consistently point to a left-branching structure. That is, an adjunct on the right is adjoined higher than material on its left. For instance, VP-fronting can target constituents consisting of all of the VP to the left of a given adjunct, or it can include the adjunct:

- (21) I said that I would study entomology (in the library) (on Wednesdays), and ...
- a. ... study entomology I did in the library on Wednesdays.
 - b. ... study entomology in the library I did on Wednesdays.
 - c. ... study entomology in the library on Wednesdays I did.

This points to the following structure:



Now, if c-command is the correct relation for Principle C, we should expect no interaction between pronouns and R-expressions contained in different adjuncts. Each would be dominated by a PP node that does not dominate the other. However, as shown in the last section, PP nodes do not seem to count for c-command. Ignoring PP nodes, then, we predict that adjuncts on the right will command adjuncts on their left, and not vice versa.

As has been documented at length, this is not correct. Elements to the left consistently command elements to their right:

(23) (Pesetsky 1995, 177, (459))

- a. * Sue spoke to him₁ about Bill₁'s mother.
- b. * Mary danced in it₁ with the owner of the hall₁.
- c. * Mary played quartets with them₁ at [John and Sue]₁'s party.
- d. * I threw the ball to him₁ on Friday during John₁'s speech.

And elements on the right do not command elements to their left:

- (24)
- a. Sue spoke to Bill₁'s mother about him₁.
 - b. Mary danced in the mayor₁'s ball room with him₁.

(25) (Hestvik 1991, 464, (15e–f))

- a. I only think about John₁ near him₁.
- b. I never say nasty things about my friends₁ near them₁.

This particular conflict between constituency tests and command has been extensively discussed in the literature (Pesetsky 1995, Phillips 2003, Lechner 2003, Janke and Neeleman 2009). This literature has *not* taken the obvious step of rejecting c-command; instead, various mechanisms have been proposed to rescue it: dual structures (Pesetsky 1995); temporary constituents that are destroyed due to later processing (Phillips 2003); remnant movement (Lechner 2003); or ambiguous structures (Janke and Neeleman 2009). (Note that Pesetsky 1995 and Phillips 2003 also address the PP problem, above, but Lechner 2003 and Janke and Neeleman 2009 seem to just assume that PP nodes do not count for c-command.) All of these accounts suffer from problems, but there is a more general and fundamental issue: command and constituency are not sensitive to the same nodes!

This problem can be made even sharper, and in a way that reveals the problems for some of these accounts, by combining command and constituency tests like movement in a single sentence, as Pesetsky (1995) tried to do. However, the only example he provided involved *each other* as a possessor:

- (26) John intended to give the books to the children, and [give the books to them₁] he did — on each other₁'s birthdays. (adapted from Pesetsky 1995, 230, (570c))

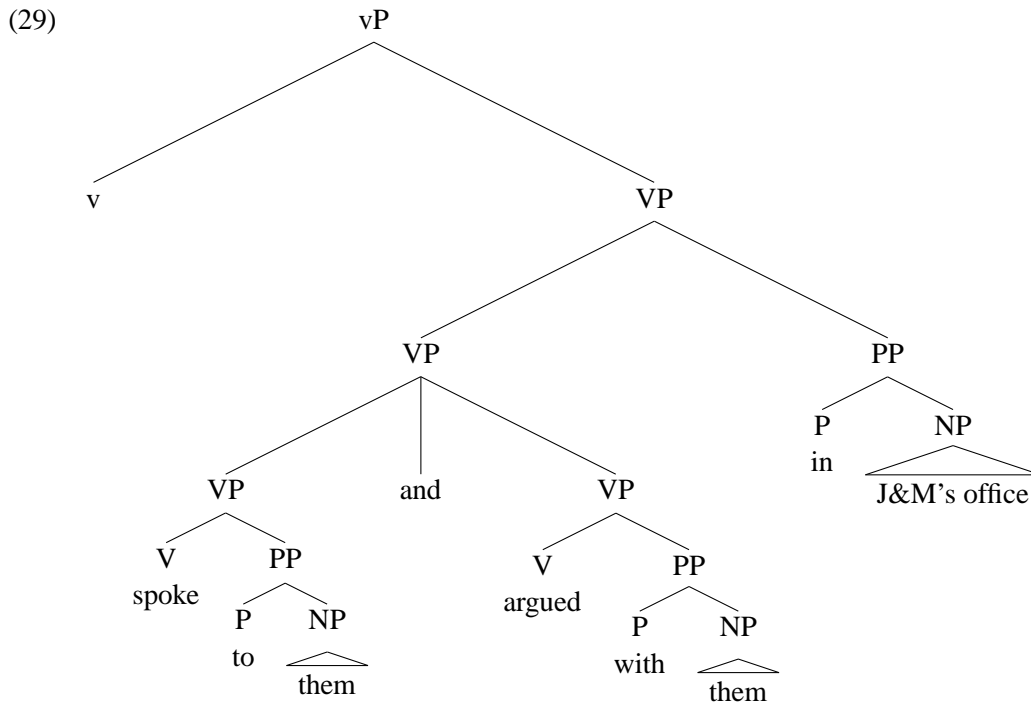
Pollard and Sag (1992) and Janke and Neeleman (2009) show that *each other* as a possessor is actually an exempt anaphor (or a *logophor*, in the terminology of Reinhart and Reuland 1993). It can take a non-local antecedent, for one thing, where *each other* as an argument of a verb or preposition cannot:

- (27) (Janke and Neeleman 2009, 37, (90))
- a. * John and Mary hoped that the psychologist would explain their weaknesses to each other.
 - b. John and Mary hoped that the psychologist would explain each other's weaknesses to them.

Pesetsky's example, then, does not show that binding can hold rightward at the same time as constituency tests point to a leftward-branching structure. However, we can use other tests which make the same point. One such test is coordination, although we have to be careful with it (see below). Consider the following examples:

- (28) a. * I spoke to them₁ about binding and argued with them₁ about gapping in [Joan and Martin]₁'s office.
 b. * The dean chewed them₁ out and cursed at them₁ in [Joan and Martin]₁'s office.

In these two examples, part of a VP including the verb is coordinated, while a PP on the right is interpreted as modifying both of the conjuncts. This points to the following structure:



Since the rightmost PP modifies both conjuncts, it must be outside the conjunction—this is one of the tests that point to a leftward-branching VP. At the same time, however, the pronouns inside the conjoined VPs

may not be coreferential with an R-expression in the final PP.⁶

Janke and Neeleman (2009) suggested that VPs are structurally ambiguous, with PPs either adjoining low on the right, or high on the right. If they are stranded by constituency tests like movement, they must be high; if binding goes rightward, they must be low. The above examples show that this is incorrect: binding goes rightward at the same time that constituency tests reveal a leftward-branching structure.

Pesetsky (1995) thought that command phenomena and constituency tests pointed in conflicting directions, and we therefore face a “phrase structure paradox.” In a precede-and-command theory where only phasal nodes matter, however, there is no paradox at all. The data are entirely consistent. In (29), there is no phasal node that dominates either occurrence of *them* but does not dominate *Joan and Martin*, so the former phase-commands the latter. They also precede it, and Principle C rules out coreference.

Moreover, at the same time as coordination shows that an adjunct must be high, we can see that precedence matters, because command does not go backward:

- (30) a. I only think about John₁ or wonder about his₁ foibles near him₁.
b. I never say bad things about Jane₁ or curse about Bill₁ near them₁.

Again, this is contrary to the expectations of c-command: constituency tests put a constituent high on the right, and command should go backward, tracking constituency and ignoring precedence. The actual facts are the complete opposite.

Examples like these, and numerous others that are well-known from the literature, show that the sensitivity of command to hierarchy is very coarse. Only certain nodes matter. Within a phase, only precedence matters, and hierarchy is irrelevant. Hypersensitivity to structure, as in c-command, makes exactly the wrong predictions.

In summary, all constituency tests point to a leftward-branching VP. At the same time, however, command phenomena go rightward. This strongly supports the phase-command plus precedence theory: within a phase, precedence and not hierarchy matters. It also resolves the phrase structure “paradox”: there is no paradox, and no conflict.

3.3 IP Adjuncts

One of Reinhart’s (1976, 1983) arguments against precede-and-command involved adjuncts that are adjoined high, to IP in current terms. Earlier versions of precede-and-command only took the clausal node (S or \bar{S}) to be relevant to command (Langacker 1969, Jackendoff 1972), or added NP nodes (Lasnik 1976). Reinhart pointed out that this predicts no subject-object asymmetry for high adjuncts. This is incorrect: such adjuncts are outside the command domain of the object, but within the command domain of the subject:

- (31) a. Rosa is kissing him₁ passionately in Ben₁’s high school picture. (Reinhart 1976, 79, (27a))
b. People worship him₁ in Kissinger₁’s native country. (Reinhart 1976, 79, (28a))
c. So many people wrote to him₁ that Brando₁ couldn’t answer them all. (Reinhart 1976, 47, (63))
d. Rosa won’t like him₁ anymore, with Ben₁’s mother hanging around all the time. (Reinhart 1976, 23, (19c))
- (32) a. *She₁ is riding a horse in Rosa₁’s high school picture. (Reinhart 1976, 68, (25a))
b. *He₁ was killed in Hoffa₁’s home town. (Reinhart 1976, 68, (26b))

⁶One could claim that these examples involve right node raising, and so do involve a representation where the PP is in both conjuncts at some level of representation. I assume that this is not correct, because the examples do not have the characteristic intonation of right node raising.

- c. * She₁ was approached by so many people in Rome that Rosa₁ couldn't do any work. (Reinhart 1976, 47, (65))
- d. * He₁ can't go out with Rosa anymore, with Ben₁'s mother hanging around all the time. (not in Reinhart)

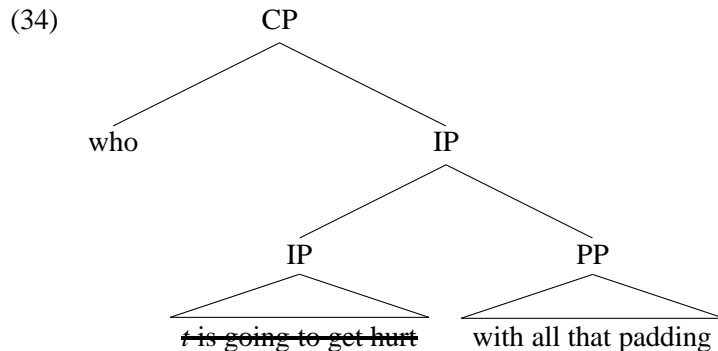
This is not a problem for phase-command, however, since literature subsequent to Reinhart, beginning with Chomsky (1986), has concluded that the maximal VP is also a node of particular importance (a cyclic node, in earlier terminology). In the phase theory, this is captured by having vP be a phasal node as well as CP. If vP is a phasal node, then objects inside vP do not phase-command adjuncts outside of vP, even if they do precede them.

The question now is, Where are these high adjuncts? They must be outside of vP, but in the c-command theory, they must be lower than the mother of the subject, or IP, in order to capture the Principle C effect in (32). However, there is abundant evidence to suggest that they are actually higher, where they must c-command the subject and not vice versa.

Consider the following examples, which show that sluicing can strand certain adjuncts:

- (33) a. A: Someone is going to get hurt. B: Who, with all that padding?
- b. A: We should be able to sneak *someone* into CIA headquarters. B: Who, without them catching him?

The standard assumption is that sluicing involves ellipsis of IP/TP (see Merchant 2001 and much other work on sluicing). Since the adjunct can be stranded, it must be at least as high as IP, let us say adjoined to IP on the right:



The actual position of the adjunct is not so important; what is important is that deletion shows that there is a constituent that includes the subject and excludes the adjunct (the lower IP node). The c-command theory therefore predicts that the subject will not command the adjunct. This is not true, however; at the same time as we do deletion, a subject pronoun cannot be coreferential with an R-expression inside the adjunct:

- (35) a. A: She₁ should be able to sneak someone into CIA headquarters. B: *Who, without Miranda₁'s old employers noticing?
- b. A: He₁ should be able to date *someone*. B: *Who, with Ben₁'s mother always hanging around?

I assume that in B's answer, there is an unpronounced representation of the missing material, including the pronoun, such that Principle C is violated.

As in VPs, tests for constituency like ellipsis put rightmost adjuncts high, where they are not c-commanded by elements on the left, here the subject. Yet the subject apparently commands the adjunct, even though it does not c-command it. Once again, we have a conflict between constituency and command: ellipsis picks

out a constituent out of which elements should not command, if c-command is the right notion for command. Phase-command gets the facts exactly right: there is no phasal node that dominates the subject that does not also dominate the adjunct.

The same point can be made with coordination:

- (36) a. *They₁ snuck into CIA headquarters and they₁ broke into the Pentagon without [Ethan and Miranda]₁'s old employers catching them.
 b. *He₁ can't date girls and he₁ can't play on the football team with Ben₁'s mother hanging around all the time.
 c. *He₁ is worshipped and he₁ is vilified in Hoffa₁'s hometown.

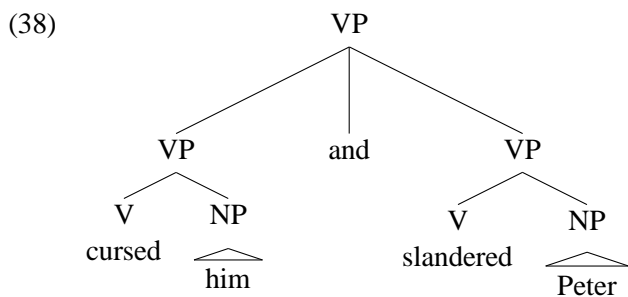
These adjuncts are not actually c-commanded by the subject. The obligatory disjoint reference is not best explained by c-command; rather, the best explanation is a version of precede-and-command with phase-command, with only coarse sensitivity to hierarchical structure.

3.4 Coordination

Langacker (1969) provides some examples involving coordination that also point to a fundamental problem with c-command. Consider the following examples of VP coordination:

- (37) (Langacker 1969, 162, (1–2))
 a. Penelope cursed Peter₁ and slandered him₁.
 b. *Penelope cursed him₁ and slandered Peter₁.

