Extraposition, the Right Roof Constraint, Result Clauses, Relative Clause Extraposition, and PP Extraposition

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Extraposition may be defined as a process by which an element is moved to the right of, or subsequent to, its canonical position. Examples of extraposition are given in (1-3):

(1) a. That John is a fool is obvious.
   b. It is obvious that John is a fool.
(2) a. A book which was written by Chomsky appeared.
   b. A book appeared which was written by Chomsky.

The (a) versions are assumed to represent the basic word orders, and the (b) versions are assumed to represent the extraposed versions. The extraposition that is exemplified in (1) is simply termed extraposition, following (Rosenbaum 1967); the process in (2) is often called extraposition of relatives, and sometimes extraposition from NP (a term that originates in the period before nominals were analyzed as DPs); and the process in (3) is often called PP-extraposition. In this survey, Rosenbaum’s extraposition will be dealt with only briefly, in section ??, where we discuss the status of the Right Roof Constraint, but it is necessary to delimit it, in order to emphasize the construction that we will not be talking about.

Rosenbaum’s extraposition deals with the alternation in which a clausal argument of a predicate does not appear in its “normal” position, but rather appears to the right of that position, and that position is occupied by the expletive “it”. We will therefore be discussing the phenomenon whereby an element appears to the right of its canonical position but a gap is left. The element is either a PP or a CP. There is another construction in which an element appears to the right of its normal position, but this construction is usually distinguished in the literature from extraposition, and is termed the “Heavy NP Shift” construction, exemplified in (4):

(4) a. I gave everything I had to John.
   b. I gave to John everything I had.

Although the similarities between Heavy NP Shift and extraposition are highly suggestive of a unified analysis, a formal unification of the grammatical analysis of the two constructions has not been made, to our knowledge.

With the focus of discussion hopefully clarified, let us proceed to the question of the etiology of the extraposition construction. Three analyses have appeared in the literature: (i) rightward movement of the extraposed element from its canonical position to a position subsequent to the canonical position ((Ross 1967), (Akmajian 1975), (Baltin 1978) (Baltin 1981)); (ii) generation of the extraposed element in the extraposed position, perhaps with some interpretive process that treats it as though it were in the canonical position((Culicover 1990); (iii) given that extraposed elements are modifiers of some sort, generating the extraposed elements and the elements that they modify as constituents in the extraposed position, with leftward movement of the elements that are modified ((Kayne 1994).

We will discuss all three of these analyses, and compare them, in subsequent sections, but we will first establish some high-level descriptive generalizations about the extraposition construction, as a kind of yard-stick against which to measure the success of each analysis.

I. The Position of Attachment of the Extraposed Element

To be neutral among all three analyses of extraposition, it would be helpful to introduce some terminology. Let us refer to the phrase which the extraposed element is construed as modifying as the host. For example, the underlined subjects in (2)(b) and (3)(b) are hosts.
Hosts can occupy a variety of positions—the subject position is only one. For example, objects can be hosts:

(5) I called somebody yesterday who I couldn’t stand.

Objects of prepositions can also serve as hosts:

(6) I talked to somebody about that who was quite knowledgeable.

Wh-phrases, presumably in [Spec, CP], can also be hosts:

(7) Who did you visit who was unhappy about the visit?

Extraposition cases such as (7), in which the host is in a derived position, raise the question of what the host is. If we assume that the wh-phrase and its trace form a chain, is the host the head of the chain, or the tail of the chain? Culicover & Rochemont (1990) present evidence that that host is the head of the chain. We will present this evidence below, but for now, it must be taken on faith, because the notion of a host has not been shown to have any theoretical significance; it has only been a terminological matter. It is clear, however, that unless grammatical relations are determined derivationally, i.e. pre-movement, in a way in which they are indelible, some mechanism must be countenanced that can determine the fact that a given extraposed element is the modifier of a given host. (Gueron 1984) provide such a principle, which they dub the complement principle. This is presented in (8):

(8) Complement Principle (Gueron & May’s (11))

In a sequence of categories $\alpha_i, \beta_i$ in a structure $\Sigma$, $\beta_i$ are complements to $\alpha_i$ only if $\alpha_i$ governs $\beta_i$.

They assume the following definition of government:

(9) (Gueron & May’s (12)): $\alpha$ governs $\beta_i$ if $\alpha, \beta_i$ are dominated by all the same maximal projections, and there are no maximal projection boundaries between $\alpha$ and $\beta$.

Gueron & May assume May’s ((May 1985)) principle that adjunction creates multi-membered projections, and that to be dominated by a node is to be contained within all of its members. They further assume that Bresnan’s $S’$ (i.e. Comp + S) is the maximal projection of $S$, a non-standard assumption today, the standard assumption being that there is a CP and a TP, both of which are maximal projections. Gueron & May’s complement principle will be examined in Section ?, but for now, we note that they require that the head of an ~A-chain be the element that is construed with the extraposed constituent, and there are two independent reasons for allowing extraposed elements to be construed with ~A-chain heads. The first is based on a fact first noted in Baltin (1978a, b), to the effect that extraposition cannot occur out of a fronted PP:

(10) *In which magazine did you see it which was lying on the table?

The object of a preposition that remains within the VP can be related to an extraposed constituent:

(11) I saw it in a magazine yesterday which was lying on the table.

Crucially, if the preposition is stranded, a fronted wh-phrase can more acceptably be related to an extraposed constituent:

(12) ?? Which magazine did you see it in which was lying on the table.

The essential contrast here is between (10) and (12). It is true that (11) shows that an extraposed constituent can be related to a prepositional object that is within the VP, but a prepositional object within a PP that is fronted out of the VP cannot launch an extraposed constituent. It seems, however, that a fronted prepositional object that is fronted by itself does more easily launch an extraposed constituent. We will return below to the inability of a fronted PP to host an argument that is related to an extraposed constituent. Unfortunately, the acceptability of (12) seems to be marginal.

