

Positions of Adjuncts and Binding without C-command

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1. Introduction

In the standard X-bar configuration, right-side adjuncts are considered to be “layered” over a structure, as illustrated in (1).

(1) [_{XP} [_{XP} Spec [_{X'} X0 Complement]] Adjunct]

However, it is well-known that binding data such as (2) raises a problem for this view; although a complement can bind a reflexive inside a right-side adjunct ((2)a), an adjunct cannot bind a reflexive inside a complement on its left ((2)b).

- (2) a. John talked [_t to these people₁] [_t about themselves₁].
b. *John talked [_t to themselves₁] [_t about these people₁]

Examples such as (3) show that a complement of a PP can bind outside the PP node (this example causes a Condition C violation because *him* binds *John* from inside the PP).

- (3) *Mary seemed [_{PP} to him₁] to like John₁.

With the assumption that a complement of the PP can bind outside, the acceptability of (2)b is problematic. In the standard ‘first node’ definition of c-command, the first node that dominates the complement in (1) is X’, which does not dominate the adjunct. Therefore, it would be incorrectly predicted that the adjunct PP c-commands the complement PP in (2)a and

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not vice versa.

The paper tackles the above problem. I will show that some pieces of evidence seem to indicate that an adjunct is ‘lower’ than the phrase it adjoins to, while others indicate that it is ‘higher’. I go on to review some previous studies that try to account for the contradictory evidence and point out their problems. Instead I adopt the analysis by Hornstein and Nunes (2006), where right-side adjuncts are “hanging” on the edge of a phrase, without being labeled. (The symbol “^” indicates concatenation without labeling.)

(4) $[_{XP} \text{Spec } [_X \text{ X0 Complement}]] \wedge \text{Adjunct}$

I claim that, in such a configuration, the adjoined position and the phrase it adjoins to have no c-commanding relations, because the adjunct is not dominated by any labeled node. As a result, the anaphors in adjoined positions (e.g. (2)a) are not licensed by c-command configurations, contrary to the standard Binding Conditions (Chomsky 1981). Instead, the analysis of reflexives as residues of movement (Hornstein 2001) can account for the distribution of anaphors inside adjuncts in terms of sideward movement.

2. Conflicting data on adjunction

2.1. Evidence to show that adjoined positions are ‘lower’

Pesetsky (1995) points out that the data of anaphors, bound pronouns and NPIs show that an adjunct PP on the right is c-commanded by the complement of a PP on the left. The below examples show that the left-side (complement) PP always c-commands the right-side (adjunct) PP, but not vice versa.¹

- (5) Anaphor binding (cf. (2))
- a. Sue talked [to these people₁] [about themselves₁].
 - b. *Sue talked [to themselves₁] [about these people₁].
- (6) Bound variable pronoun
- a. Sue talked [to each employee₁] [about his₁ paycheck].
 - b. ??Sue talked [to his₁ friends] [about each employee₁].
- (7) Negative polarity
- a. Sue talked [to no linguist] [about any conference].

1. The examples are slight modification from Pesetsky (1995: 161-162, 266-267). Some speakers find the anaphor binding examples with PP shift ((8)a) less acceptable than the other examples.

- b. *Sue talked [to any linguist] [about no conference].

When the complement PP undergoes rightward movement (which I call “PP shift”), however, the c-command relationship seems to be reversed: the shifted PP seems to be asymmetrically c-commanded by the adjunct PP on its left.

(8) Anaphor binding

- a. (?)John talked t_{PP} [about the men_i] [$_{PP}$ to themselves_i].
 b. *I talked t_{PP} [about themselves_i] [$_{PP}$ to [John and Bill]_i].

(9) Bound variable pronoun

- a. Rosa talked t_{PP} [about each defendant_i] [$_{PP}$ to his_i lawyer].
 b. ??I talked t_{PP} [about her_i mother] [$_{PP}$ to every girl_i].

(10) Negative polarity

- a. Bill talked t_{PP} [about no conference] [$_{PP}$ to any linguist].
 b. *I talked t_{PP} [about any of the boys] [$_{PP}$ to none of the girls].

The above data seem to show that an adjoined element is lower than the element it adjoins to; an adjunct/shifted PP is always c-commanded by a PP on its left side.

2.2. Evidence to show that adjoined positions are ‘higher’

On the other hand, other data suggest the opposite: PP shift seems to move a PP to a higher position than its original position. If PP shift adjoins a PP to an adjoined position, it indicates that right-side adjunct positions can be higher than the complement position.

Jeff Lidz (p.c.) observes the following contrast between shifted and non-shifted complement PPs.