Since VP is coordinated, there must be a VP node that dominates the pronoun but does not dominate the R-expression in the ungrammatical example:



If c-command is the right relation, there should again be no Principle C effect, because the VP constituent node dominating *him* does not dominate *Peter*. If we can somehow ignore this node (see below), then *both* examples should be ungrammatical, because both NPs should command each other.⁷

Precede-and-command, where command is phase-command, correctly predicts this contrast, if what is coordinated is VP, below vP, as shown. There is no phasal node that dominates *him* that does not also dominate *Peter*.

IP coordination makes the same point:

- (39) (Langacker 1969, 162, (5–6))
 a. Peter₁ has a lot of talent and he₁ should go far.

⁷This assumes that coordination is symmetrical, as shown, and is not asymmetrical, as in the ConjP or &P proposal (e.g., Munn 1993). Note that using precede-and-command rather than c-command largely removes the motivation for this asymmetrical approach to coordination. Coordinations are asymmetrical because of precedence.

- b. * He₁ has a lot of talent and Peter₁ should go far.

Again, there is a node, IP, in the ungrammatical example that dominates *he* but does not dominate *Peter*, and coreference should be fine. If we can ignore this node for c-command, then both examples should be ungrammatical again.

In the phase-command theory, IP is not a phasal node, and precedence accounts for the contrast. Note that this theory predicts that if what is coordinated *is* a phasal node, then there should be no Principle C effect. This is correct:

- (40) a. Mary said [_{CP} that Peter₁ has a lot of talent] and [_{CP} that he₁ should go far].
 b. Mary said [_{CP} that he₁ has a lot of talent] and [_{CP} that Peter₁ should go far].

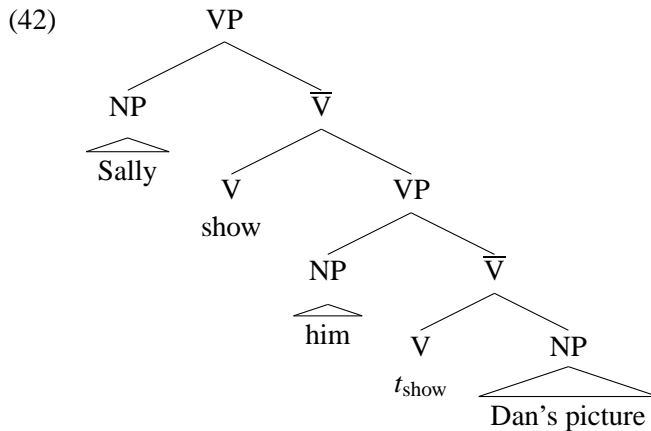
Coordination, like PPs and adjunction, reveals that c-command is fundamentally flawed.⁸

3.5 Ditransitives

Double object constructions present further difficulties for c-command. As was shown by Barss and Lasnik (1986), the first object seems to asymmetrically command the second:

- (41) a. * Sally showed him₁ Dan₁'s picture.
 b. That mistake cost Sally₁'s husband her₁. (stress on *her*)

In a c-command theory without precedence, this means that there must be some constituent node that dominates the second object and excludes the first object, while that constituent must form a constituent with the first object. One structure that captures this is the type of VP shell proposed by Larson (1988):



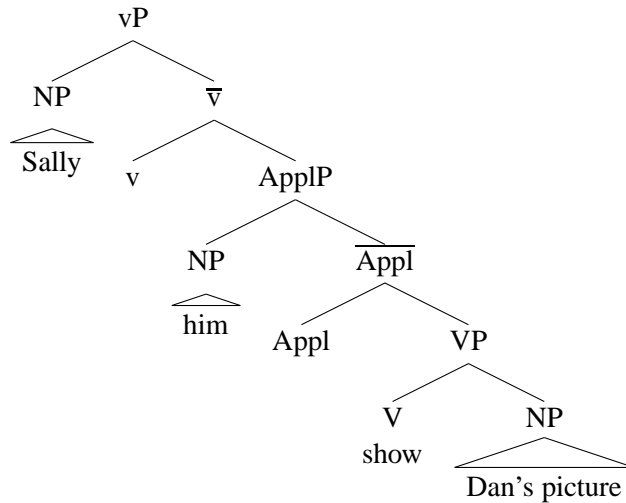
There could also be an Applicative Phrase above the VP, as in Marantz (1993), or the second object could be the complement of an abstract HAVE predicate, which is itself the complement of a CAUSE predicate, as in Harley (1997):

⁸Langacker (1969) also includes the following examples, which he judges to be ungrammatical with coreference, contrary to the predictions of both c-command and phase-command:

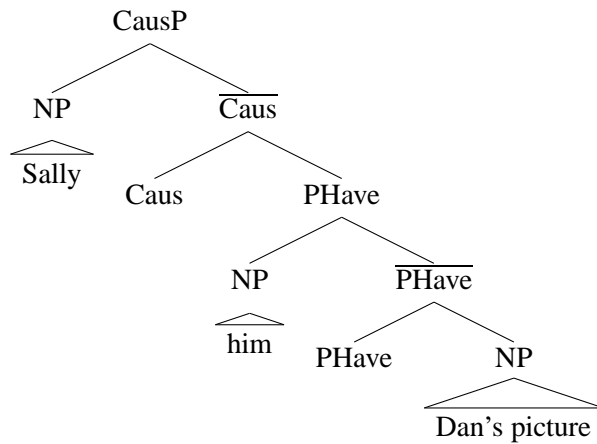
- (i) (Langacker 1969, 162, (12), (14))
 a. His₁ wife and the woman Peter₁ is living with just met.
 b. I met a woman who was dying to find out more about him₁ and another who had just been wronged by that man₁.

I disagree with this judgment, and find the indicated coreference acceptable (adding *both* in (ia) helps).

(43) a.



b.



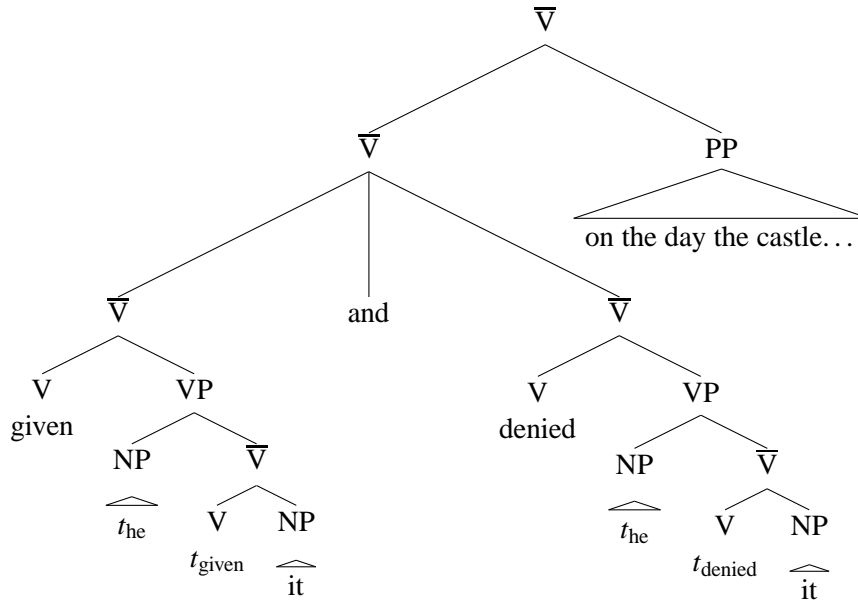
Regardless, the second object is embedded even lower than the single object of a transitive verb. Yet it still seems to command adjuncts that must be high and on the right (the passive makes a pronoun as second object more natural, but should not affect its position):

- (44) a. He was given the sword₁ on the day it₁ was made.
 b. * He was given it₁ on the day the sword₁ was made.

Again, this holds even when the adjunct is excluded from a constituent that includes the verb and both objects (or the second object and the trace of the first):

- (45) a. He was first given the castle₁ and then denied it₁ on the day it₁ was erected.
 b. * He was first given it₁ and then denied it₁ on the day the castle₁ was erected.

c.



I use the VP shell theory simply for the sake of exposition; the same constituency is posited by all theories.

On almost all theories of ditransitives (other than a ternary branching structure⁹), then, there are at least two levels of embedding between the second object in such examples and the mother of the adjunct. As we will see below, this will continue to create problems for c-command, even if c-command is modified to accommodate adjunction and coordination.

4 Modifying C-Command

Reinhart (1976) already suggested a modification of c-command to deal with issues created by adjuncts. However, as we will see, this modification still needs to be supplemented with two additions: the stipulation that PP nodes do not count for c-command, and precedence. This makes formulating c-command cumbersome and awkward, whereas precede-and-command elegantly captures the facts.

4.1 Reinhart's Reformulation

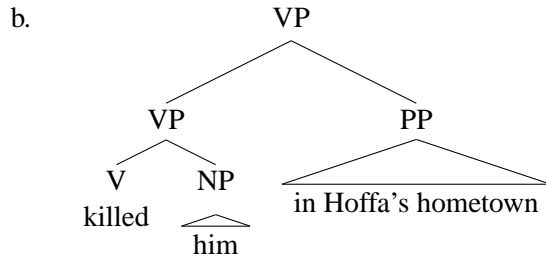
The following is Reinhart's reformulation of the definition of c-command:

- (46) Node A c(onstituent)-commands node B iff the first branching node α_1 dominating A either dominates B or is immediately dominated by a node α_2 which dominates B, and α_2 is of the same category type as α_1 . (Reinhart 1976, 148, (4))

The basic idea is that, when the first branching node is itself dominated by a node that is identical to it (created by adjunction), the higher node is what counts for command. So, in a VP adjunct case, the object would c-command into the adjunct:

- (47) a. * The gangsters killed him₁ in Hoffa₁'s hometown. (Reinhart 1976, 69, (28b))

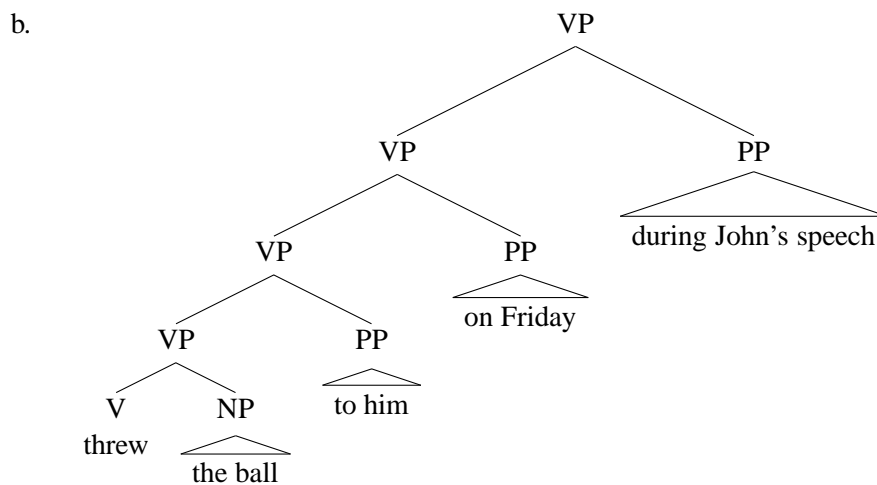
⁹One might think that rejecting c-command in favor of precede-and-command largely removes the motivation for rejecting a ternary branching analysis of ditransitives. However, there are still other facts besides binding that point to a more complicated structure, for instance the idiom data discussed in Bruening (2010).



The first branching node dominating *him* is dominated by a node of the same category that dominates the adjunct.

Note that Reinhart's reformulation limits the number of adjoined nodes to one, which would be problematic for VP adjunct cases like the following (based on Pesetsky 1995):

- (48) a. * I threw the ball to him₁ on Friday during John₁'s speech.



Here, we have to go up two VP nodes. We should therefore reformulate c-command to something like the following, using the notion of *exclusion* from Chomsky (1986, 9):

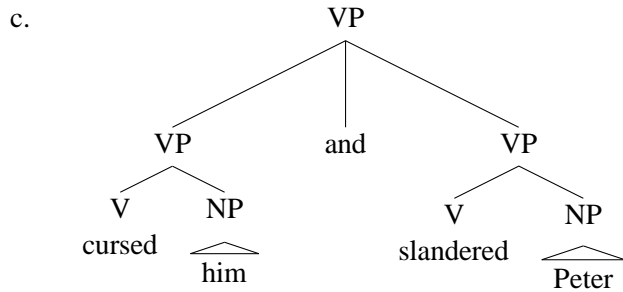
- (49) C-command:
Node A c-commands node B iff the first branching node dominating A does not exclude B.

- (50) Exclusion:
A excludes B iff no segment of A dominates B.

In (47b), the first branching node dominating *him* is VP. VP does not exclude the R-expression *Hoffa*, because there is a segment of VP, namely the higher one, that dominates *Hoffa*. As for (48b), so long as the PP node dominating *him* does not count, *him* will also c-command *John*, because *John* is dominated by a segment of VP, the same node that dominates *to him*. Note that this reformulation will only help if PP nodes are ignored.

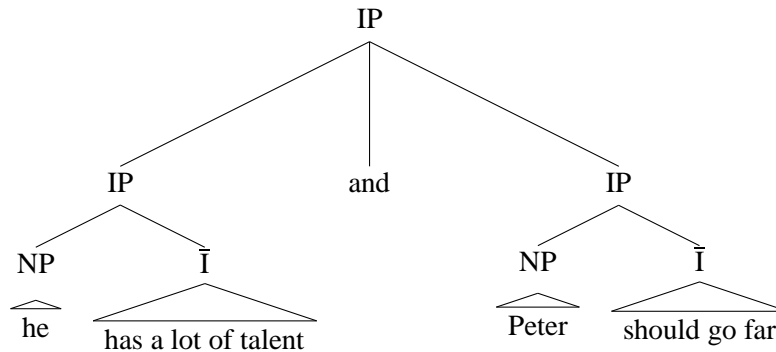
This reformulation will also help us with coordination, if coordination is as represented below (and does not involve a ConjP/&P):

- (51) (Langacker 1969, 162, (1–2))
a. Penelope cursed Peter₁ and slandered him₁.
b. * Penelope cursed him₁ and slandered Peter₁.



(52) (Langacker 1969, 162, (5–6))

- a. Peter₁ has a lot of talent and he₁ should go far.
- b. *He₁ has a lot of talent and Peter₁ should go far.
- c.