A clearer piece of evidence that an extraposed constituent must be related to the head of an ~A-chain, rather than the tail, is provided by Culicover & Rochemont (1990), who note the contrast between (13) and (14) (their (49) and (50), respectively).
*He invited several girls to the party [that John dated in high school].
How many girls did he invite to the party [that John dated in high school]?

If we assume that the extraposed relative in (13) is adjoined to the VP, co-indexing between a pronominal subject and an R-expression that is within the extraposed relative violates Principle C of the binding theory (Chomsky (1981)) under standard assumptions. The fact that such co-indexing is acceptable in (14) indicates that the extraposed relative must be outside of the domain of the subject, which it is if the extraposed relative in (14) is adjoined to CP.

Baltin (1981) shows that there is no unique point of attachment for extraposed constituents. It is shown there that constituents that are extraposed from subject position (relatives and extraposed PPs) are adjoined to IP, while relatives and PPs that are extraposed from within objects are adjoined to VP. The arguments are based on stranding contrasts of extraposed material under VP-ellipsis and VP-fronting processes. Specifically, material that is extraposed from subject position can be stranded when the VP is elided or fronted, and indeed must be stranded under those conditions, while material that is extraposed from object position cannot be stranded when the VP is elided or fronted:

Although not many people would ride with Fred who knew just him, some would who knew his brother.
Although no reviews appeared of Chomsky’s book, one did of Jakobson’s book.
*Although he didn’t call people up who are from Boston, he did who are from New York.
*Although he didn’t call people up from Boston, he did from New York.
John said that he would call people up who are from Boston, and call people up who are from Boston he did.
*John said that he would call people up who are from Boston, and call people up he did who are from Boston.
John said that he would call people up from Boston, and call people up from Boston he did.
*John said that he would call people up from Boston, and call people up he did from Boston.

This would indicate that the generalization about the structural position of extraposed phrases is the following:

An extraposed phrase is adjoined to the first maximal projection that dominates the phrase in which it originates.

Therefore, an extraposed element that modifies a wh-phrase in [Spec, CP] would be adjoined to CP, and hence out of the c-command domain of the subject, accounting for Culicover & Rochemont’s observations noted in (14). It will be noted that (16) predicts that an element that is extraposed from subject position will follow an element that is extraposed from object position, given that the former would be adjoined to a projection dominating VP, while the latter is adjoined to VP. This prediction appears to be correct:

Someone picked some books up which were lying on the table who really didn’t want to.
*Someone picked some books up who really didn’t want to which were lying on the table.

It should be noted that while extraposition is usually thought of as applying to elements that modify nominals, the process is clearly more general. It applies to clausal and PP complements of adjectives and verbs as well (as noted by Baltin (1981)):

How fond of Sally are you?
How fond are you of Sally?
How certain that the Mets will win are you?
How certain are you that the Mets will win?
Believe that Fred is crazy though I may, it doesn’t matter.
b. Believe though I may that Fred is crazy, it doesn’t matter.

(21) a. Talk to Sally about Martha though I may, it won’t matter.
   b. Talk to Sally though I may about Martha, it won’t matter.

Gueron & May’s complement principle does not make reference to the categorial status of
the head, and this is one of its virtues, as we see.

II. LF-Locality Between Head and Complement

Let us examine more closely Gueron & May’s (1984) Complement Principle, repeated here,
together with their definition of government:

(15) Complement Principle (Gueron & May’s (11))

In a sequence of categories $\alpha_i, \beta_i^1\ldots\beta_i^n$ in a structure $\Sigma$, $\beta_i^1\ldots\beta_i^n$ are complements to $\alpha_i$ only if $\alpha_i$ governs $\beta_i^1\ldots\beta_i^n$.

(16) (Gueron & May’s (12)): $\alpha$ governs $\beta$ =df $\alpha, \beta$ are dominated by all the same
maximal projections, and there are no maximal projection boundaries between $\alpha$ and $\beta$.

Assuming that the Complement Principle governs locality between an extraposed constituent
and its host, S-structure cannot be the level at which the Complement Principle must hold.
Gueron & May assume the S-structures advocated in Baltin (1981), in which a constituent that is
extraposed from subject position is adjoined to TP, while a constituent that is extraposed from
object position is adjoined to VP. They also assume May’s (1985) convention regarding
adjunction-structures, which posits a distinction between projections and members of
projections. Adjunction structures are viewed as creating multi-membered projections.
Domination by a projection requires containment within all of the members of the projection, so
that an adjoined element is not viewed as being dominated by the node to which it is adjoined;
rather, it is viewed as being dominated by the next higher projection. Hence, a relative clause
that is adjoined to VP is not dominated by that VP, since it is not contained within the lowest
member of that VP (the one to which it is adjoined), while an object would be dominated by the
VP. The same argument holds, by parity of reasoning, for relative clauses adjoined to TP.

Hence, the nominal host of an extraposed relative clause would not govern it at S-
Structure. Gueron & May claim, however, that government by the nominal host of the
extraposed relative clause would hold at LF if the nominal QRs (Quantifier Raises) to adjoin
still higher than the extraposed relative clause (or PP).

As evidence for the Complement Principle’s application at LF, after QR feeds the
Complement Principle, it is necessary to bifurcate the class of restrictive relative clause-taking
nominals into those that are quantified and those that are not, with the prediction being that only
the former will be able to host extraposed relative clauses. The definite determiner the, and
demonstratives, are not considered to be quantified, and therefore cannot cause the DPs that they
head to QR. Therefore, they should not be able to host extraposed relative clauses. It has often
been noted, and Gueron & May note as well, that nominals introduced by definite articles indeed
do not host extraposed relatives:

(5)* The man showed up who hated Chomsky.

The claim, however, that DPs that are headed by demonstratives do not host extraposed
constituents is less obviously true. Gueron & May assign a * to the following example:

(6) (Gueron & May’s (17)(b)) * I read that book during the vacation that was written by
Chomsky.