- (11) a. [$_{IP}$ Someone [$_{VP}$ gave every book_i [$_{PP}$ to its_i prize winning author]] yesterday]. (some>every, every>some)
 b. [$_{IP}$ Someone [$_{VP}$ gave every book_i t_{PP}] yesterday] [$_{PP}$ to its_i prize winning author]. (??some>every, every>some)

In (11)a, *every* can take either wide or narrow scope with respect to *someone* when it binds the variable inside the PP. If this PP undergoes PP shift as in (11)b, on the other hand, *every* must scope over *someone* to obtain the bound reading of the pronoun inside the PP.² Differently put, *every* must be

2. The fact that speakers only allow “every>some” for (11)b requires an

in a higher position than *some* at LF in order to bind the pronoun.³ This asymmetry suggests that the PP in (11)b is actually in a higher position than that in (11)a, and that PP shift can affect scope relationships. This constitutes an argument against the claim that a shifted PP is lower than (or in the same height as) its non-shifted counterpart.

Note that the PP shift in (11)b is ‘long-distance’ in that it crosses a temporal adverb. Similarly, (12)-(14) shows that, when the shifted PP crosses a temporal adverb, it cannot be bound by an element on its left anymore, unlike the examples in 2.1.

(12) Anaphor binding

??John talked t_{PP} [about the men₁] yesterday [_{PP} to themselves₁].

(13) Bound variable pronoun

??Rosa talked t_{PP} [about each defendant₁] yesterday [_{PP} to his₁ lawyer].

(14) Negative polarity

??Bill talked t_{PP} [about no conference] yesterday [_{PP} to any linguist].

If adjunction operation is uniformly to a lower position, these pieces of data are hard to capture.

2.3. Evidence to show that adjoined positions are ‘outer’

The above subsections illustrate the puzzle about the height of an adjoined position. Moreover, data of VP-fronting (15) and *do-so* test (16) show that adjunct PPs, unlike complements, can be excluded from the target of these operations, indicating that adjuncts are attached outside of complements.

(15) a. *?John talked [_{PP} to Mary]. Bill did so [_{PP} to Susan].

explanation; the situations where “some>every” holds should be a subset of the situations where “every>some” holds. I speculate that some kind of scalar implicature is in order to exclude “some>every” situations from the “every>some” interpretation. See also Musolino and Lidz (in press) for an example of scalar implicature in adult comprehension tasks.

3. The configuration in (11)b apparently induces Weak Crossover violation (WCO), because the trace of the QP does not c-command the variable *its* in the shifted PP. The fact that derivation in b is not excluded as WCO violation seems to suggest that WCO should be defined in terms of ‘leftness’ rather than ‘c-command.’ The bound variable is not c-commanded by the original position of every, but still sits on its right side. (See Epstein 1987, 2000 for a related discussion.)

- b. John talked [_{PP} near Mary]. Bill did so [_{PP} near Susan].
 (16) a. *Talk, though John did _ [_{PP} to Mary] (, ...)
 b. Talk, though John did _ [_{PP} near Mary] (, ...)

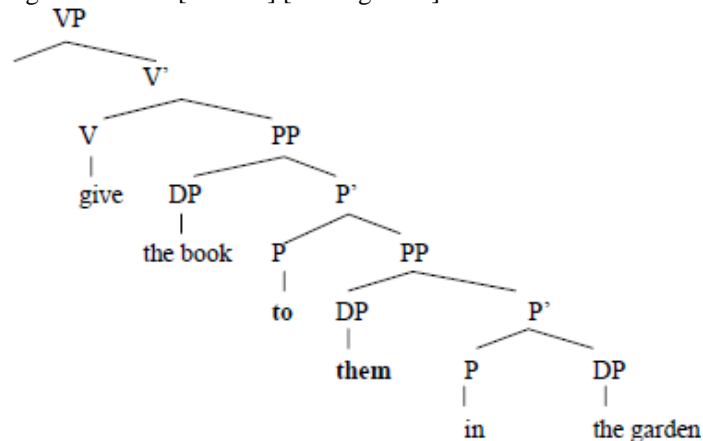
This asymmetry is standardly considered to be evidence that a complement is included in the innermost VP segment, while adjunct is excluded from it (See (1)). If you abandon the configuration in (1) and claim that the adjunct is somewhere below the complement, you need to explain why adjuncts can freely be outside of the operations that target a VP.