In both of these cases, the pronoun will c-command the R-expression, because the first branching node dominating it (VP or IP) does not exclude the R-expression, since there is a segment, the higher VP or IP dominating both conjuncts, that dominates the R-expression.

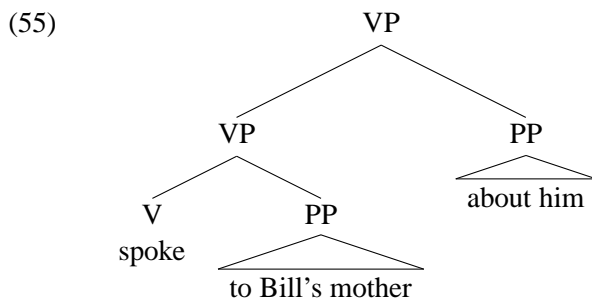
4.2 A Precedence Problem

So, this reformulation helps to account for adjunction and coordination structures, but it still suffers from the PP problem: PP nodes must not count. It also suffers from a precedence issue: In all of the cases above, c-command should be symmetric. We therefore predict backward Principle C effects in addition to forward ones, and (51a) and (52a) should both be ungrammatical, as well. So should the examples in (24–25), repeated below:

- (53) a. Sue spoke to Bill₁'s mother about him₁.
- b. Mary danced in the mayor₁'s ball room with him₁.

(54) (Hestvik 1991, 464, (15e–f))

- a. I only think about John₁ near him₁.
- b. I never say nasty things about my friends₁ near them₁.



We already had to say that PP nodes do not count; but then *him* in the above structure c-commands *Bill*, because the first branching node (not counting PP) that dominates it does not exclude *Bill*.

Similarly, we saw above that IP adjuncts are outside of the command domain of the object:

- (56) a. Rosa is kissing him₁ passionately in Ben₁'s high school picture. (Reinhart 1976, 79, (27a))
 b. People worship him₁ in Kissinger₁'s native country. (Reinhart 1976, 79, (28a))
 c. So many people wrote to him₁ that Brando₁ couldn't answer them all. (Reinhart 1976, 47, (63))
 d. Rosa won't like him₁ anymore, with Ben₁'s mother hanging around all the time. (Reinhart 1976, 23, (19c))

If PP nodes do not count, then in this case we should predict asymmetric leftward command: the object of the preposition in the IP adjunct should c-command the object of the verb, but not vice versa. This is incorrect, however. The following examples are somewhat awkward because of the lightness of the pronoun, but they do show a distinct lack of Principle C going backward:

- (57) a. People worship the temple₁'s founder in it₁.
 b. Rosa can't belittle Ben₁'s jokes anymore without him₁.

Once again, precedence plays a role, contrary to the expectations of the c-command theory.¹⁰

Additionally, double object constructions continue to pose problems for the revised version of c-command (see section 3.5). In many analyses of double object constructions, the second object is buried in a lower phrase that is not part of the phrase that hosts either the verb or the second object. In some accounts this is a HAVE projection, while the verb is higher, in a CAUSE projection (Harley 1997); in others the second object is in VP, while the verb has moved to (or through) an Appl(licative) Phrase (Marantz 1993, Bruening 2010). In still other accounts, there are two VP shells (Larson 1988). In the first two types of theories, it is clear that the second object should not c-command out of the lowest projection and into adjuncts, even with the revised definition of c-command. In a VP-shell theory, it might be possible to maintain that the higher VP shell is not distinct from the lower one, but this would incorrectly predict symmetric c-command between the two objects. Again, modifying the definition of c-command simply does not work. Precedence is still necessary, and PP nodes have to not count for c-command.

In all of these cases, precede-and-command, where phase-command is the formulation of command, makes exactly the right predictions. Reformulating c-command still requires precedence in addition, and it

¹⁰A reviewer suggests that there might be a backwards Principle C effect in an example like the following:

- (i) (*) Sue wrote near Bill₁ to him₁.

I do not agree with this judgment; the sentence is semantically odd (change it to *Sue screamed near Bill right at him*), but coreference seems acceptable. See also the examples cited above from Hestvik (1991). The reviewer's example probably involves rightward movement of the *to* PP. Rightward movement in general seems to feed Condition C:

- (ii) a. We gave [John₁'s brand new toy] to him₁ on Friday.
 b. * We gave — to him₁ on Friday [John₁'s brand new toy]. (Pesetsky 1995, 266, (643a))
 (iii) (Huang 1982, 579, (126–127))
 a. A book that John₁ ordered pleased him₁.
 b. * A book pleased him₁ that John₁ ordered.

However, as movement, we might expect rightward movement to be able to bleed Condition C in some other circumstances, the way leftward movement seems to be able to in some cases. I will leave a full exploration of rightward movement to future research (see Pesetsky 1995 and Takano 2003 for a beginning), but conclude here that, in general, precedence is what matters to command phenomena; phase-command alone is insufficient, as is c-command.

also has problems with PP nodes and ditransitives. There is absolutely nothing to be gained by reformulating c-command in such an awkward way: we would need (49), *plus* the statement that PP nodes do not count, *plus* precedence.¹¹ Precedence plus phase-command is a much simpler way of capturing the facts, and relates binding to phase theory, the theory that certain nodes are of particular importance to numerous phenomena. The claim is that it is these same nodes that are relevant to command. This unifies command with all of the other phenomena that require phases, a conceptual advantage.

5 The Argument Against Precedence

So, why did Reinhart (1976, 1983) abandon precedence in the first place? Most of the literature attributes to her a knock-down argument *against* any role for precedence. I present this argument here, and show that it actually does not go through.

5.1 Reinhart's Argument: Fronted PPs

The argument involves fronted phrases like the following:

- (58) (Reinhart 1976, 23, exx.18, 20)
- a. Near him₁, Dan₁ saw a snake. (18a)
 - b. * Near Dan₁, he₁ saw a snake. (20a)
- (59) a. In her₁ bed, Zelda₁ spent her sweetest hours. (18b)
- b. * In Zelda₁'s bed, she₁ spent her sweetest hours. (20b)
- (60) a. How obnoxious to his₁ friends Ben₁ is. (18d)
- b. * How obnoxious to Ben₁'s friends he₁ is. (20d)
- (61) a. (I predicted that Rosa would quit her job and) quit her₁ job Rosa₁ finally did. (18f)
- b. * (I predicted that Rosa would quit her job and) quit Rosa₁'s job she₁ finally did. (20f)

In these examples, a pronoun in the fronted phrase can be coreferential with a subject R-expression, but a pronominal subject cannot be coreferential with an R-expression in the fronted phrase. The latter fact is a Principle C violation going leftwards, according to Reinhart, showing that precedence is irrelevant: Principle C operates in both directions.

Reinhart argues that reconstruction (in her terms, ordering the binding principles before movement) cannot explain the bad examples, because of the following subject-nonsubject asymmetry:

- (62) (Reinhart 1976, 23–25, exx.20, 24)
- a. * How obnoxious to Ben₁'s friends he₁ is. (20d)
 - b. How obnoxious to Ben₁'s friends I found him₁ to be. (24c)
- (63) a. * Near Dan₁, he₁ saw a snake. (20a)
- b. Near Dan₁, I saw his₁ snake. (24a).
- (64) a. * In Dan₁'s apartment, he₁ practiced some new tricks. (not in Reinhart)
- b. In Dan₁'s apartment, Rosa showed him₁ her new tricks. (24b)

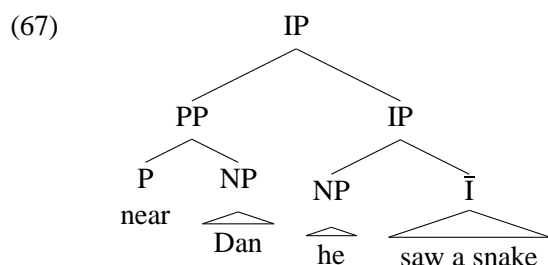
In the putative base position, there is no such subject-nonsubject asymmetry, meaning that reconstruction is not a viable account:

¹¹Exactly the same holds of m-command plus precedence, as in Ernst (1994).

- (65) a. * He₁ is obnoxious to Ben₁'s friends.
 b. * I found him₁ to be obnoxious to Ben₁'s friends. (Reinhart 1976, 26, (27a))
- (66) a. * He₁ practiced some new tricks in Dan₁'s apartment.
 b. * Rosa showed him₁ her new tricks in Dan₁'s apartment.

That is, if the fronted phrase were required to reconstruct to its base position for binding, there should be no subject-object asymmetry, because there is none in the base position.

Reinhart's account is to say that the subject c-commands a preposed phrase, using her modified version of c-command to account for adjunction. Translating her structures into modern terms, the preposed PP would be adjoined to IP (based on Reinhart 1976, 147, (2)):



In this structure, *he* c-commands *Dan*, because the first branching node dominating *he* (IP) does not exclude *Dan* (there is a segment of this IP that dominates *Dan*). The complement of the preposition, according to Reinhart, does not c-command the subject, because of the presence of the PP node. Note the contradiction: PP nodes have to count for these cases, but must not count when they are within VP (see more on this in section 6).

5.2 Two Problems

Besides the issue of PP nodes, there are two problems with Reinhart's account of these fronted PPs, and hence her argument against precedence. Both point in the direction of a reconstruction account, where precedence is involved.

The first problem is that the coreference pattern still holds even when the fronted phrase has fronted into a higher clause:¹²

- (68) a. * Near Dan₁, I heard that he₁ saw a snake.
 b. Near Dan₁, I heard that some girl saw his₁ snake.
- (69) a. * In Dan₁'s apartment, I think he₁'s going to practice some new tricks.
 b. In Dan₁'s apartment, I heard that Rosa showed him₁ her new tricks. (24)

In none of these long-distance cases would the lower subject c-command the fronted phrase. The fronted phrase is not dominated by a segment of the IP that is the first branching node dominating the embedded subject.

The second problem involves data pointed out by Lakoff (1968). When the R-expression in the fronted PP is contained within an adjunct rather than serving as (part of) the object of the preposition, there is no Principle C effect:

- (70) a. * Near Dan₁, he₁ saw a snake.

¹²An anonymous reviewer believes that this problem has been pointed out in the literature before, but I have been unable to locate a reference for it.

- b. Near the man that Dan₁ was approaching, he₁ saw a snake.
- (71) a. * In Ben's picture of Rosa₁, she₁ found a scratch. (Reinhart 1976, 147, (2))
- b. In Ben's picture, which Rosa₁ loves, she₁ found a scratch.
(based on Lakoff 1968)

In the modified c-command theory, this should make no difference: the subject c-commands everything contained within the fronted PP.

This lack of a Principle C effect when the R-expression is contained within an adjunct within a fronted phrase has been noticed before, with fronted wh-phrases, and has been given a reconstruction account (Lebeaux 1988, Chomsky 1993, Fox 1999):

- (72) a. * He₁ actually believes only the second argument that John₁ made.
- b. [Which argument that John₁ made] does he₁ actually believe *t*?

The reconstruction account is that adjuncts do not need to reconstruct along with the rest of the fronted phrase, and so give rise to no Principle C effect at LF. At LF, the adjunct remains in the fronted position, outside of the command domain of the pronoun.

These two issues—the fact that Principle C effects still hold with long-distance fronting, and the mitigating effect of adjuncts—both point to a reconstruction account. I construct such an account in the next subsection. Importantly, these two problems show that Reinhart's account of fronted PPs does not work, and hence her argument against precedence and for c-command does not go through. As the next subsection shows, Principle C effects with fronted phrases are entirely consistent with a precede-and-command account.

5.3 A Reconstruction Account

Before beginning to construct an account, we need to get the full picture regarding fronted phrases. Reinhart discusses a second type of fronted phrase which does permit coreference between a subject pronoun and an R-expression inside the fronted phrase:

- (73) a. In Ford₁'s home town, he₁ is considered a genius. (Reinhart 1976, 70, (31a))
- b. In Ben₁'s family, he₁ is the genius. (Reinhart 1976, 70, (32a))
- c. With Rosa₁'s new job, she₁'ll end up in the hospital. (Reinhart 1976, 70, (33a))

Reinhart argues that these phrases originate adjoined to S (or IP), and move to a much higher position ($\overline{\text{S}}$, for her, see Reinhart 1976, 149, (5)). In the higher position, the subject does not c-command them, even with the revised definition of c-command. The type that does give rise to a Principle C effect originates adjoined to VP, and moves to Comp (adjoined to IP, here), where the subject does c-command them as described above.

Note that the division here corresponds to one we saw before: some adjuncts are adjoined to VP, and are within the command domain of the object. These are the ones which, when fronted, cannot be coreferential with a subject pronoun. Because their starting position is within the command domain of the object, Reinhart concluded that evaluating binding in the base position would not work. The second type is outside the command domain of the object, adjoined to IP (see above). When fronted, these permit coreference with a subject pronoun, although they do not in their starting position. These facts are recapitulated below:

- (74) VP Adjuncts
 - a. * He₁ practiced some new tricks in Dan₁'s apartment.
(in command domain of subject)

- b. * Rosa showed him₁ her new tricks in Dan₁'s apartment.
(in command domain of object)
- c. * In Dan₁'s apartment, he₁ practiced some new tricks.
(in command domain of subject)
- d. In Dan₁'s apartment, Rosa showed him₁ her new tricks.
(outside command domain of object)

(75) IP Adjuncts

- a. People worship him₁ in Kissinger₁'s native country.
(outside command domain of object)
- b. * He₁ is worshipped as a hero in Kissinger₁'s native country.
(in command domain of subject)
- c. In Kissinger₁'s native country, he₁ is worshipped as a hero.
(outside command domain of subject)
- d. In Kissinger₁'s native country, people worship him₁.
(outside command domain of object)

Note that at the time Reinhart wrote, the only two places a fronted phrase could possibly be evaluated for binding were its surface position, and its base position. However, modern phase theory gives us an additional position, namely, the vP phase edge. In phase theory, elements within vP must first move to Spec-vP if they are to move further. As shown by Fox (1999) and Legate (2003), this position is a position that moved elements can reconstruct to; they do not necessarily have to reconstruct all the way to their base position. This gives us a position between the subject and the object that the fronted phrase can reconstruct to, where it will be commanded by the subject but not by the object.