However, it is not as bad as (6), and parallel examples are perfect:

(7) Those students will pass this course who complete all of their assignments on time.
It is, however, impossible, it seems, to improve a nominal that is introduced by a pure definite
article as an extraposition host. Therefore, the predictions of the LF-locality theory of
extraposition do not seem to be clearly borne out. In Section V, when we consider the stranding
account of extraposition, we will examine an alternative, more overtly syntactic, account of the
contrast between definite articles and demonstratives as introducers of extraposed relative clause hosts.

III. The Right Roof Constraint

Assuming that (16) is correct, and that extraposed elements are adjoined to the first maximal projection that dominates their “hosts”, we must ask precisely what mechanism ensures this. If extraposition is a rightward movement process, it is natural to place its restriction on the theory of bounding, a specification of the locality constraints on movement. If one takes extraposition as arising from generation of the constituent in its extraposed position, and construal of this element as modifying some element to its left, the locality constraint would be taken to be a specification of the configuration in which this modification construal is licit. A third view of the rightward movement locality conditions was proposed by Kayne (1994), which we will discuss below.

First, however, a bit of history is in order. Ross (1967), taking extraposition to be a rightward movement process, noticed that extraposition had stricter constraints on how far it could move than leftward movement processes, such as wh-movement. Specifically, he posited a constraint that has come to be known as the Right Roof Constraint:

\[(22) \text{ Right Roof Constraint} \]

An element cannot move rightward out of the clause in which it originates.

An example of the Right Roof Constraint can be seen below, taken from Baltin (1978):

\[(23) \] *John was believed to be certain by everybody that the Mets would lose.

Assuming the by-phrase to be in the matrix clause, whose main verb is passive, it follows that the finite complement which follows it, the underlying complement of certain, must also be in the matrix clause, and cannot be within the infinitive. Since we have seen that clausal complements of adjectives can extrapose (as seen in (19)), something must be preventing it from extraposing out of the infinitive clause into the matrix clause, and the Right Roof Constraint seems to accurately describe this restriction.

Of course, the fact that the Right Roof Constraint needs to explicitly mention the direction of movement is a defect in a theory of Universal Grammar that incorporates it. It is clear that there is no “Left Roof Constraint”; wh-movement, for example, can clearly extract elements out of the clauses in which they originate:

\[(24) \] *What was John believed to be certain that we would be assigned__?*

Let us put aside for the moment the objection to incorporating the Right Roof Constraint as is into the theory of grammar, while we examine its empirical adequacy.

Following Ross’s extensive discussion of the range of syntactic islands, an attempt was made to unify them into a general theory of bounding of movement, a theory of locality of movement in the form of Chomsky’s ((Chomsky 1973)) Subjacency condition:

\[(25) \text{ Subjacency:} \]

In the configuration $X\ldots[[\alpha\ldots[\beta\ldots\gamma\ldots]\ldots]\ldots]X'$, no element $Y$ can be moved to position $X$ or $X'$, if $\alpha$ and $\beta$ are both cyclic nodes.

It had been thought in the 1960s and 1970s that a proper subset of the set of maximal projections could be stipulated as cyclic nodes, the set of nodes that were relevant for the transformational cycle. It had been proposed that universally NP (before NPs were reanalyzed as DPs, in Abney (1987)) was one of the cyclic nodes, and either CP, IP (in those days, $S'$ and $S$ respectively) or both were cyclic nodes as a parameter.

Much of the empirical effects of the Right Roof Constraint could be derived from Subjacency, but not all, as shown by Baltin (1981), to whom we will return. Akmajian (1975) showed, however, that the Right Roof constraint, which mentions only the clause as setting a boundary for rightward movement, is too weak, in that extraposition seems to be much more
bounded in its movement, the required boundary being at a sub-clausal level. Akmajian discussed the ambiguity of (26):

(26) A review of a book by three authors appeared.

The ambiguity hinges on the modification relation between the second PP and the NP that it is taken to modify, with different structures for the subject. Presumably, assuming again that nominal arguments are NPs rather than DPs (for historical fidelity to the work cited, although nothing hinges on this):

(27)a. [ NP A [N’ [N’ review of a book][PP by three authors]]]
   b. [ NP A [ N’ [review][PP [P of ][NP a book by three authors]]]]

In (27)a, the second PP is within the highest NP, representing the reading in which three authors penned the review, while in (27)b the second PP is within the lowest NP, representing the reading in which three individuals wrote the book. Akmajian noted, however, that PP extraposition of the second PP removes the ambiguity, with the reading corresponding to (27)a, rather than (27)b:

(27) A review of a book appeared by three authors.

Assuming extraposition to be an instance of movement, movement out of the lowest NP would violate subjacency, since the PP would have to cross two NPs to move out of the subject, while movement out of the higher NP would only cross one NP, obeying subjacency.

Baltin (1978a, b) and, independently, van Riemsdijk (1978), argued that PPs also had to be counted in the set of cyclic nodes that were relevant to Subjacency. These authors argued on the basis of leftward movement restrictions as well, but one argument, from Baltin (1978a, Baltin 1978), was the account that inclusion of PP in the inventory of cyclic nodes would furnish of the inability of extraposition of relative clauses to occur out of fronted PPs, noted in (10), repeated here:

(10) *In which magazine did you see it which was lying on the table?

If the PP and the NP that contain the relative clause are both counted for subjacency, subjacency rules out extraposition of a relative clause to a position outside of the PP.

A problem for this account, however, is the fact that such extraposition does seem to be possible out of a PP that remains inside of the VP, as noted in (11), repeated here:

(11) I saw it in a magazine yesterday which was lying on the table.

One account of the difference in extraposition possibilities between (10) and (11) relied on a notion of “reanalysis” of the preposition, causing it to incorporate, in current parlance, into the verb, and presumably pruning the preposition’s projections, so that there would be no PP node in (11) that would dominate the NP out of which extraposition took place. The reanalysis account was extremely influential for a number of years, but Baltin & Postal (1996) presented several arguments, to which the reader is referred, that there is no reanalysis of prepositions that occurs within the VP. For example, comparative subdeletion cannot occur in the object of a preposition, while it clearly can to uncontroversial objects, so that the contrast in (28) holds:

(28) a. *John talked to more of these people than he talked to__of those people.
   b. John read more of these books than he read__of those books.