3. Previous analyses

3.1. Pesetsky (1995) on cascade structures

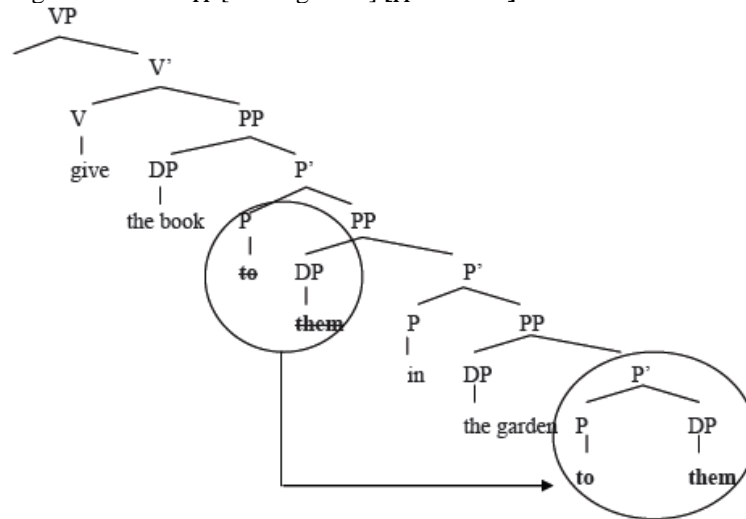
To account for the c-command facts in 2.1., Pesetsky (1995) proposes what he calls a ‘cascade structure’ for adjunction. In the cascade structure, adjuncts are located lower than the left-side material, as shown in (17).

- (17) ... give the book [to them] [in the garden]



In this structure, the adjunct PP (*in the garden*) is embedded inside the complement PP (*to them*). The fact that the adjunct PP is asymmetrically c-commanded by the complement ((5)-(7)) naturally follows. When the argument PP undergoes PP shift, it is further embedded deeper than the adjunct PP in the cascade structure, as in (18).

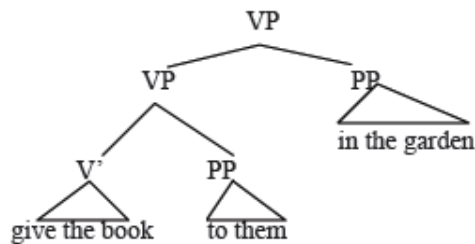
(18) ... give the book **t_{PP}** [in the garden] [**PP to them**]



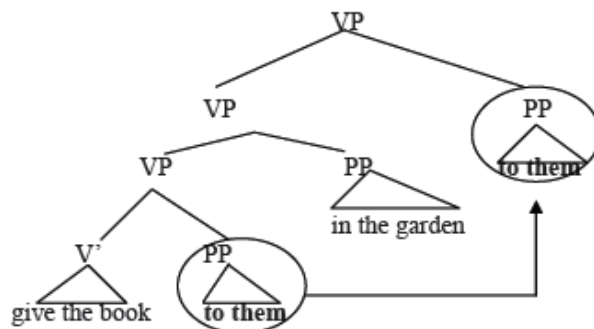
Hence, a complement PP that is shifted to the right-side of an adjunct PP is asymmetrically c-commanded by the adjunct PP, as seen in (8)-(10).

He also assumes that the standard 'layered structure' such as (1) is also constructed in the grammar. This explains the fact that adjuncts can be outside of the target VP in VP constituency tests ((15)-(16)). (17) and (18) are represented as (19)a and (19)b, respectively, in the layered structure.

(19) a.



b.



Thus, the same PP shift operation is a lowering operation in the cascade structure ((18)), and is a raising operation in the layered structure ((19)b). The layered structure is used for determining the constituency (such as *do-so* test and VP-fronting), while the cascade structure is used to determine the c-command relationships.

However, there are several problems in this analysis. First, it cannot explain the fact that the ‘long’ PP shift that crosses a temporal adverb is to a higher adjoined position ((12) in 2.2. is repeated in (20)).

(20) ??John talked _{PP_} [about the men_i] yesterday [_{PP} to themselves_i].

In the cascade structure, the shifted PP is buried inside the existing elements. The PP *to themselves* should still be lower than *about the men*. Hence, the example is predicted to be fine, contrary to the fact. Secondly, PP shift in his view must involve a non-constituent movement ((19)b). Pesetsky calls elements that are constituents only in layered structure ‘L-constituents,’ while elements that are constituents in both structures are called ‘LC-constituents.’ For example, the PP *to them* in (18) and (19)b is an L-constituent. He assumes that L-constituents as well as LC-constituents undergo movement, but it is unclear why such movement is not problematic in the cascade structure. Finally, positing two totally different hierarchies for one sentence can be a burden for computation. If we can get by with a single structure per sentence, it would be theoretically more desirable.