In section 7, I will show that we can derive precede-and-command from a grammar that builds sentences left-to-right. I will therefore couch the reconstruction account here in such terms, as well. So, the grammar builds sentences from left-to-right, as in Phillips (1996, 2003), Richards (1999), and in the spirit of Shan and Barker (2006). This means that when a fronted phrase is encountered in an A-bar position, it must be copied into a position where it can be interpreted (in terms of the literature on processing, a processed *filler* has to be associated with a *gap* later in the sentence, where it will be interpreted thematically). If the fronted phrase is an argument, it (or at least part of it) must be copied into the A-position where it gets its thematic role. If it is an adjunct, however, there is no such requirement. Adjuncts have some freedom of ordering; they just have to occur in a position where they can combine semantically with the phrase they attach to. In phase theory, this might lead us to posit the following:

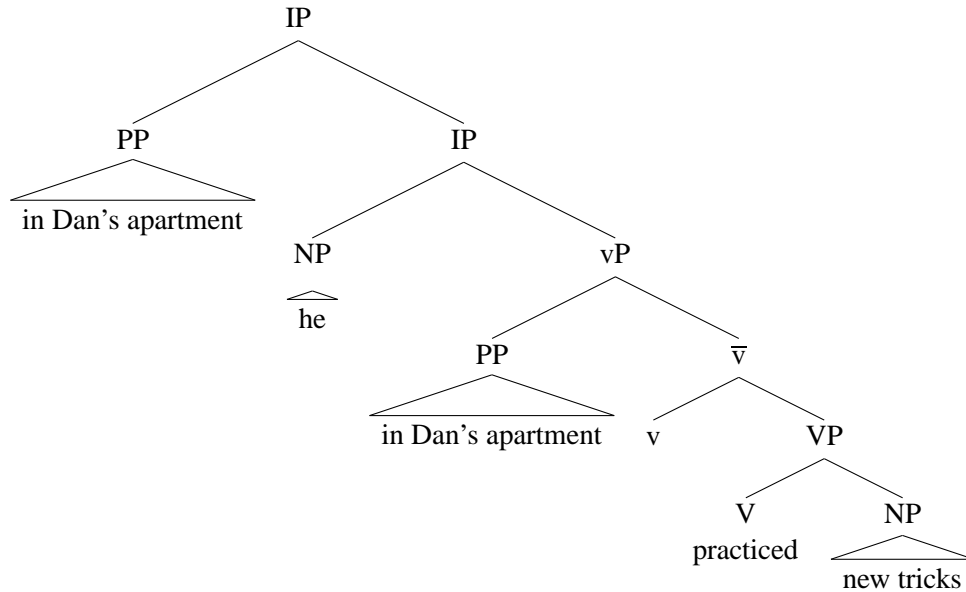
- (76) Adjunct Reconstruction Principle:
An adjunct must reconstruct to the edge of the phase where it is semantically interpreted.

Take the following VP-adjunct as an example:

- (77) * In Dan₁'s apartment, he₁ practiced some new tricks.

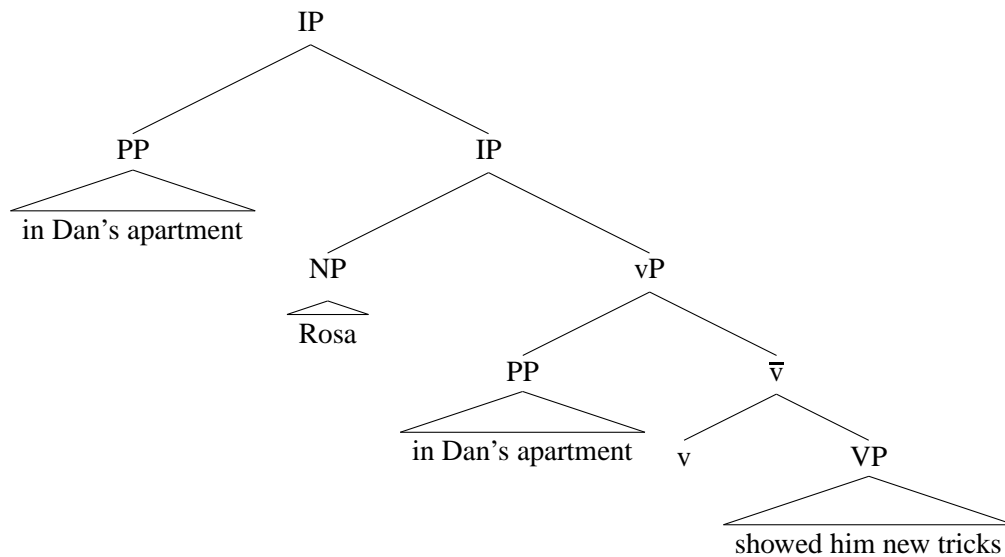
Here, the fronted PP has to be interpreted with the VP, or vP (see Reinhart 1976 on semantic differences between VP and IP adjuncts). Therefore, it must be copied into a position in the vP phase. But this is *all* that has to be done; the grammar just needs to create a copy in the phase edge, Spec-vP. It does not need to create a copy adjoined to VP:

(78)



The subject *he* precedes-and-commands the PP in Spec-vP here; hence there is a Principle C effect, and *he* cannot be coreferential with an R-expression in the PP. In contrast, an object does not precede-and-command Spec-vP:

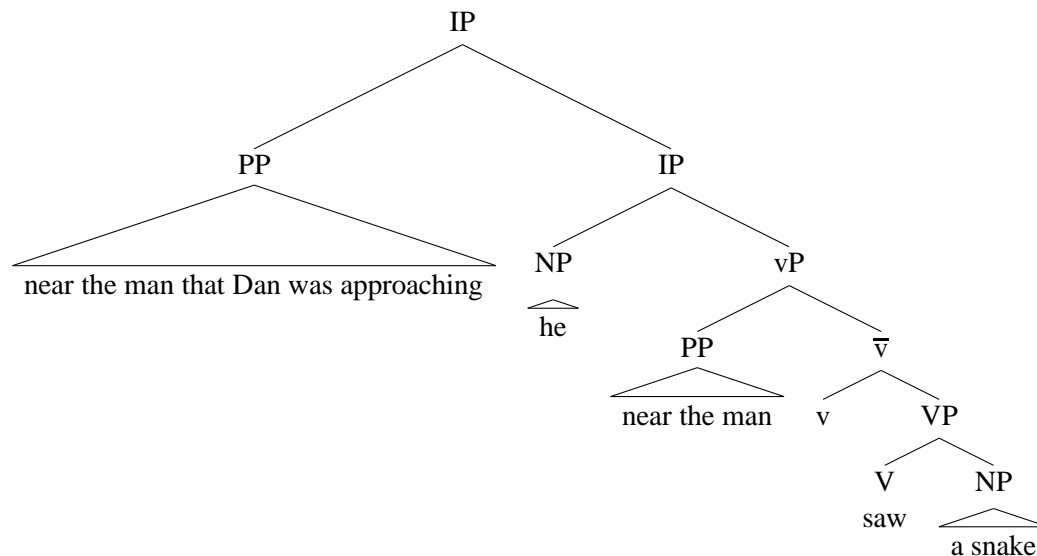
(79)



This accounts for the subject-object asymmetry when the PP is fronted, but the lack of an asymmetry when the PP is adjoined on the right, to VP. On the right, both the subject and the object precede-and-command the adjunct. The long-distance cases also fall into place: the Adjunct Reconstruction Principle requires copying a fronted adjunct back into the phase it is interpreted with, regardless of how many clauses intervene.

We can also now account for the lack of a Principle C effect with adjuncts inside the fronted phrase, if we adopt the by-now standard account that not all material needs to be copied. In particular, adjuncts do not need to be included in lower copies. In standard bottom-up approaches, this works by only adjoining the adjunct to the higher copy of a moved element; see Lebeaux (1988), Chomsky (1993), Fox (1999), among others. In the left-to-right system adopted here, the adjunct is simply left out of lower copies:

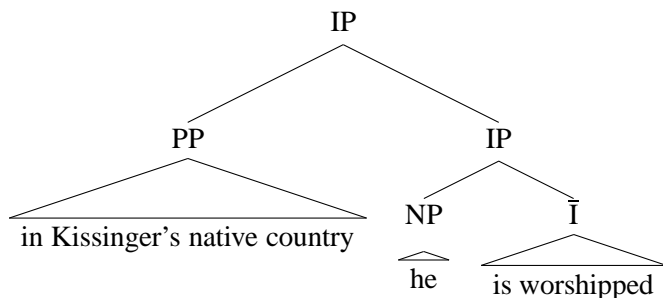
(80)



Here, *he* does *not* precede-and-command *Dan*, and there is no Principle C effect.

As for IP adjuncts (see 75), they do not need to reconstruct at all. They are already in the phase they are interpreted with in their fronted position, and no copy needs to be made anywhere:

(81)



The subject does not precede the R-expression here, and so no Principle C violation occurs if they are coreferential. If an IP adjunct moves long-distance, it will reconstruct only to the edge of the phase it is associated with, namely, to Spec-CP, which also is not preceded by the subject in Spec-IP.

This account therefore explains the subject-object asymmetry that holds under fronting, but not in the absence of fronting. A precede-and-command theory *is* able to explain the data discussed by Reinhart, and therefore those data do not constitute an argument against such a theory. Moreover, as I showed, Reinhart's own c-command account suffers from flaws. The data necessitate a reconstruction account, and do not show that command can go backwards. In fact, we only ever see forwards command, strongly indicating that syntax makes reference to precedence.

To sum up this section, then, Reinhart's argument against precedence actually does not go through. There is no argument against precedence, and, as we have seen, it is actually *necessary* to invoke precedence, for otherwise, we predict leftward command with VP adjuncts and IP adjuncts and in coordinated structures, contrary to fact. Not only is there no argument against precedence, precedence is *necessary*.

5.4 VOS Languages

Reinhart (1976, 41) also gave an argument against precedence from VOS languages like Malagasy. Malagasy is a VOS language in which the subject follows the object; nevertheless, just as in SVO languages like English, the subject seems to command the object, and not the other way around. However, such languages are not the problem for precedence that Reinhart and others have supposed. Most recent investigations of

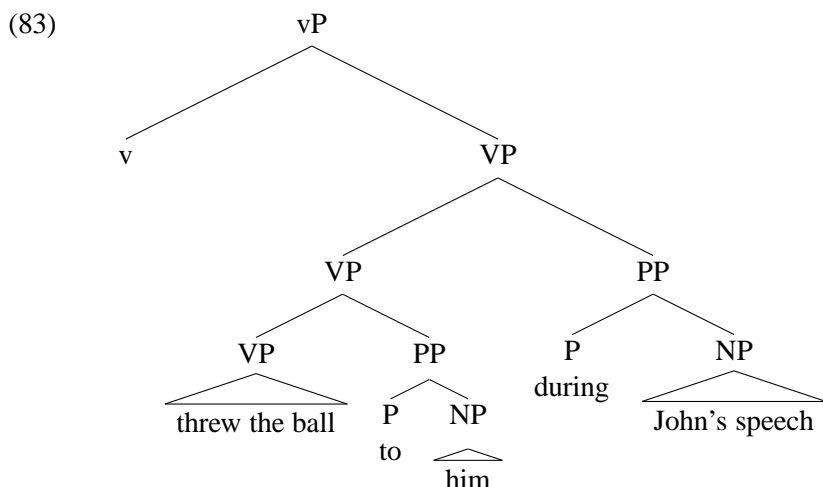
(at least some) Austronesian VOS languages have concluded that they are derived by (remnant) VP fronting from an underlying SVO structure (e.g., Rackowski and Travis 2000, Chung 2006, Cole and Hermon 2008). In these theories, relations that depend on some notion of command are computed at the underlying level, and not at the surface level. At the underlying level, the subject does precede the object. Hence, VOS languages (of this type, at least) also do not decide between c-command and precede-and-command.

Moreover, in at least one other Austronesian VOS language, Palauan, precedence has been argued to play a crucial role in variable binding by Georgopoulos (1991b, 1991a). If Georgopoulos is correct, then Austronesian VOS languages are not only not problematic for precedence, they actually point to a crucial role *for* precedence in the grammars of individual languages (see also Bresnan 1998).¹³

5.5 Coordination

In addition to Reinhart’s arguments, Larson (1988) and Pesetsky (1995) cite coordination as an argument for c-command. Recall that we see Principle C effects in cases like the following, while constituency tests point to a left-branching structure:

(82) * I threw the ball to him₁ on Friday during John₁’s speech. (based on Pesetsky 1995, 177, (459))

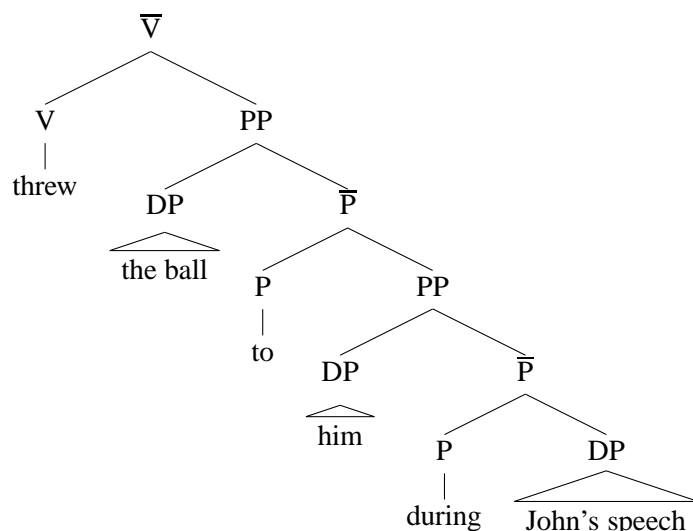


As argued extensively above, this discrepancy indicates that c-command is incorrect, and precede-and-command is the right relation for the Binding Principles.

However, that is not what Larson (1988) and Pesetsky (1995) concluded. Rather, they both argued that c-command, without precedence, was the relevant principle, and these data necessitate a departure from the traditional leftward branching structure that seems to be indicated by constituency tests like movement. The following is the structure advocated by Pesetsky (his “cascade” structures, which, for him, coexist with “layered,” or leftward-branching structures):

(84) (based on Pesetsky 1995, 174, (456))

¹³Another issue is postverbal subjects of the Romance variety. It appears that Romance languages differ in how binding works in these constructions; see Gallego 2013 and the references there. I leave full investigation of such languages to future work.