The contrast between (10) and (11) seems to be identical to the contrast in (29) and (30), involving anaphoric binding rather than extraposition:

(29) *To whom did he talk about each other?
(30) I talked to them about each other.

On the face of it, the contrast between (29) and (30) would seem to argue for reanalysis of the preposition with the verb, allowing the prepositional object to then c-command the second PP (again assuming subsequent pruning or some sort of analogous device of the preposition’s original projection(s)). However, as shown by Baltin & Postal, we get contrary results for Principle B, involving pronouns:

(31)* To whom, did John talk about him?
(32)* John talked to Fred, about him,
Assuming a uniform definition of c-command that would underly Principle A and Principle B, we would first have to make re-analysis obligatory, to account for the impossibility of binding in (4), but the impossibility of binding in (3) is unexplained, since re-analysis would not be able to apply to the fronted P.

Another possible avenue of pursuit in the account of why PPs that remain within the VP allow extraposition out of them, within the attempt to subsume bounding constraints on extraposition from subjacency, would be the adoption of Chomsky’s ((Chomsky 1986)) revised formulation of Subjacency in the context of the Barriers approach. In this view, subjacency makes reference not simply to the number of maximal projections between the original position of a moved element and the position to which it moves; rather, reference is made to the number of barriers between a moved element and its trace, where a barrier is a maximal projection that is not L-marked (roughly speaking, L-marking means being a complement to a lexical category and being θ-marked by that lexical category). To see the need for relativization of the set of bounding nodes for subjacency to the set of L-marked maximal projections, consider (33), in which wh-movement is occurring out of an infinitival complement of a noun that is the semantic head of the object (Chomsky (1986) has similar examples):

(34) Who did you announce [DP ..[NP plans [CP to visit ti ]] ]?

This would be ruled out by the earliest formulation of subjacency, but permitted by the Barriers approach to subjacency.

With this in mind, if a PP that remains within the VP is a selected complement of the V, and the prepositional object presumably bears the same relation to the P, neither said PP nor its object will be barriers, and subjacency will not be violated.

A fronted PP, on the other hand, will be a barrier, since it is not in a configuration to be L-marked. Hence, the difference between (10) and (11) is accounted for.

We must still ask, however, how (23), repeated here, is accounted for if we assume the Barriers approach to Subjacency.

(23) *John was believed to be certain by everybody that the Mets would lose.

There is one way in which extraposition out of an infinitival complement that remains within the VP could be ruled out. The infinitive could be viewed as a CP that dominates a TP. The TP, not being L-marked, would be a blocking category, and the CP of the infinitive would be a “barrier by inheritance”. However, Chomsky explicitly argues that TP, while a blocking category, is not a barrier. The infinitival VP, not being L-marked, is also a barrier. Hence, extraction out of the infinitive would cross two barriers- the VP and, possibly, the CP.

Given that subjacency is taken to induce weak violations, with the number of barriers crossed leading to increased unacceptability, crossing two barriers is taken to induce unacceptability, while crossing one does not. For example, extraposition of the clausal complement of a wh-moved adjective does not induce any unacceptability:

(35) How fond are you of Sally?

However, assuming that movement over one barrier is possible, we can see that subjacency is insufficient in and of itself to account for the locality constraints on the extraposition relation between an extraposed element and its host. For example a relative clause that is extraposed from object position to a position outside of the VP would only be crossing one barrier, the VP, given that the object is L-marked by V, and yet we saw that such extraposition leads to unacceptability, as seen in (15)(f), repeated here:

(15)(f) *John said that he would call people up who are from Boston, and call people up he did _who are from Boston.

Similarly, if we assume that prepositions L-mark their complements, extraposing a relative clause out of a fronted PP would only cross one barrier-the PP itself. We would therefore have no account of the impossibility of such extraposition, exemplified by (10), repeated here:

(10) *In which magazine did you see it which was lying on the table?
As a matter of historical fact, between the formulation of subjacency in Chomsky (1973), which simply counted cyclic nodes, and the Barriers formulation of subjacency in Chomsky (1986), another formulation of subjacency was proposed by Baltin (1981). In that formulation, there was believed to be an asymmetry between the set of bounding nodes for rightward and leftward movements, such that every maximal projection was considered to be a bounding node for rightward movement, and only a subset of these were bounding nodes for leftward movements. The formulation is given in (35):

(35) (Baltin (1981), (8)) Generalized Subjacency:

In the configuration A…[a…[b…B …]…]…l….A’,

i. A’ cannot be related to B where a and b are maximal projections of any major categories;

ii. A cannot be related to B where α and β are drawn from the following list of phrasal categories: (a) PP; (b) NP; (c) S or S’ or both, depending on the specific language.

This asymmetry was motivated by the general impossibility of extraposing out of any VP complement to a position outside of the VP. An example would be the unacceptability of (36)(b) as opposed to (36)(a):

(36)(a) Become fond of Sally though he may, it won’t matter.

(b) *Become fond though he may of Sally, it won’t matter.

It was assumed in Baltin (1981) that the complement of become is an AP, and hence the extraposition in (36)(b) would involve movement past AP and VP. Clearly, leftward wh-movement of the PP is perfectly acceptable:

(37) Sally, of whom I became quite fond___, is an exceptional linguist.

IV. The Status of The Right Roof Constraint

There are some problems with the Right Roof Constraint and its successor, Generalized Subjacency. These problems are of both an empirical and a conceptual nature. Let us begin with an empirical problem.

We noted that PPs that are located within the VP can host extraposition of relative clauses out of them, as in (11), repeated here:

(11) I saw it in a magazine yesterday which was lying on the table.

Without reanalysis, Generalized Subjacency is apparently violated with impunity, since the relative clause, if extraposed, is crossing the NP or DP, as well as the PP dominating the host nominal. It is unclear, however, that such violations are systematically possible, however. For example, if we adapt Akmajian’s example by placing the complex nominal within the VP, the extraposed PP cannot be interpreted as modifying the most deeply embedded nominal:

(38) I read a review of a book yesterday by three authors.