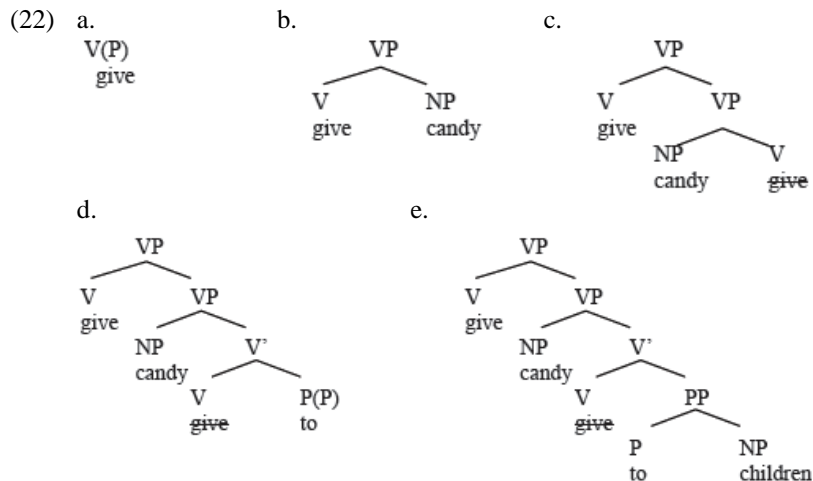
3.2. Phillips (1996) on Merge right

Phillips (1996) accounts for the same paradigm explained in Pesetsky (1995) without positing two parallel structures. He proposes that derivation

proceeds incrementally from left to right, employing the two conditions on tree building in (21).

- (21) a. *Merge Right*: New items must be introduced at the right edge of a structure.
- b. *Branch Right*: Where a terminal can be attached to more than one position in the existing structure with no effect on interpretation, the attachment that results in the more right-branching structure must be chosen.

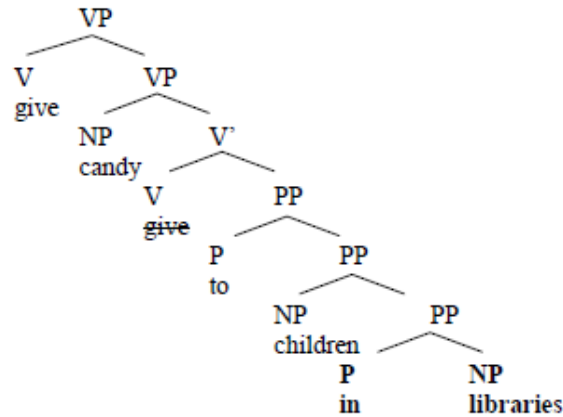
Under this analysis, the derivation of the VP *give candy to the children* proceeds in the following way.



The derivation starts as a single node *give* ((22)a). The next element, that is, the complement NP *candy* Merges to its right ((22)b). A null copy of the verb *give* is added to the further right to make a VP-shell structure of the oblique dative construction (Larson 1988) ((22)c). When a PP is added, the P node is Merged right first ((22)d), followed by its complement ((22)e).

When another adjunct PP is added in the derivation, it is Merged further to the right, as illustrated in (23).

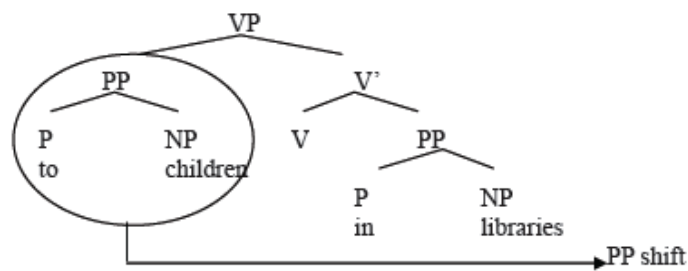
(23)



This structure, just like Pesetsky’s (1995) cascade structure, can explain why an anaphor in the right side PP can be licensed by the antecedent in the left side PP.

In this system, Branch Right is a preference principle, not an absolute principle. Left-branching structure is allowed when Merge Right is not appropriate. The right-branching structure (23), for example, is incompatible with the rightward movement of PP shift of *to children*, because the complement PP does not make a constituent. The PP shift example (24)a, hence, needs to be derived from the left-branching source (24)b, where the PP *to children* is a constituent.

- (24) a. I give candy t_{PP} in libraries [$_{PP}$ to children].
- b.



Note that whether it is upward or downward does not affect his discussion. If you add an assumption that the ‘short’ PP shift in (5)-(7) is a lowering operation while the ‘long’ PP shift in (11)-(14) is a raising operation, the

that right-side adjuncts are freely ordered as shown in (27). The free ordering indicates lack of inherent ordering between adjuncts.