In this structure, the object of one head occupies the specifier of the next head down, a position from which it c-commands subsequent material.

Both Larson (1988) and Pesetsky (1995) argue that coordination supports their radically right-branching structures that preserve c-command. Note that in Pesetsky's tree in (84), there is a constituent consisting of the words *him during John's speech* (taking the sentence on its grammatical interpretation, where *him* is not *John*). There is no such constituent in the structure in (83). This putative constituent can be coordinated (Hudson 1976, e.g.):

- (85) I threw the ball to [Brandon during John's speech] and [Miranda during the following ovation].

If, as Larson and Pesetsky assume, coordination can only conjoin constituents, then this is an argument for the right-branching structures that c-command without precedence requires.

However, this argument is blunted by the fact that coordination can also conjoin strings that are not predicted to be conjoinable in this theory, if coordination can only target constituents. For instance, in the tree in (84), *to him* is not a constituent. Yet it can be coordinated:

- (86) I threw the ball [to Brandon] and [to Miranda] during John's speech.

Similarly, *the ball to him* is not a constituent in the rightward-branching structure when it is followed by another adjunct as in (84), but it can still be coordinated:

- (87) I threw [the ball to Brandon] and [the racket to Miranda] during John's speech.

In fact, coordination can conjoin strings that *no* theory would treat as a constituent. The following examples come from Sailor and Thoms (2013, (5), (8)):

- (88) a. Mary took pictures of dogs on Thursday and cats on Friday.
 b. I claimed that I was a spy to impress John and an astronaut to impress Bill.

In (88b), in particular, the adjunct clause *to impress Bill* modifies the higher verb, *claim*, but it is coordinated together with an element from the clausal complement of that verb.

This means that coordination is not the argument for rightward-branching structures that Larson and Pesetsky claimed that it was, since such structures do not predict which strings will be able to be coordinated and which will not.

There are several different approaches to so-called non-constituent coordination of this type. The most promising, in my view, is left-edge ellipsis, which, if correct, requires that syntax be sensitive to linear

order. A recent proponent of this approach (which goes back at least to Aristotle) is Hofmeister (2010). Hofmeister (2010) argues that there is a process of ellipsis that operates in coordinate structures from the left edge of conjuncts beyond the first. This process does not target syntactic constituents, but rather a linear string. The way this works in one of Pesetsky's examples is that what is actually coordinated is the VP:

- (89) Sue will [_{VP} speak to Mary about linguistics on Friday] and [_{VP} ~~speak to Mary about~~ philosophy on Thursday]. (based on Pesetsky 1995, 176, (458))

Within the second conjunct, a linear string starting from the left can be elided (indicated with the strikethrough), provided it is identical to a linear string on the left edge of the first conjunct, as it is here. The same thing occurs in example (85) above:

- (90) I [_{VP} threw the ball to Brandon during John's speech] and [_{VP} ~~threw the ball to~~ Miranda during the following ovation].

Hofmeister (2010) argues that this must be what is going on in examples like the following, where the disjunction clearly has the verb *say* in its scope:

- (91) Either Micah said that Will needed a rope or a robe. (Hofmeister 2010, 299, (73b))

This sentence has to be interpreted as saying that Micah said one of two things; it cannot be interpreted as saying that Will needed one of two things. On the ellipsis account, a linear string is elided from the left edge of the second conjunct (it is the location of *either* that forces this level of coordination; see Hofmeister 2010):

- (92) Either [Micah said that Will needed a rope] or [~~Micah said that Will needed~~ a robe].

Without ellipsis, it is unclear how this reading could be derived.

If this approach is the right one,¹⁴ we are going to need a mechanism to encode linear order (precedence) in syntax independently of command phenomena, in order to account for ellipsis in coordination, since this coordinate ellipsis process targets a linear string and not a constituent. Building precedence in at Merge, where Merge creates ordered sets, allows us to do this: a complete ordering can be read off of every tree, and it will be possible to refer to a linear sequence independent of the hierarchical constituency of the tree. See Hofmeister (2010) and the references cited there for an idea of how this will work (though his account is formalized within a very different framework).¹⁵

¹⁴Sailor and Thoms (2013) argue against left-edge ellipsis, and for a movement-plus-ellipsis account. Their arguments against left-edge ellipsis do not go through, though: their examples of ellipsis of non-left-edge material are actually instances of gapping, and the overgeneration problem only shows that there are additional constraints on left-edge ellipsis besides linear order (for instance, determiners cannot be elided without their head nouns; see the discussion in Dowty 1988). There are also problems with the movement account: chunks that cannot undergo movement can be coordinated together with a non-constituent, like final particles in (i); and chunks that can undergo movement cannot be coordinated, like VPs in (ii):

- (i) a. * Off, I turned the lights.
 b. I turned the TV on in the study and the lights off in the hallway.
 (ii) a. ... and dance the mazurka, I can.
 b. * I claimed that I can speak Russian to impress Natasha, and dance the mazurka to impress Boris.

Constraints on movement, then, do not predict what chunks will be able to participate in non-constituent coordination, contra Sailor and Thoms (2013). Movement also does not straightforwardly account for the word order of the pronounced material, whereas left-edge ellipsis does. I conclude that the most promising account is left-edge ellipsis, though the constraints that regulate this process are not yet fully understood.

¹⁵Levine (2011) cites examples like (i) below as problematic for left-edge ellipsis, because the negative quantifier has to take scope over the disjunction:

This same left-edge coordinate ellipsis process can then account for the apparent coordination of non-constituents noted by Larson and Pesetsky (as in examples (89) and (90) above), without the need to posit constituents that no other syntactic process can target. In Larson and Pesetsky's accounts, something has to be said to stop other processes from targeting these constituents. In the precede-and-command theory, there are no such constituents; coordination is special, because it can involve ellipsis of a linear string rather a constituent, resulting in apparent coordination of non-constituents.

Note, though, that coordination still targets constituents; it only gives the appearance of not doing so sometimes by permitting ellipsis. This means that it is still a valid test for constituency, so long as the possibility of left-edge ellipsis is taken into account. This was done in all the cases above where coordination was used to argue for a particular structure, as the reader can verify. Additionally, we rule out ill-formed coordinations where what is coordinated is not a constituent, such as those from Phillips (2003):

- (93) (Phillips 2003, 49, (22a–c))
- a. * The man [who built the rocket has] and [who studied robots designed] a dog.
 - b. * Wallace gave his [dog half a dozen] and [sheep a handful of] crackers for breakfast.
 - c. * After Wallace fed [his dog the postman] and [his sheep the milkman] arrived.

In all of these cases, what is coordinated is not a constituent, and there is no parse with larger constituents coordinated plus left-edge ellipsis.

Coordination, then, does not indicate a need for radically right-branching structures. It is consistent with precede-and-command. Coordination also indicates that we need linear order in syntax, so that left-edge coordinate ellipsis can target a linear string.

5.6 Summary

None of the arguments that have been presented against a precede-and-command theory and for c-command actually go through.¹⁶ In fact, there are problems with all of the c-command accounts of the facts that were argued to require c-command. In every case, precede-and-command makes the right predictions. Moreover, precedence has been shown to be necessary in both coreference and coordination. C-command is fundamentally flawed: most of the nodes that are relevant to constituency are not relevant at all for command. These include PPs, nodes created by adjunction and coordination, and all non-phasal nodes in general (such as whatever node dominates the second object of a ditransitive).

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- (i) Terry said nothing about Robin on Thursday or Leslie on Friday.

Because of the non-constituent coordination, however, the representation should involve VP coordination, *Terry [said nothing about Robin on Thursday] or [~~said nothing about~~ Leslie on Friday]*, with the negative quantifier in both disjuncts, incorrectly. This is not a problem, however, if we adopt the fairly standard decomposition of negative quantifiers into sentential negation and an existential quantifier (Jacobs 1980, 1991; Rullmann 1995), so that the representation is something like *Terry NEG [said something about Robin on Thursday] or [~~said something about~~ Leslie on Friday]*, which seems to result in the correct interpretation.

Levine also criticizes left-edge ellipsis as an approach to coordination of unlike categories (examples like *Robin is [a Republican] and [proud of it]*). His criticisms appear to be valid, and it seems to me that a better approach would be to say that the constraints on what can be coordinated with what are semantic rather than syntactic in nature. I will not attempt to spell out such constraints here, however.

¹⁶Larson (1990) gives one more argument in favor of c-command over precede-and-command. This is that, according to Larson, c-command is a more restrictive theory, in that it permits fewer structural options. By itself, however, this is an empty argument: restrictiveness in the abstract is not an advantage, it is only an advantage if the particular restriction that is argued for can be shown to have some advantage, for instance in aiding processing or in solving the problem of acquisition. A theory that says that every branching node must be followed by a non-branching node is also a more restrictive theory, but no one would take that to be an advantage.

6 More on PPs

PPs have played an important (but by no means an exclusive) role in the discussion above (see coordination, ditransitives). It is crucial to the account that PPs are not phases. Descriptively, they seem to be ignored in computing Principle C.

There are two issues that we need to look at in further detail. First, Pesetsky (1995) has claimed that PP nodes *do* block binding for Principle C, just when they are fronted (as Reinhart also claimed). Second, there is a line of research starting with van Riemsdijk (1978) that holds that PPs are, in current terms, phases. In this section I show that there is no support for either contention, and PPs are simply irrelevant for command. In the current theory, they are not phasal nodes.

6.1 Fronted PPs are Not Relevant to Binding

Pesetsky (1995) claimed that when PPs are fronted, the branching node does become relevant, blocking command. He cites the following examples:

- (94) (Pesetsky 1995, 240, (588b, 589b))
- a. * To the kids, each other's friends said Mary had spoken — about vacation plans.
 - b. To him₁, John₁ said Mary would never speak — about Sue.

If PP nodes were simply invisible, Pesetsky reasons, the first example should be grammatical, and the second should not, since the NP inside the fronted PP should command out of that PP. (See also Reinhart's examples from above, like *Near him₁, Dan₁ saw a snake.*)

However, the lack of command in these cases is not due to the preposition. If the preposition is stranded, we get the same pattern of judgments:

- (95) a. * The kids, each other's friends said that Mary had spoken to — about vacation plans.
b. Him₁, John₁ said that Mary would never speak to — about Sue.

The preposition has nothing to do with the command relations in Pesetsky's examples. Rather, it appears that the moved position is not relevant for command; instead, the fronted phrase reconstructs to some lower position, either its thematic position or Spec-vP, as was discussed above regarding Reinhart's examples.¹⁷

I should note that, as shown above, *each other* as a possessor is an exempt anaphor and does not actually require a commanding antecedent (Pollard and Sag 1992, Janke and Neeleman 2009). The Principle C example makes the point just as well, though, and I will stick with data of that sort in this section.

Pesetsky's examples involve fronting across a clause boundary, but the same pattern of judgments holds within a single clause (although we have to change the examples slightly, to guard against Principle A interfering):

- (96) a. To him₁, John₁'s friends will never speak — about Sue.
b. Him₁, John₁'s friends will never speak to — about Sue.

Again, the PP node makes no difference to command. More generally, there are no cases that I know about

¹⁷Schlenker (2005b, (68c)) claims that *Him₁, John₁'s mother loves* is a Principle C violation. However, whatever awkwardness there is with this example seems to have to do with an incompatibility between the pragmatics of fronting and the intended coreference. Speakers who find coreference in Schlenker's example degraded find it much improved in *Him, John's colleagues despise, but his work, they respect*. This sentence sets up a reason for the fronting that is compatible with the coreference.

where a PP node clearly stops an NP from commanding outside that PP.¹⁸ This is true of both fronted PPs and *in situ* PPs. As was shown above, objects of prepositions command out of their dominating PPs.

I conclude that PP is never a relevant node for precede-and-command, whether the PP occurs within VP or is fronted. Objects of prepositions precede-and-command everything that they precede in the most local vP, CP, or NP. In the theory where phasal nodes are the relevant ones for command, PP must not be a phasal node.

6.2 The Phasal Status of PPs

As just stated, PPs must not be phasal nodes, since they seem to be ignored for command. However, there is a strand of research, from van Riemsdijk (1978) to Abels (2012), explicitly arguing that PPs are phasal nodes (or “binding nodes” in van Riemsdijk’s terminology). If the current theory is correct that only phasal nodes matter for command, then this line of research must be incorrect.

Extraction is the phenomenon that this line of research concentrates on, and the basic concern is showing that, for an element to move out of PP, it must do so via the “escape hatch” of Spec-PP. In current phasal terms, movement must take place via the edge of the phase. However, the empirical evidence for the claim that movement out of PP must stop at Spec-PP is less than compelling.

van Riemsdijk (1978) shows that phrases can move from within PP to the right edge of PP (I present English examples, see van Riemsdijk 1978 for Dutch and German):

- (97) a. Too far along the road for us to see him, the policeman set up his trap. (van Riemsdijk 1978, 178, (4))
 b. With [that tie around his neck that he got from his sister], ... (van Riemsdijk 1978, 181, (9b))

In these examples, *for us to see him* and *that he got from his sister* seem to have extraposed from material they are interpreted with semantically (*too far* and *that tie*). At the same time, they seem to still be within the maximal projection of the PP, which has fronted as a constituent in the first example and forms a small clause complement of *with* in the second.

van Riemsdijk (1978) suggests that this shows that Spec-PP is a landing site for movement, the same way Spec-vP and Spec-CP are in the phase theory. However, extraposition actually seems to target non-phasal nodes, like IP. For instance, I argued above that examples like the following have the extraposed clause adjoined to IP:

¹⁸van Riemsdijk and Williams (1986) argue that the object of a preposition can only bind outside of the PP if the P reanalyzes with the verb. In support of this analysis, they claim that fronting a PP prevents reanalysis and blocks binding. They give the following contrast (van Riemsdijk and Williams 1986, p.203):

- (i) a. John talked to Bill₁ about himself₁.
 b. Who₁ did John talk to about himself₁?
 c. * To whom₁ did John talk about himself₁?