One potential problem may lie in the acceptability of the following:

(39) I would prefer for everyone to leave that you would___.

Sentence (39) seems to be an example of the much-discussed Antecedent-Contained Deletion (ACD) construction, originally discussed Bouton (Bouton (1970)), and then by May (1985), (Baltin 1987), (Larson 1990), (Hornstein 1994), and others. ACD is the phenomenon whereby ellipsis occurs apparently in the antecedent of the elided material. Another example is given in (40):

(40) I read everything you did___.

Assuming that the VP of the relative clause in (40) has undergone VP-ellipsis (including elision of the trace of the relative clause operator), the antecedent of the elided VP appears to contain the elided VP, and reconstruction or copying of the antecedent into the null VP would lead to an infinite regress. To solve this problem, it is necessary to perform some operation that would move the relative clause out of the antecedent VP so that the antecedent does not contain
the VP to be elided at the stage at which the identity between antecedent and ellipsis candidate is to be determined.

There have been three main mechanisms in the literature to accomplish this configurational rescue: (i) quantifier-raising of the DP at LF (May (1985), (Larson 1990)); (ii) extraposition of the relative clause out of the VP ((Baltin 1987))); (iii) movement of the DP that contains the null VP to [Spec, Agr-O"] for Case-checking reasons ((Hornstein 1994)).

(May 1985) difference between (39) and (41):

(41) ?? I would prefer for everyone that you would to leave.

Presumably the infinitival sequence which follows the infinitive's subject is a non-maximal projection, hence unable to extrapose out of the highest VP. The entire infinitive subject is therefore assumed to be a complex nominal, i.e. a constituent, and hence the relative clause in (41) would have to be contained within its antecedent.

Crucially, the antecedent in (39) is assumed to be the matrix VP, so that (39) means that I would prefer for everyone to leave that you would prefer to leave. However, in order to avoid antecedent-containment, the relative clause in (39), if extraposed, would have to cross the TP of which it is subject, the CP, and the DP, violating Generalized Subjacency.

It would seem, therefore, that in at least two situations, when the host of the extraposed element is located within the VP, Generalized Subjacency, an extension of Ross's Right Roof Constraint, is violated. However, it cannot be violated in Akmajian's cases, as in (38).

The conceptual problem with Generalized Subjacency is its stipulative nature. Why should there be an asymmetry between the set of movement barriers for rightward and leftward movement? Moreover, the stipulation of the set of bounding nodes for leftward movement, an embarrassment for pre-Barriers formulations of Subjacency, remains in this account.

IV. Alternative Accounts of the Right Roof Constraint in Other Approaches to Extraposition

At this point, it may be useful to compare the other two approaches to extraposition—the non-movement account and the stranding account— with respect to how they handle the bounding restrictions on the extraposition relationship. These two accounts will be examined in more detail in subsequent sections, but it will be useful to look at these approaches simply with respect to this issue.

First, with respect to the non-movement account, notice that the Complement Principle, given in (8), will ensure locality between the extraposed element and its host, given that the extraposed element must be adjoined to the minimal maximal projection containing the host (Culicover & Rochemont (1997)) in order to be interpreted as a complement. Hence, violations of Generalized Subjacency will be due, not to this constraint per se as a primitive, but to the Principle of Full Interpretation (Chomsky (1985)), given that an extraposed element that is adjoined above the first maximal projection that dominates the element that it is supposed to modify will not be in the right configuration to modify that element. Unless there is some other role for the extraposed element to play in the interpretation, it will simply be superfluous, and cause the structure to run afoul of the Principle of Full Interpretation.

It is clear, however, that the problems for Generalized Subjacency remain as problems for the Complement Principle. Without re-analysis, (11) violates the Complement Principle, just as it violated Generalized Subjacency, and (39), for which re-analysis is even less plausible, violates the Complement Principle in exactly the same way that it violates Generalized Subjacency. In both cases, the extraposed element, assuming that it is adjoined, is adjoined higher than the first maximal projection dominating the candidate for modifiee.

Another alternative to the Right Roof Constraint was proposed by (Kayne 1994), within the context of the stranding analysis of extraposition. Recall that the stranding analysis eschews rightward movement of the modifier. Rather (Kayne only discusses relative clause extraposition, but presumably the analysis would be extended to extraposition of complements of other types of modifiers, as in (18-21)), the head is moved leftward by normal leftward movement (presumably A-movement), stranding the relative clause. Hence, the “extraposed” position is
in fact the base position of the head. This analysis affords us the opportunity to view with a fresh eye Right Roof Constraint violations such as the following (Kayne (1994)’s (5), Chapter 9):

(42) * The fact that somebody walked into the room is irrelevant who I knew.

Kayne notes that if we assume the stranding analysis, the head of the relative clause would have to originate in the matrix clause and move leftward, lowering into the subject noun-complement clause. Given that the nominal is not an argument of the matrix predicate, generating it in this position would violate the theta-criterion, however it is re-cast in Minimalist terms. Second, the movement would be movement to a non-c-commanding position, violating an assumption that movement is always to a c-commanding position (although see Boskovic & Takahashi (1998) for a defense of lowering rules).

Hence, the stranding analysis of extraposition replaces Generalized Subjacency with either of two restrictions: (i) the requirement that arguments be generated in the domain of their heads; (ii) a ban on movement to non-c-commanding positions.

It can be shown, however, that while (ii), the ban on lowering, may be accurate, (i) is not. Turning our attention to extraposition of clausal arguments, discussed by Rosenbaum (1967), consider the following sentence, discussed in (Baltin 1978):

(43) It was believed to be certain by everybody that Fred would win.

Assuming that the by-phrase is in the matrix clause, the finite complement, certainly an argument of certain, must also be in the matrix clause. Extraposition of clausal arguments clearly obeys Generalized Subjacency:

(44) (a) That it was obvious to everybody that Bush was a moron surprised me.
(b) *That it was obvious to everybody surprised me that Bush was a moron.