- (27) a. John eats the cake [with a fork] [in the yard].
 b. John eats the cake [in the yard] [with a fork].

Second, it explains the fact that they are freely included in or excluded from operations such as VP fronting ((28)).

- (28) John could eat the cake [in the yard] [with a fork] and...
 a. [eat the cake] he did in the yard with a fork.
 b. [eat the cake with a fork] he did in the yard.
 c. [eat the cake in the yard] he did with a fork.
 d. [eat the cake in the yard with a fork] he did.

H&N assumes that VP adjuncts are only optionally labeled under VP. If an adjunct is outside of the label as in (25), it escapes the target of VP fronting. In this way, the hanging adjunct analysis explains the behavior of adjoined elements.

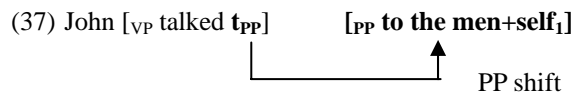
4.2. Adjunct attachment without c-command

Adopting H&N's analysis, I will attempt to explain the facts about the PP shift and c-commanding relations. The core of my argument is that an adjoined position is not in a c-command relationship with a phrase it adjoins to. According to H&N, adjuncts are in a hanging position that does not have a labeled node. If there is no labeled node that dominates the adjoined PP, the adjoined position is not incorporated into the hierarchy; therefore, it is not hierarchically higher or lower than the elements inside the VP. As a result, the adjoined PP cannot c-command inside the adjoined phrase. In other words, using the "first-node" definition of c-command (29), there is no c-command domain for the adjoined PP because there is no "node" that immediately dominates the adjunct.

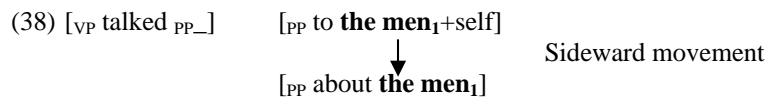
- (29) A c-commands B if the node that immediately dominates A also dominates B.

Therefore, the fact that an adjunct cannot c-command the complement PP is naturally derived. If unlabelled concatenation does not create a 'node' that is relevant for the definition (29), it also follows that the complement PP does not c-command the adjoined position.

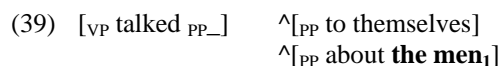
preposition *to*. When a complement PP is shifted, I assume that it becomes like an adjunct subtree, as shown in (37).



When the adjunct PP is constructed, *the men* in the complement PP can undergo sideward movement and be Merged with the preposition *about*.



Finally, both subtrees are adjoined to VP, to be interpreted as VP adjuncts. The origin of the movement is pronounced as *themselves* and it yields the structure (39).⁴



The sideward movement account can distinguish the data of ‘long’ PP shift from the ones of ‘short’ PP shift. When PP shift crosses a temporal adverb as well as an adjunct PP, the shifted PP seems to be higher than the ‘short’ PP cases, as the contrast between (36) and (40) (repeated from (12)) shows.

(40) ??John talked PP₋ [about the men₁] yesterday [PP to themselves₁].

I claim that the degradedness of (40) can be explained in terms of the strict

4. A technical question arises as to why the derived form (39) is pronounced as “talked about the men to themselves,” and not “*talked to themselves about the men,” under the assumptions that right-side adjuncts are freely ordered (H&N). One way to explain it is to assume an inherent direction in which sideward movement can happen. In Nunes (1995, 1999, 2004) and Hornstein’s (2001) system, sideward movement always occurs from the adjunct into the main clause tree. In (38), sideward movement starts from one adjunct (which used to be a complement) and moves into another adjunct. The generalization seems to be that sideward movement always forms a leftward movement in the final outcome. In other words, there is a constraint that the starting subtree of the sideward movement is pronounced later.

the hanging adjunct analysis by Hornstein and Nunes (2006), I claimed that an adjoined position does not need to enter into a c-commanding relationship with a phrase it attaches to. I went on to show that the reflexive licensing does not need to be explained in terms of c-command, following Hornstein (2001). In such an account, a reflexive inside a PP is licensed by sideward movement (Nunes 1995; 1999; 2004). Although it remains to be seen whether the explanation can be extended to other phenomena that has been explained in terms of c-command, such as reciprocals, bound pronouns and NPIs, it would not be implausible, given movement analyses of these phenomena in previous studies (e.g. Heim, Lasnik and May 1991 on reciprocals, Kayne 2002 on bound pronouns).

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