While this judgment is quite strong for some speakers (but not all; a reviewer finds (ic) fine), it appears to be true only of this particular verb phrase (*talk to about*), as the examples of fronted PPs in the text show. Moreover, Condition B, NPI licensing, and variable binding still go through even with this VP (see Baltin and Postal 1996, 133 on Condition B):

- (ii) a. * To Bill₁, Mary talked about him₁.
 b. To none of his henchmen did the supervillain talk about any of his plans.
 c. To each of the boys₁ I plan to talk about his₁ inappropriate behavior.

While I am not sure what is going on with the anaphor *himself*, it is clear that an NP in a fronted PP can still bind out of that PP, meaning that P-V reanalysis is not necessary. See also examples (17c–17d), where the P could not be reanalyzing with the verb, because an NP object intervenes.

- (98) So many people wrote to him₁ that Brando₁ couldn't answer them all. (Reinhart 1976, 47, (63))

The extraposed clause can be included in sluicing, for instance, which most people analyze as deletion of IP (see above):

- (99) So many people tried to log on to some website that it shut down web servers for hours, but I can't remember which website.

If extraposed material can adjoin to non-phasal nodes like IP and VP, then there is no reason from extraposition to think that PP is a phasal node.

Similarly, Abels (2012) cites several cases of movement to the left edge of PP as evidence that the specifier of PP must be a phase edge. Again, however, this is not compelling evidence, as specifiers of non-phase heads like Infl/T are also generally landing sites for movement.

Moving to other possible evidence for the phasal status of PP, one of the most convincing arguments for the phasal status of CP and vP is that they are available as sites for reconstruction; see Fox (1999) and Legate (2003) in particular. Unfortunately, I have found it impossible to construct examples that would show whether Spec-PP is available as a reconstruction site. There is simply no evidence one way or another from reconstruction.

In the phase theory, phasal nodes are also supposed to block long-distance agreement (the operation Agree in Chomsky 2000). It does appear that in many languages, including English, PP nodes are opaque to agreement. However, vP, which phase theory treats as a phasal node, and which reconstruction shows is a phasal node, is transparent to agreement:

- (100) In 2006 there were [_{vP} believed to be 4,035 species of amphibians that depended on water at some stage during their life cycle]. (Wikipedia, *Amphibian*)

In this example, finite Infl (*were*) agrees with *4,035 species of amphibians. . .*, which is embedded within a vP. Chomsky (2001) changes his account of phase impenetrability to permit agreement with Infl (or T) to go through the vP node, based on the evidence in Legate (2003) that passive and unaccusative vP nodes are in fact phasal nodes. It is therefore not true that all and only phasal nodes block agreement, and so there is no reason to think that the blocking effect of PP indicates that it is a phasal node.

Moreover, objects of Ps *can* Agree, once they have moved out of PP, either all the way to the surface subject position or only part of the way:

- (101) a. Not a single bed was slept in on that fateful night.
b. Many questions were talked about during the deliberations.
c. More than one speaker was jeered at during the debate.
- (102) a. There wasn't a single bed slept in on that fateful night.
b. There were many questions talked about during the deliberations.
c. There was more than one speaker jeered at during the debate.

In Chomsky's theory, Agree is a prerequisite for Move; if that is true, then PP must be transparent to Agree, even if that Agree relation is never visible without movement out of PP.

The most devastating problem for the theory that PP is a phasal node is exactly the command phenomena discussed here. In the PP-as-phase theory, most versions of which assume c-command, there is simply no way for the complement of a P to command out of the PP. None of van Riemsdijk (1978), Abels (2003), or Abels (2012) address binding or coreference, but command out of PPs is fundamentally incompatible with the theories they propose. Elements dominated by a phasal node (or a binding node in van Riemsdijk's terminology) should not command out of that phasal node. As we have seen above, however, PP nodes seem

to be completely invisible to command. This is true in other languages as well, even ones that do not permit P-stranding like English. The following examples illustrate Principle C in German.¹⁹

- (103) a. * Maria holte für ihn₁ Martins₁ buch.
 Maria fetched for him Martin's book
- b. * Ich habe etwas an ihn₁ für Martins₁ Bruder verkauft.
 I have something to him for Martin's brother sold
- c. * Ich habe mit ihm₁ über Ottos₁ Thesen gestritten.
 I have with him about Otto's thesis argued

Objects of Ps also command out of PPs in Spanish, another language where prepositions cannot strand.²⁰

- (104) a. Bailé con Juan₁ en su_{1/2} departamento.
 danced.1Sg with Juan in his apartment
 'I danced with Juan₁ in his₁ apartment.'
- b. * Bailé con el₁ en el departamento de Juan₁.
 danced.1Sg with him in the apartment of Juan
 'I danced with him₁ in Juan₁'s apartment.'

(See also Ordóñez 1998, although the PPs he uses are often regarded as NPs, with the preposition *a* as a case marker.)

NPs also command out of PPs in Mandarin Chinese, as shown by Principle C; Chinese also never allows preposition stranding (Huang 1982, Aoun and Li 2003):²¹

- (105) a. Wǒ tì Zhāngsān₁ xiū hǎo le tā₁ de chēzi.
 I for Zhangsan fix well Asp he Poss car
 'I fixed his₁ car for Zhangsan₁.'
- b. * Wǒ tì tā₁ xiū hǎo le Zhāngsān₁ de chēzi.
 I for him fix well Asp Zhangsan Poss car
 'I fixed Zhangsan₁'s car for him₁.'
- (106) a. Wǒ wèi Zhāngsān₁ zài tā₁ de gōngyù zhǔ le yī dùn wǎncān.
 I for Zhangsan at he Poss apartment prepare Asp one CL meal
 'I prepared dinner for Zhangsan₁ at his₁ apartment.'
- b. * Wǒ wèi tā₁ zài Zhāngsān₁ de gōngyù zhǔ le yī dùn wǎncān.
 I for him at Zhangsan Poss apartment prepare Asp one CL dinner
 'I prepared dinner for him₁ at Zhangsan's apartment.'

(Note that PPs normally come between the subject and the verb in Mandarin Chinese.)

See also Greek, as discussed by Anagnostopoulou (2005), although the command data she presents involve something like the English *each...the other* construction rather than Principle C. Most relevantly, Anagnostopoulou (2005) shows that the same kinds of constituency and c-command conflicts arise in Greek as in English: constituency puts a PP high on the right, but command always goes rightward, not leftward. Again, PP nodes have to not count for c-command; but then if they do not, the c-command theory predicts backward command, incorrectly. Greek patterns with every other language that I have looked at, in that PP simply does not count for command.

¹⁹Thanks to Solveig Bosse and Werner Frey for examples and judgments.

²⁰Thanks to MaryEllen Cathcart for examples and judgments.

²¹Thanks to Yaping Tsai for examples and judgments.

I therefore conclude that PP is not a phasal node in any language. The nodes relevant to phase-command are only vP, CP, and NP (I leave aside the status of APs). As reviewed above, there is no positive evidence in any language that PP is a phasal node, and the command data are incompatible with them being such.

7 Deriving Precede-And-Command

This paper has argued that the Binding Principles do not refer to c-command, rather they require precedence and phase-command (or precede-and-command). In this section, I show that this does not need to be stipulated, but can be derived from a view of the grammar where sentences are built left-to-right rather than bottom-to-top. Principle C is about the left-to-right processing of discourse referents in a discourse model. The account adapts and combines proposals of Schlenker (2005a) and Branco (2001), although the resulting system is different from both of those proposals. Importantly, Principle C is about coreference between referents in the discourse model; it is not related in any way to variable binding or scope.

7.1 The Proposal

Suppose the grammar keeps track of discourse referents as it processes sentences. Processing takes place in a left-to-right fashion, which is almost but not quite equivalent to the top-down model proposed by Schlenker (2005a). The grammar places discourse referents into two sets: the total discourse model D; and the active set C. The active set C consists of all those discourse referents currently being processed in the sentence, while D consists of all referents in the discourse. At the right edge of a phase boundary, an NP that was contained within that phase (dominated by that phasal node) is moved out of the active set C and into the total discourse set D (it is backgrounded, in a way, no longer active). These principles are formalized below:

(107) Discourse Sets:

- a. Discourse Set D: Consists of all referents in the current discourse.
- b. Discourse Set C: Consists of referents represented by NPs in the sentence currently being processed.

(108) Processing Principle:

Move discourse referent R denoted by NP N out of active set C and into set D at the right edge of a phasal node that dominates N.

Now, as the grammar processes the sentence, if a newly processed NP is to be coreferential with an NP already in the active set C, it must obey a version of the Minimize Restrictors principle proposed by Schlenker (2005a). This principle (modifying Schlenker) says that a definite description of the form *the A* is deviant if A could be dropped without affecting either the denotation of the description or its various pragmatic effects. A pronoun, following among others Elbourne (2001), is a very short description: basically, just the definite article. So, the effect of dropping A in *the A* is to use a pronoun. (A proper name has a hidden definite article, so proper names fall under this principle, too; see Schlenker 2005a.) Principle C, or Minimize Restrictors, is formalized below:

(109) Principle C (Minimize Restrictors):

A definite description of the form *the A* may not refer to a discourse referent in active set C if A could be dropped without affecting either (i) the denotation of the description or (ii) its various pragmatic effects.

Let us see how this works with several examples.

7.2 Illustrations

Consider the following sentence:

(110) She doesn't like the teacher's students.

Starting from the left, the individual denoted by *she* is placed into the active set of referents C. The verb is processed, and then the definite description *the teacher* is encountered. If this denotes a different individual from the one already in C, everything is fine. If it is meant to be coreferential with that individual, however, it is deviant according to Minimize Restrictors, since *teacher* could have been dropped (to yield *her*) without affecting the denotation or losing any pragmatic effect.

Contrast the sentence above with the following sentence:

(111) The teacher doesn't like her students.

Here, the referent denoted by *the teacher* is first put into set C, and then *her* can be coreferential with it, since it is not of the form *the A* (it is basically just *the*).

Consider now the following case:

(112) Her assistant doesn't like the teacher's students.

The individual denoted by *her* is first placed into the active set C, but at the right edge of the NP *her assistant*, it is moved out of C into D, while *her assistant* stays in C. Upon encountering *the teacher*, the referent denoted by *her* is no longer in C, so Minimize Restrictors has nothing to say about *the teacher*, and coreference with *her* is fine.

Turning to an example where left-to-right rather than top-down processing makes a difference, consider the following example, one of Reinhart's IP adjuncts:

(113) Rosa is kissing him passionately in the President's high school picture.

First the referent denoted by *Rosa* and then the one denoted by *him* are placed in the active set C. In between the adverb *passionately* and the PP, however, the grammar reaches the right edge of the vP phase. The referent denoted by *him* is moved to set D, since it is dominated by vP. The referent denoted by *Rosa* is not, since it is not dominated by vP. Hence, when *the President* is encountered, it can be coreferential with *him*, but could not be coreferential with the subject:

(114) * She₁ is kissing the President passionately in Rosa₁'s high school picture.

This should be sufficient to illustrate the workings of the system. As the reader can verify, it correctly captures all of the data discussed in the paper (and, to the best of my knowledge, all of the data in the vast literature on the topic²²).

²²A reviewer asks why cataphoric reference is often much worse across sentences:

- (i) a. Whenever he₁ comes to town, Ben₁ gets arrested.
- b. * He₁ came to town. Then Ben₁ got arrested.

The deviance of (ib) cannot be due to Principle C, since Principle C is about sentence grammar; it must be deviant because of discourse principles, which I will not attempt to address in this paper.

7.3 Discussion

This version of Schlenker’s Minimize Restrictors approach to Principle C accounts for precede-and-command by processing sentences left-to-right rather than top-down. Precedence comes in because elements that precede are entered into the local set of discourse referents *C* *first*, before elements that come later in linear order. Phase-command comes in because elements are shifted out of the local set *C* at the right edge of phase boundaries. The idea is that phases are closed off and finished; elements within them are no longer part of the domain actively being processed. Using Schlenker’s Minimize Restrictors principle confers many of the advantages that he discusses, for instance accounting for exceptions to Principle C; see that paper for details.²³ The difference is that the workings of the principle are not about scope, as Schlenker claimed, but about left-to-right, phase-sensitive processing.

Thus, precede-and-command does not need to be stipulated; rather, it falls out from a reasonable view of how sentences are processed. They are processed in a linear order, and in a way that is sensitive to the grammar, in particular to the nodes that are thought to be of prime importance in cyclicity.

As just mentioned, Schlenker (2005a) related Principle C to quantifier scope, a relation that many have made since Reinhart’s work. In addition to claiming that coreference is sensitive to c-command and not to precedence, Reinhart (1976, 1983) also argued that coreference was crucially related to scope and the binding of variables by quantifiers. All of them, she argued, involved c-command, and Principle C effects track the availability of variable binding. A number of researchers have adopted this proposal and tried to explain or derive the supposed relation (e.g., Grodzinsky and Reinhart 1993; Heim 1998; Fox 2000; Büring 2005; Schlenker 2005b, 2005a; Reinhart 2006; Roelofsen 2010). In contrast, the account of Principle C that I have presented has absolutely nothing to do with scope or variable binding. This, I believe, is an advantage, as the two phenomena do not obey the same principles at all. The fact that scope and variable binding do not require c-command has already been extensively documented, by Barker (2012). They also do not require precede-and-command, meaning that they obey different principles from Principle C.

This can be shown quite easily with IP adjuncts, which are outside of the command domain of an object. Recall that a pronoun as object can be coreferential with an R-expression contained in such an adjunct:

- (115) a. Rosa is kissing him₁ passionately in Ben₁’s high school picture. (Reinhart 1976, 79, (27a))
b. People worship him₁ in Kissinger₁’s native country. (Reinhart 1976, 79, (28a))
c. So many people wrote to him₁ that Brando₁ couldn’t answer them all. (Reinhart 1976, 47, (63))

This is because *vP* is a phasal node which dominates the pronoun but does not dominate the R-expression, and so the pronoun does not precede-and-command the R-expression.

Now, if variable binding and Principle C obeyed the same principles, and Principle C effects appear wherever variable binding is a possibility, as claimed by Reinhart and others, we would not expect variable binding to be a possibility in such examples. That is, if we were to replace the pronominal object with a quantifier, and the R-expression in the adjunct with a pronoun, we would not expect the quantifier to be able to bind the pronoun. This is false:

- (116) a. Rosa is kissing every boy₁ passionately in his₁ high school picture.
b. People worship every UN Secretary-General₁ in his₁ native country.