It should be noted that (43) contrasts with (23), repeated here:

(23) *John was believed to be certain by everybody that the Mets would lose.

What is the basis of this contrast? One immediate observation that comes to mind is that in (43), the finite complement is related to the expletive in some way, and the expletive has clearly undergone A-motion into the matrix. In (23), the clausal argument cannot be related to any position in the clause in which it resides; there is no expletive, for one thing.

The re-analysis of extraposition, viewed as a rightward movement, as stranding, a leftward movement, is done in the context of Kayne’s (1994) Linear Correspondence Axiom (LCA), which maps linear precedence onto asymmetric c-command, such that if A asymmetrically c-commands B (A and B are assumed to be non-terminals), the terminals that A dominates must precede the terminals that B dominates. Therefore, rightward adjunction would be impossible, because the results could not be linearized.

Given that the alternation that is characterized by extraposition must be characterized by any grammar, including one that assumes the LCA as the basis for linear order, one way to capture the relationship between the variant in which the clausal argument appears in subject position and the variant in which it appears in final position (the subject position being occupied by the expletive) would be to generate the clausal argument in final position, and allow it to move leftward into subject position. Hence, the structure in which the clausal argument is in “extraposed” position, corresponding to (45)(a), would be more basic than the structure in which the clausal argument is in subject position, corresponding to (45)(b):

(45)(a) It is obvious that Fred is crazy.
(b) That Fred is crazy is obvious.

Indeed, this was the tack that Emonds ((Emonds 1970), (Emonds 1972)) took, in an analysis of the alternation that was an alternative to Rosenbaum’s, labelling the leftward movement process “intraposition”.

If we adopt the leftward movement characterization of the extraposition analysis, the intraposition view, sentences such as (43), in which clausal arguments are in clauses superior to the ones in which their selecting predicates occur, indicates that Kayne’s first suggestion as to how to rule out Right Roof Constraint violations cannot be correct. Arguments would have to be
permitted to be generated in clauses that are superior to the ones in which they are arguments, under this view.

The second barrier to leftward movement of all or part of an argument into a lower clause, the fact that such movement would be lowering to a non-c-commanding position, may be more promising. The problem here comes from consideration of the case in which the clausal argument appears in final position, with the subject position apparently occupied by the expletive *it*. No overt movement occurs here. In earlier times, Emonds (1970, 1972) suggested that the expletive and the clausal argument were “co-indexed”. If this were true, the unacceptability of apparent Right Roof Constraint violations that involve clausal argument extraposition, such as (44)(b), might be due to a requirement that such co-indexing requires c-command.

However, current Minimalism eschews indices in general. A more recent mechanism for the relationship of expletive-associate pairs, which (Chomsky 1995) pursues for *there*-expletives, involves positing the expletive *there* as defective, i.e. missing some of the features of T, in whose specifier position it occurs. The associate of the expletive has these features (Case and phi-features), so that these features would then raise and adjoin to T. However, crucially, Chomsky contrasts English *it*-expletives, which are not defective, so that features of the associate would not raise to T. If this is correct, then there would seem to be no device to explicitly mark the relationship between the expletive and the clausal argument in the final representation.

However, we would then have to ask what is responsible for the Right Roof Constraint effects in (44)(b). It can be seen from examples such as (43) that arguments can be higher than their selecting predicates. If there is no device to explicitly relate the expletive and clausal argument pairs in extraposition constructions, then what is responsible for the Right Roof Constraint restrictions in this construction?

In fact, one possible move might be to generate the expletive and the clausal argument together, and move either the expletive or the clausal argument into subject position. In English, the expletive and the clausal argument cannot surface together, for reasons that we cannot explore here, but the two can surface together in Scandinavian languages, according to Noam Chomsky (personal communication, citing Dianne Jonas). If this is correct, one can perhaps assimilate Rosenbaum’s view of extraposition to Kayne’s view of extraposition as, in fact, leftward movement of the non-clausal part of an argument, stranding the clause. In the phenomenon that Rosenbaum analyzed, it would be the expletive itself that is moving leftward, rather than the semantic head of the relative clause. It would be necessary, however, to attribute the Right Roof Constraint effects to a ban on movement to a non-c-commanding position, rather than a requirement that arguments be generated within the same local domain as the heads that license them.

V. The Base-Generation Analysis of Extraposition and the Stranding Analysis In Greater Detail.

A. The Base-Generation Analysis

The earliest analysis of the extraposition phenomenon viewed it as arising from rightward movement of clauses and prepositional phrases. There are a number of problems that arise from this analysis of extraposition. One problem is a theory-internal problem that can be seen from considering extraposition of relatives and PPs from subject position. In Government-Binding theory terms, the Empty Category Principle (ECP), originally proposed in (Chomsky 1981) and revised and refined in numerous works in that period, required that traces be properly governed, in the sense of being governed by either a lexical category (later, the trace’s theta-role assigner) or its antecedent; traces of categories which were not theta-governed had to fulfill the latter requirement. The subject position was always a barrier to government, and relative clauses, which have been viewed as adjuncts, are not theta-governed. Hence, as originally noted by Howard Lasnik (cited in Baltin (1987)), if a relative clause were extrapoosed from subject position, and it left a trace, the trace would violate the ECP. Extraposition of a PP complement of a noun would not violate the ECP, since the PP would be governed by the noun, its theta-role assigner.
It is important to note an objection to a movement account of extraposition that was advanced often in the 1970s through the early 1990s that no longer has any force. As noted by Akmajian (1975) in a footnote, and often repeated, one might ask why extraposition could not violate subjacency by successive cyclically moving the extraposed element to adjoin to the first bounding node, and then the next, etc., parallel to the successive-cyclic movement of wh-elements, which, of course, superficially violate subjacency, but do not in reality because of the successive-cyclic character of wh-movement.

The reason that the question of why successive-cyclicity for extraposition was not possible was even raised in Akmajian (1975), and subsequently, was that successive-cyclicity was supposed to be the norm for movement, an assumption that was crucial in Chomsky (1986), for example, who used widespread adjunctions to barriers as a means of voiding barrierhood. 

This assumption is no longer held within, e.g., Minimalism, where it is held that movement is only done for, e.g., feature-checking (Chomsky (1995)) or for some other purpose, pragmatic or semantic ((Reinhart 1995), (Reinhart 1997)), (Fox 2000)), a principle known as “Last Resort” (Chomsky ((Chomsky 1991), 1995), Lasnik ((Lasnik 1999))). If Last Resort is assumed, something extra must be assumed to allow for successive-cyclic movement. For example, to allow for successive-cyclic raising, Chomsky (1995) makes a distinction between interpretable features, which are checked but not erased, allowing an element to keep moving to check features of a target, and uninterpretable features, which are deleted as soon as they are first checked. If we assume that extraposition does not check any interpretable features, it could not be successive-cyclic, and the question disappears. Of course, the question within Minimalism, assuming Last Resort, would be what feature(s) extraposition would check. There is no satisfactory answer to this question at this time.

An extremely straightforward argument against a movement account of extraposition is based on a phenomenon originally noted by (Ross 1970) There are extraposed relative clauses with split antecedents, one in each conjunct of a coordination. In this case, there is no single head that could serve as the antecedent for the relative clause. The phenomenon appears when the relative clause contains a symmetric predicate, one requiring a plural subject:

(46) A man entered the room and a woman left who were similar.

Interestingly enough, such split antecedence appears to be possible only across conjuncts:

(47) *A man visited a woman (yesterday) who were similar.

It is also only possible when the two antecedents are in parallel positions within the conjuncts; a subject in the first conjunct cannot combine with an object in the second:

(48) *A man entered the room and I saw a woman who were similar.

Needless to say, as Ross & Perlmutter (1970) noted at the time, such cases of extraposition are extremely problematic for a movement account of this construction, since there is no plausible source for the origin of the relative clause within a single nominal. Such cases of extraposition would therefore appear to lend credence to a base-generation approach to extraposition. However, it is necessary to account for the apparent need for parallel positions for the antecedents in the split antecedent construction.

One line that might be pursued in accounting for these restrictions might be to make use of the difference in adjunction sites for relative clauses extraposed from subject position versus those for relative clauses extraposed from object position. It should be recalled that the former were shown to be adjoined to TP, while the latter were adjoined to VP. Assuming that this difference in adjunction sites is relevant to the reconstruction of the complement relation, such that a complement could be at most adjoined to the maximal projection dominating the element to which it is to be interpreted as complement, the relative clause in (48) would have to be adjoined to the TP conjunction. This would allow the extraposed relative to be interpreted as modifying the subject in the first conjunct, but not the object in the second.

This account would also account for why split antecedence is not possible in simple sentences, as in (47). The extraposed relative could be interpreted as modifying the subject if
adjoined to TP, but it would not be able to be interpreted as modifying the object in that case. If it is adjoined to TP, it could modify the object, but could not then modify the subject (if we assume that modifiers cannot be interpreted as being lower than the phrases they modify, perhaps if modification is assumed to be interpreted cyclically and indelibly).

The Complement Principle, in tandem with the Principle of Full Interpretation (Chomsky (1986), which requires that all elements that are present at LF must be integrated into the sentence in some way, thus accounts for the locality restrictions on “extraposed” (the term being used in a purely descriptive sense now) elements vis-à-vis the elements that they modify. However, there is a cost. The term complement is usually reserved for a phrase that is an X-bar sister of an X₀ head that assigns it a theta-role; it is an argument of that head. Elements that modify higher projections are considered adjuncts. The Complement Principle does not distinguish between complements, which are internal arguments of some theta-role assigning X₀, and adjuncts, so that the underlined elements in both (49)(a) and (b) are considered complements:

(49)(a) A review appeared of Chomsky’s book.
(b) A man showed up who was quite convincing.

While this may be accurate for the LF grammatical relations of these phrases, it does not reflect their underlying grammatical relations. The same problem shows up clearly in examples of extraposition that modify phrases other than nominals, such as the following, pointed out by an anonymous Linguistic Inquiry reviewer to Culicover & Rochemont (1990):

(50)(a) How fond of Sally are you?
(b) How fond are you of Sally?

The adjective fond obligatorily takes a PP headed by of as an internal argument, and yet a trace-less structure with the Complement Principle would simply note the locality between the “extraposed” PP and the AP headed by of—in other words, placing the PP in the configuration of an adjunct, modifying the AP. Nowhere is, e.g., the obligatory selection between the PP and fond reflected in this structure.

In sum, it would seem that the adoption of the Complement Principle obscures what has been thought to be a crucial grammatical distinction, between arguments and adjuncts, and complicates the view that there are linking regularities between thematic relations and syntactic positions for realizing those thematic relations (Carter 1988), (Gruber 2000), (Perlmutter & Postal 1977; Pesetsky 1995)).

B. The Stranding Analysis
As noted earlier, the stranding analysis of extraposed constituents (Kayne (1994)) generates them, together with their hosts, in the positions in which they ultimately reside, and moves the host into its surface position, minus the relative clause. To see how this works, we must first discuss the analysis of relative clauses within this approach.1

First of all, relative clauses are analyzed as CP complements of determiners², and the heads of relative clauses are promoted from within the relative clauses themselves, an analysis first advocated in the 1970s (Brame 1976), (Schachter 1973), (Vergnaud 1974), and others. Hence, the structure of, e.g., (51) would be as in (52):

(51) The book that I read.
(52) [DP [D the] [CP [NP book][C' [C that ] [TP I [VP [V read][NP t] ]]]]

Hence, the nominal “head” of the relative clause is within the Spec of the CP of the head of the relative clause, and, at least in the case of determiner the introducing the relative clause, does

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1 See (Borsley (1977)) for a criticism of this approach, and Bianchi (2000) for a response to Borsley’s criticisms.