²³One advantage that is lost is that Minimize Restrictors is just about Principle C; for Schlenker, it is much more general, and has numerous other effects. Whether these can be related is a question for future work, although a few possible directions suggest themselves. For instance, the speaker and hearer might always be part of set *C*, accounting for why they cannot except in particular pragmatic circumstances be referred to with anything but a pronoun. Schlenker’s “super-salient” individuals might also be part of set *C*, and one could imagine set *C* sometimes being maintained across sentences in particular discourse circumstances, as well. (However, see Johnson 2012 for some reasons to think that not all of the things discussed by Schlenker should be viewed in the same way.)

- c. So many people wrote to every actress₁ that she₁ couldn't answer them all.

These examples also show that, contra Grodzinsky and Reinhart (1993), among others, Principle C does not arise just when variable binding is possible: in these examples, variable binding is clearly available between two positions, but no Principle C effect arises between those same two positions. We can also rule out these adjuncts being ambiguous in where they attach, because of (116c): the *that* clause has to associate with the subject *so many people*, and must therefore be outside of vP. We also saw this confirmed with VP fronting (12b–12c). This means that quantifiers do not need to phase-command pronouns in order to bind them as variables, and quantificational binding and Principle C therefore obey different principles.

The lack of weak crossover with wh-movement shows the same thing:

- (117) a. So many people wrote to him₁ that Brando₁ couldn't answer them all. (Reinhart 1976, 47, (63))
 b. Rosa won't like him₁ anymore, with Ben₁'s mother hanging around all the time. (Reinhart 1976, 23, (19c))
- (118) a. Who₁ did so many people write to *t*₁ that he₁ couldn't answer them all?
 b. Who₁ is Rosa going to stop going out with *t*₁, with his₁ mother hanging around all the time?

Once again, Principle C effects do not track the availability of bound variable readings. In particular, the highest A-position occupied by a wh-phrase does not have to phase-command (or c-command) a pronoun in order to bind it as a variable.

We can also look at weak crossover with wh-movement from a left branch. Chaves (2012) presents numerous examples where speakers judge extraction out of a left branch to be grammatical, for instance the following:

- (119) (Chaves 2012, (4d,g))
 a. Which president would [the impeachment of *t*] cause more outrage?
 b. Which problem will [no solution to *t*] ever be found?

Since the starting position of the wh-phrase does not c-command or phase-command out of the subject phrase in these examples, it should not be able to bind a subsequent pronoun if c-command or phase-command was at issue. It appears to be able to, however, contrasting with a pronoun to its left:

- (120) a. Which president₁ would [the impeachment of *t*₁] cause more outrage within his₁ party?
 b. Which problem₁ will [no solution to *t*₁] ever be found by its₁ discoverer?
- (121) a. * Which president₁ would his₁ party agree that [the impeachment of *t*₁] would cause more outrage?
 b. * Which problem₁ did its₁ discoverer declare that [no solution to *t*₁] would ever be found?

Clearly, the highest A-position of a quantifier does not need to command a pronoun (either c-command or phase-command) in order to bind that pronoun as a variable. Numerous other examples in Barker (2012) make the same point.

The overall conclusion is that Principle C has nothing to do with scope or variable binding. Principle C involves precede-and-command; variable binding probably requires LF scope, plus surface precedence (but it would take us too far afield to investigate this in any detail). I have presented a theory that derives the conditions on coreference (Principle C) from left-to-right, phase-sensitive processing. This theory does not relate Principle C to quantificational binding, which seems to be correct.

8 Principles A and B

I turn now from Principle C to the other two Binding Principles, Principles A and B.

8.1 Principles A and B Require Precede-and-Command

Throughout this paper I have concentrated on Principle C, the principle that regulates coreference with an R-expression. I have been assuming that precede-and-command is the relevant relation for all three Binding Principles and not c-command, but I have not yet shown that to be true. It is in fact very difficult to show it to be true, because of the locality conditions inherent in Principles A and B. However, there are some indications that precede-and-command is the right relation, and not c-command.

First, certain types of PPs are clearly irrelevant to both Principles A and B:

- (122) a. We talked to Bobby₁ about himself₁.
b. * We talked to Bobby₁ about him₁.
- (123) a. You can depend on Martina₁ to behave herself₁.
b. * You can depend on Martina₁ to behave her₁.

Here, *Bobby* and *Martina* must command outside of the dominating PP, or Principle A would be violated in the first example of each pair, and Principle B would not be violated in the second example.

Additionally, coordinated VP nodes do not block command:

- (124) a. Samantha explained Martin₁ and justified him₁ to himself₁.
b. * Samantha explained Martin₁ and justified him₁ to him₁.

Here, both *Martin* and *him* command into the PP, despite being dominated by a branching node that does not dominate the PP.

Note that in this case no Principle B violation occurs between the two conjuncts (*Martin* and the *him* that is the object of *justified*), while, as we saw above, a Principle C violation is incurred: **Lucie explained him₁ and justified Martin₁ (to himself)*. The account that I present below will correctly capture this discrepancy. For now, what is important is that the coordination of VP does not block command into an adjunct that is not included in the coordination.

This should be sufficient to show that the exact same phenomena that indicate that c-command is incorrect for Principle C indicate that it is incorrect for Principles A and B, as well. Precede-and-command is the relation that is involved in all three Binding Principles.

8.2 Principles A and B in the Left-to-Right Model

The question now is how to incorporate Principles A and B into the left-to-right model that derives precede-and-command for Principle C. This is relatively straightforward, and independent of the particular formulation of locality that is adopted. That is, any view of locality can be incorporated into the model, once it is determined which view is correct. I will adopt the view that the locality domain is related to co-argumenthood, as in Reinhart and Reuland (1993), although the technical implementation will differ substantially.

First, there is no category of pronouns, as described above; pronouns are simply the result of minimizing restrictors in definite descriptions. There is a category of local anaphors, namely reflexives and reciprocals. We need to divide the active set of discourse referents being constructed by a language user (set C) into two sets:

- (125) Discourse Sets:

- a. Discourse Set D: Consists of all referents in the current discourse.
- b. Discourse Set C (the *active* set): Consists of referents represented by NPs in the sentence currently being processed.
- c. Discourse Set A (the *local* set): Consists of referents represented by NPs in the local argument domain currently being processed.

There is now an extremely local set, set A, in addition to the active set C.

We also need to split the Processing Principle into two principles. This is where the exact definition of locality comes in. The italicized part of Processing Principle 1 represents the locality condition, and could be replaced by another, if that is determined to be appropriate:

- (126) Processing Principle 1:
Move discourse referent R denoted by NP N out of local set A and into the active set C *at the left edge of an argument domain that does not include N*.
- (127) An argument domain is the set of elements that includes a predicate P and all the arguments of P.
- (128) Processing Principle 2:
Move discourse referent R denoted by NP N out of sets A and C and into set D at the right edge of a phasal node that dominates N.

Processing Principle 2 is the same one from above, but with set A added. Processing Principle 1 is where locality comes in, moving referents out of the local set A at particular points, and into set C. The points where this happens are where the processor crosses from one argument domain to the next. Relative to an NP N, this will be when either a predicate is encountered that N is not an argument of, or when another NP M is encountered, such that M is an argument of a different predicate from the one N is an argument of.

Now we can define Binding Principles A and B:

- (129) Binding Principle B:
If a newly processed NP N is to be interpreted as denoting a discourse referent R already in set A, then N must have the form of a local anaphor.
- (130) Binding Principle A:
If a newly processed NP N has the form of a local anaphor, it must denote a discourse referent in set A.

8.3 Illustrations

To illustrate, the simplest example involves arguments of the same predicate (verb) within the same clause:

- (131) Martin₁ berated himself₁/*him₁.

Here, the referent denoted by *Martin* is placed into the local set A. The verb is processed, and then the object. If the object is to refer to this same referent, it must be a local anaphor. If the object is a local anaphor, it must refer to a referent in set A (in this example, only *Martin*).

In cross-clausal cases, any matrix NP will be moved out of local set A and into the active set C upon encountering the embedded subject:

- (132) a. Martin₁ said [that Samantha offended him₁/*himself₁].
b. The kung fu masters₁ said [that Samantha offended them₁/*each other₁].

This is because the embedded subject is an argument NP that is not an argument of the same predicate that the higher subject is an argument of. This makes it begin a new argument domain.

The role of phase-command appears in cases like the following:

- (133) a. Martin₁'s mother criticized him₁/*himself₁.
 b. That Martin₁ won astonished him₁/*himself₁.

In both cases, *Martin* is moved out of set A and into set D at the right edge of the subject, because it is a phase in both cases (an NP in one, a CP in the other).

With multiple arguments in a single clause, a local anaphor can refer to any of the arguments that preceded it, since they are all in set A:

- (134) a. The kung fu masters₁ sent me to each other₁.
 b. I sent the kung fu masters₁ to each other₁.
 c. The kung fu masters₁ sent each other₁ to me.

However, a local anaphor may not refer to an NP that follows it, because at the point of processing the anaphor, subsequent referents have not yet been added to local set A:

- (135) a. *Himself₁ berated Martin₁.
 b. *I sent each other₁ to the kung fu masters₁.

There is no need for a Chain Condition to rule out these examples, as in Reinhart and Reuland (1993); this would be problematic anyway, given the issues with c-command discussed above. Asymmetries are the result of precedence, not hierarchy. Precedence follows here from left-to-right parsing.

Of course, movement can change precedence relations:

- (136) Himself₁, Martin₁ will criticize.

I assume that the anaphor here is reconstructed into its A-position, and it is at that point that Binding Principles A and B are evaluated.²⁴

Let us now turn back to the coordinated examples from above, and see how the principles result in the discrepancy between Principles B and C:

- (137) a. Samantha explained Martin₁ and justified him₁ (to himself₁).
 b. *Samantha explained him₁ and justified Martin₁ (to himself₁).

We saw above that a Principle C violation occurs in the (b) example because there is no phasal node that dominates *him* that does not also dominate *Martin*. The pronoun therefore precedes and phase-commands the R-expression. The question is, why is there no Principle B violation in the (a) example? The reason is that the referent denoted by *Martin* is moved out of the local set A upon encountering *justified*, since *Martin* is not an argument of this verb. The referent denoted by *Martin* is therefore not in the local set A when *him* is encountered, it is in the active set C. Minimize Restrictors says that it must have the form of a pronoun in order to refer to Martin, and it does.

²⁴Apparently, such a moved anaphor can also (optionally) be evaluated in its moved position (Lasnik and Saito 1992, 110–111):

- (i) Martin₁ said that himself₁, Samantha will criticize.

However, it is likely that embedded topics are actually exempt anaphors; hanging topics certainly can be (Pollard and Sag 1992). That they are exempt is suggested by the relative acceptability of the following example, where the antecedent is non-local:

- (ii) Martin₁ will be upset if it appears that himself₁, Samantha will criticize.

If this is correct, then A-bar movement like topicalization never gives rise to new binding possibilities; it is only when the anaphor can be exempt (for instance, by virtue of being in a picture-NP, or being a topic) that A-bar movement will give the impression of changing binding possibilities.

Upon encountering the preposition, the referent denoted by *him* is still in the local set A. Therefore the NP after *to* must be a local anaphor. Note that this account therefore predicts that if there is no pronoun in the second conjunct coreferential with an NP in the first, then an anaphor after the P will be ungrammatical referring to the NP in the first conjunct. This is correct:

- (138) a. *Samantha explained Martin₁ and justified herself₂ to himself₁.
 b. Samantha explained Martin₁ and justified herself₂ to him₁.

This follows because, as described, the referent denoted by *Martin* is moved out of the local set A upon encountering *justified*. I take this as a strong indication that linear processing is involved in anaphora, and not, for instance, the construction of two representations for coordination in parallel, as in Reinhart and Reuland (1993).

8.4 ECM and Raising

There are some syntactic processes that affect predicate-argument relations. In exceptional case marking (ECM, aka raising to object) and raising (to subject), an NP that is an argument in one clause becomes an argument in another clause, as well. In such cases, *both* functions of the NP involved are relevant. Consider ECM first:

- (139) a. Lucie₁ expects herself₁/*her₁ to charm Bill.
 b. Lucie₁ expects Bill to charm her₁/*herself₁.
 c. Lucie expects Bill to charm himself₁/*him₁.

An ECM NP is in many respects the object of the ECM verb, for instance in case marking, agreement in languages with object agreement, word order, etc. I therefore adopt the standard assumption that the “argument-of” relation includes such relations, and not just semantic relations. This means that the ECM NP is an argument of the ECM verb. As such, the ECM NP does not begin a new argument domain in (139a). Therefore, *Lucie* is still in set A when the ECM NP is parsed, and can only be referred to with an anaphor, not a pronoun. Now, the ECM NP is also the subject of the lower clause. This means that in a subsequent processing step, the ECM NP is then parsed as the subject of the embedded clause, and the embedded predicate is encountered. At this point, *Lucie* is shifted out of set A and into set C, so that a subsequent NP that refers to *Lucie* must be a pronoun and may not be an anaphor (139b). A lower NP that refers to the ECM NP must be an anaphor and not a pronoun (139c), because the ECM NP is still in set A when the lower NP is parsed.

Similar mechanisms are at work in raising to subject, where overt movement clearly occurs:

- (140) a. Lucie₁ seems to herself₁/*her₁ [*t* to be beyond suspicion]. (Reinhart and Reuland 1993, (42a))
 b. Lucie₁ seems to me [*t* to have betrayed herself₁/*her₁/*myself].

In both of these examples, the raised NP *Lucie* is processed and put in set A. Upon encountering the experiencer inside the PP in (140a), if it is to refer to *Lucie*, it must be an anaphor and may not be a pronoun. Subsequently, the raised NP is parsed again, in its trace position, as the embedded subject. The embedded predicate is then encountered, so the matrix experiencer is shifted out of set A and into set C. The raised NP is not shifted out of set A, because it is also an argument of the embedded predicate. Any subsequent NP must therefore be an anaphor if it refers to the raised subject *Lucie*, but may not be an anaphor if it refers to the matrix experiencer (140b).

In ECM and raising, then, the processing principles as they are formulated above derive the correct results.

8.5 Prepositional Phrases

Reinhart and Reuland (1993) noted that with some PPs, pronouns and anaphors are not in complementary distribution (see Hestvik 1991 and references there):

- (141) a. Max₁ saw a gun near himself₁/him₁. (Reinhart and Reuland 1993, (7a))
b. Max₁ saw a ghost next to him₁/himself₁. (Reinhart and Reuland 1993, (59a))
c. Max₁ put the book next to him₁/himself₁. (Reinhart and Reuland 1993, (59b))
d. Max₁ pulled the cart towards him₁/himself₁. (Reinhart and Reuland 1993, (59c))

Reinhart and Reuland's own theory fails here, though. In their theory, if pronouns and anaphors are not in complementary distribution, then the anaphor must be an exempt anaphor (a *logophor*, in their terminology). However, as noticed by Hestvik and Philip (2001), the anaphors here are *not* exempt anaphors; they cannot take long-distance or non-phase-commanding antecedents, contrasting with exempt anaphors inside picture-NPs:²⁵

- (142) (Hestvik and Philip 2001, (2a–b))
a. Clinton's car carried a picture of himself on the roof.
b. * Clinton's car backfired/collapsed/explored behind himself.
- (143) a. Max₁ thinks that you saw a gun near him₁/*himself₁.
b. Max₁ said that Mary saw a ghost next to him₁/*himself₁.
c. Max₁ said that I put the book next to him₁/*himself₁.
d. Max₁ told me to pull the cart toward him₁/*himself₁.

What we have with these PPs is a genuine case of non-complementary distribution between pronouns and local anaphors.

Note also that these PPs have semantic subjects: the prepositions are transitive. *Near* relates *a gun* and its object; *next to* relates *a ghost* and its object; etc. If these two arguments are to be co-referential, only an anaphor is allowed (Reinhart and Reuland 1993, 687):

- (144) a. Max saw two guns₁ near each other₁/*them₁.
b. Max saw two ghosts₁ next to each other₁/*them₁.
c. Max put the books₁ next to each other₁/*them₁.
d. Max pulled the carts₁ toward each other₁/*them₁.
e. Max rolled the carpet₁ over itself₁/*it₁. (Reinhart and Reuland 1993, (61b))

These cases follow from the principles as stated: *two guns* is still in set A when the object of the P is encountered, because it is an argument of the P. An anaphor must therefore be used in order to denote the subject of the P.

What is not clear is whether the P begins a new argument domain, distinct from that of the verb. On the one hand, the P is a predicate that takes two arguments, neither of which is the subject. On the other hand, one of its arguments is also an argument of the verb. The PP is also a modifier of the event denoted by the verb.

I therefore propose that the grammar/parser faces indeterminacy here. It can choose to treat the P as beginning a new argument domain, or not. Take the following example:

²⁵Reinhart and Reuland (1993, 686) claim that they can, giving *Lucie said that Max saw a ghost next to herself* as grammatical (their example (60b)). However, this does not accord with my intuitions, or those reported by Hestvik and Philip (2001).

(145) Max pulled the cart toward him/himself.

First, *Max* is put into the local set A. The verb is parsed, and then *the cart* is parsed and put into set A as well. Upon encountering *toward*, the parser can decide whether to take *toward* as a predicate that defines a new argument domain, or not. If it is taken to begin a new argument domain, then *Max* is moved from set A into set C. In this case, *Max* can only be referred to with a pronoun. If *toward* is not taken to begin a new argument domain, then *Max* is not removed from set A, and it can only be referred to with an anaphor. In either case, *the cart* is still in set A, and so it can only be referred to with an anaphor.

This accounts for the non-complementarity in PPs as a case of indeterminacy: the P can be taken to begin a new argument domain, or not. The grammar can decide to parse it either way. Note that if the semantic subject of the PP is also a syntactic subject, only an anaphor is allowed:

- (146) a. They stood next to each other/*them.
b. The rug folded (up) over itself/*it.

This is predicted by the analysis, since the subject of the verb is also an argument of the preposition, and is never moved out of set A.²⁶

8.6 Exempt Anaphors

As shown by Pollard and Sag (1992) and Reinhart and Reuland (1993), certain anaphors are exempt from the Binding Principles. Chief among these are hanging topics and anaphors inside NPs:

- (147) John₁ had worked hard to make sure that the twins would be well taken care of. As for himself₁, it was relatively unlikely that anyone would be interested in hiring an ex-convict who had little in the way of professional skills. (Pollard and Sag 1992, (8a))
- (148) a. [Kim and Sandy]₁ knew that *Computational Ichthyology* had rejected each other₁'s papers. (Pollard and Sag 1992, (7i))
b. John₁'s campaign requires that pictures of himself₁ be placed all over town. (Pollard and Sag 1992, (7g))

I have no great insight to add concerning these exempt anaphors; for some reason, anaphors are exempt from the Binding Principles in these types of contexts, and get their reference in some manner other than as described above for argument anaphors (point of view, etc.).

Note that Reinhart and Reuland (1993) tried to derive the contexts where anaphors are exempt: basically, in non-argument positions. Their theory runs into a number of difficulties, however, such that this derivation

²⁶There are some cases that initially appear problematic, such as these:

- (i) (Hestvik 1991, 462, (10))
a. John looked around him/himself.
b. John glanced behind/around him/himself.
c. In the tunnel, John searched above him/himself and below him/himself for an opening.

In these cases, it appears that the subject of the verb is also the semantic subject of the preposition, and so the account given in the text would expect only the reflexive to be possible. Interestingly, this seems to be true with these same verbs but different prepositions:

- (ii) a. John looked/glanced toward himself/*him.
b. John looked/searched inside himself/*him.

It is possible that the specific prepositions *around*, *behind*, *above*, and *below* can take a different deictic perspective, for instance that of the speaker, and it is this different perspective that enables a pronoun to appear.

does not actually succeed. For instance, anaphors in PPs, above, and in coordinated NPs, next, do not fit their theory.

8.7 Coordinated NPs

Coordinated NPs raise a problem for Reinhart and Reuland's theory that the current approach solves. Consider the following:

- (149) a. Max₁ said that the Queen invited both Lucie and himself₁ for tea. (Reinhart and Reuland 1993, (29c))
b. The Queen invited both Max and myself for tea. (Reinhart and Reuland 1993, (29b))
c. The Queen₁ invited both Max and herself₁ to our party. (Reinhart and Reuland 1993, (30a))
d. * The Queen₁ invited both Max and her₁ to our party. (Reinhart and Reuland 1993, (30b))

Coordinated NPs must be a context where anaphors are exempt, because of (149a–b). In (149a–b), the anaphor does not have a local commanding antecedent. However, anaphors and pronouns are still in complementary distribution with a local antecedent in (149c–d).

Reinhart and Reuland (1993) are forced to give a convoluted account of this pattern, involving syntactic versus semantic predicates, and the different Binding Principles holding differentially over the two types of predicates. None of this is necessary in the current account; the facts simply fall out. First, Principle B says that if an NP is to be coreferential with the local subject (or any NP in set A), it must be an anaphor. This rules out (149d) and permits (149c). However, an anaphor that appears inside an NP can be exempt from Binding Condition A, as discussed above. This means that the anaphors in (149a–b) do not need to refer to a discourse referent in set A, and (149a–b) are grammatical.

It is worth highlighting the problem for Reinhart and Reuland here. In their theory, in any given context, either anaphors and pronouns are in complementary distribution, or else they are not and the anaphors are exempt. This is not true in PPs and in coordinated NPs: in PPs, anaphors and pronouns are not in complementary distribution, but anaphors are not exempt. In coordinated NPs, anaphors are exempt, but anaphors and pronouns are not in complementary distribution. Reinhart and Reuland's theory fails to account for this pattern. The current account captures it without difficulty.

8.8 Possessors

Possessors have always raised particular difficulties for theories of anaphora. In English, a possessive pronoun may refer to a local antecedent:

- (150) Max lost his keys.

This violates many formulations of Principle B, including the one here.

Many languages have possessive anaphors. English happens not to. This seems to be relevant. In some languages, including older stages of English, there just are no anaphors for particular persons, and pronouns can refer to local or non-local antecedents. It appears to be crucial that the language have contrasting anaphors and pronouns for a given context. One way to approach this is to reformulate Binding Principle B in the following way:

- (151) Binding Principle B:
If a newly processed NP N is to be interpreted as denoting a discourse referent R already in set A, then N must have the form of a local anaphor. If there is no local anaphor appropriate to the morphosyntactic context, then Minimize Restrictors.

In this reformulation, a pronoun will be used if there is no anaphor available for the morphosyntactic context. Possessor position is one such case in English.

8.9 Summary

Principles A and B, like Principle C, depend on precede-and-command, not c-command. They can be incorporated into the left-to-right model quite easily, and the particular way that I proposed to incorporate them has the advantage of accounting for several recalcitrant facts. It also accounts for a newly discovered fact, namely a discrepancy between Principles B and C in VP coordination.²⁷

9 Conclusion

This paper has shown that c-command is not the relation that much of syntax depends on, as previously assumed. The Binding Principles, in particular, require precedence and phase-command, not c-command. Reformulating c-command to use the notion of *exclusion* (Chomsky 1986) rather than “first branching node” is not sufficient; that reformulation still requires the stipulation that PP nodes do not count, and precedence in addition. (It also runs counter to most of the attempts to derive c-command from the workings of the grammar; see the works cited in the introduction.) In contrast, precede-and-command falls out naturally from a view of syntax where sentences are built left-to-right, phase-by-phase. It also has the conceptual advantage of bringing the Binding Principles under the purview of phase theory, linking them to cyclicity and all the other phenomena captured by the notion of phases. It also *explains* why PP nodes do not count, rather than stipulating it.

The Binding Principles are not the only syntactic phenomena that are thought to require c-command. In section 7.3, I mentioned one other one, binding and weak crossover, and showed that c-command is not relevant there, either (see also Barker 2012). Several other phenomena have also been thought to depend on c-command, for instance the *each...the other* construction, negative polarity item (NPI) licensing, and superiority. Like binding and weak crossover, none of these actually do require c-command, but in the interests of space I will not attempt to show this here (see Hoeksema 2000 on NPI licensing, and Shan and Barker 2006 and Bhattacharya and Simpson 2007 for issues with superiority). I will briefly mention syntactic movement.

Syntactic movement has long been thought to refer to c-command, in that a moved element must c-command its trace (Fiengo 1977). It does not appear that this requirement can be replaced with precedence, given the existence of heavy shift and extraposition, among other rightward movement phenomena (which I assume exist, contra Kayne 1994). Precede-and-command therefore does not appear to be the relevant constraint, nor does precedence by itself. However, phase-command might be, and if it is, we can do without c-command entirely.

At least two movement phenomena have always been problematic for a c-command condition on movement. The first is raising to object of P, argued to exist in English (Postal 1974, Postal 2004, chapter 2), Greek (Joseph 1979, 1990), and Irish (McCloskey 1984; see also Kayne 2004). Some English examples

²⁷One question, raised by a reviewer, is whether the current proposal accounts for cases of overlapping reference, like **We like me* (Postal 1966). These follow from the account, since the NP *we* adds the speaker to set A. To refer to the speaker, then, a local anaphor must be used. **We like myself* is ruled out because of a syntactic agreement condition, I assume. The end result is that such propositions are ineffable. In contrast, *We read my book* is acceptable (Fiengo and Higginbotham 1981), because, again, there is no local anaphor for the syntactic context.

A second question, raised by a different reviewer, is how to account for the following contrast, from Davies and Dubinsky (2003, (60a–b)):

- (i) a. Why did you send me that letter about yourself/you?
- b. Why did you write me that letter about yourself/*you?

I disagree with this judgment, and find *you* perfectly acceptable in (ib). I also find many similar examples on the web (e.g., *How do you write a letter about you?* on Wiki Answers). However, there are similar cases with a much stronger judgment of obviation: for instance, in *yesterday's operation on her*, *her* cannot be understood as both the surgeon and the patient. It is likely that certain nominals (and other categories) have implicit arguments that are activated in the discourse model, which then act like any overt NP.

appear below, illustrating a standard diagnostic for raising, namely expletives:

(152) (Postal 2004)

- a. Amanda relied on it to be evident that the bomb would not be found.
- b. Amanda depended on it not to sleet.
- c. We can't depend on there to be enough beer to keep all the students happy.

Constituency tests like movement and coordination show that there is a constituent consisting of the preposition and the raised NP:

- (153) a. On whom can you count to listen to you when you really need to talk?
b. You can rely on him and on her to be discreet.

Given that the first branching node dominating the object of the preposition dominates only the preposition and that object, it is impossible for the object of the preposition here to c-command its trace. It does phase-command it, though; hence phase-command, rather than c-command, might be the right constraint on movement.

The other movement phenomenon that is problematic for c-command is head movement, which again does not c-command its trace if it is an adjunction operation (as it is in most conceptions of head movement). Numerous responses to this problem have been offered, from Baker's Government Transparency Corollary (Baker 1988) to the denial that head movement as a syntactic operation exists (Chomsky 2000); see Matushansky 2006 for recent discussion. Another way of looking at head movement, though, is to view it as indicating that movement is not subject to a c-command requirement, after all. Perhaps phase-command is the relevant condition.

Given these exceptions to c-command, it is worth exploring whether syntactic movement is sensitive to phase-command rather than to c-command. Phase-command is much more permissive than c-command, and would even allow phase-internal lowering. Classical affix hopping (Chomsky 1957) might be an instance of this, and other cases of lowering head movement have also been argued to exist, by Brody (2000) and Abels (2003).

Whether or not we can get rid of c-command entirely, this paper has shown that the problems for c-command are insurmountable in the domain of the Binding Principles. Precedence, in contrast, plays a primary role. This means that linear order must be decided early in the syntax, at Merge. Merge must create an ordered set: Merging two elements, A and B, creates either (A,B) or (B,A). In addition, one of A or B becomes the label of the set (again, see Chomsky 2000 and much subsequent literature). So, Merge of A and B creates one of (_AA,B), (_AB,A), (_BA,B), or (_BB,A). Under this view, precedence is encoded at Merge, subject to headedness and selectional patterns of the individual language, or universal constraints, whatever they are determined to be.

Note that building in precedence at Merge does not add much complexity to the grammar of Merge, and precedence has to be encoded *somewhere* in the grammar, in any theory; the question is simply where. In this paper, I have shown numerous empirical facts that argue for this early computation of precedence, where the syntax can make use of it.

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