2 While the approach taken in Kayne (1994) is easiest to explain for relative clauses that are introduced by the complementizer that, he also shows how this account can extend to wh-relatives. The exposition of this extension would take us too far afield. For details, see Kayne (1994), pp. 88-90.
not form a constituent with the determiner. This aspect of the analysis is crucial, as we will see in Section IV.B.1, for accounting for stranding possibilities for relative clauses headed by various determiners. Other determiners are not located as the highest head of DP, but are in fact within the NP, such as numerals or the indefinite article a.

(53) two books that I read.
(54) [DP [ D 0][CP [NP two books ][C’[C that]][TP I [VP [V read][NP t]]]

As evidence for this analysis of relative clauses, Kayne notes that the definite article cannot introduce a simple nominal with a post-nominal genitive, as in (55):

(55) *The picture of John’s.

Post-nominal genitives that are introduced by the are possible when the nominals are further modified by relative clauses, however:

(56) The picture of John’s that we like.

In contradistinction to the, numerals can introduce post-nominal genitives in simple nominals:

(57) two pictures of John’s.

Briefly, Kayne analyzes nominals such as (57) as being headed by of, which he takes to be a determiner (D), and the material to the left of of in (57) originates in the NP complement of of, which then moves to its specifier. The two stages are shown in (58):

(58) a.  [ DP [D of][NP John’s [NP two pictures]]
    b.  [DP [NP two pictures]][D of ][NP John’s ti]

However, if the, unlike the numerals and the indefinite article, is a D which cannot take a DP complement, the impossibility of post-nominal genitives introduced by the is accounted for.

With this in mind, we are now in a position to see some advantages of the stranding analysis of relative clause extraposition:

1. Advantages

It will be recalled that in Section II, we reviewed the claim by Gueron & May (1984) that the hosts of extraposed constituents had to be quantified. One piece of evidence for this claim was the observation that nominals which were introduced by the definite article the were impossible hosts for extraposed constituents, as in (5), repeated here:

(5)* The man showed up that hated Chomsky.

Gueron & May tied the impossibility of (5) to the non-quantified status of the head of the relative, but the stranding analysis offers a competing account. The structure of a complex nominal which is introduced by the has the structure in (59):

(59)[DP [D the ][CP [NP man][C’ that hated Chomsky]]]

Crucially, the determiner the and the NP man do not form a constituent under this analysis, and under the traditional assumption that only constituents can move, the derivation of (5) from a structure which corresponds to (60) would illicitly involve movement of a non-constituent:

(60) e showed up )[DP [D the ][CP [NP man][C’ that hated Chomsky]]]

We therefore have two proposed methods of preventing nominals that are introduced by the from hosting extraposed relative clauses. The first method, that of Gueron & May (1984), bases the method on the syntactico-semantic properties of the determiner; the second method, relying on Kayne (1994), bases the account on a purely syntactic restriction on the definite article the—it is a D^0, higher in the DP than numerals and the indefinite article. Can we find any additional evidence to choose between the Gueron & May account and the Kayne-based account?

We can. It will be recalled that the restriction on demonstratives introducing hosts of extraposed relatives, to the extent that the restriction is real at all, is much weaker than the restriction on the introducing hosts of extraposed relatives, as was seen from the perfect acceptability of (7), repeated here:

(7) Those students will pass this course that complete all of their assignments on time.

Demonstratives and the are equally definite, so some other factor must be responsible for the distinction between (6) and (7).
It turns out that demonstratives, unlike the definite article *the*, can introduce post-nominal genitive constructions:

(62) Those pictures of John’s….

By the reasoning in Kayne (1994) concerning the post-nominal genitive, demonstratives must be lower within the DP than the definite article, perhaps within the NP itself. Hence, the structure of the relative clause in (7) would be, in the relevant respects, (63):

(63) [DP [D 0][CP [NP those students][C’ [C that][TP t’[VP complete all of their assignments on time]]]]]

The prediction would be that ability to introduce a post-nominal genitive construction would correlate with the ability to host an extraposed relative clause. More research is needed to see if this correlation holds.

Similarly, the inability of the host of an extraposed relative clause to reside within a fronted PP, noted in the discussion of (10), repeated here, has a natural explanation within the stranding analysis:

(10) *In which magazine did you see it which was lying on the table?

The preposition plus NP do not form a constituent if the head of the relative clause resides within the Spec of CP.

Of course, the fact that apparent prepositional objects that reside within the VP can host extraposed relative clauses, as in (6), repeated here, poses the same problems for the stranding analysis as it did for Generalized Subjacency, discussed in Section III:

(6) I talked to somebody about that who was quite knowledgeable.

2. Disadvantages

Given that a relative clause that is extraposed from subject position is to the right of the VP, the stranding analysis requires a stage of derivations in which the subject is to the right of VP, with the subject moving to [Spec, AgrP] or whatever the superficial subject position turns out to be. Assuming movement is always to a c-commanding position (a position that is currently predominantly but not universally accepted ((Bobaljik 1997) (1998(Culicover 1997) note the following binding contrast involving extraposition from object position:

(64)(Culicover & Rochemont (1997)’s ex. (7)(a) and (b)):

a. I sent her, many gifts last year that Mary, didn’t like.

b. I sent her, many gifts that Mary, didn’t like last year.

The pronominal first object c-commands the second object ((Larson 1988), based on (Barss 1986)), triggering a Principle C violation (Chomsky 1981)) in (a), but if the only difference between the derivation of (64)(a) and (64)(b) is the complexity of the moved material into the second object position, Principle C should rule out both (64)(a) and (64)(b), as pointed out by Culicover & Rochemont. In short, it would appear that the “extraposed” constituent is not c-commanded by its host.

A characterization of the positions from which stranding can occur is not a trivial matter. For example, Kayne (1994) proposes (p. 121, (21)) that “A relative clause can be stranded by A-movement only in a non-Case position.” However, if we assume, as is standard, that nominals that undergo passive A-movement are in non-Case positions, we would predict from this statement that a relative clause can be stranded in the first object position of a passive double object construction, contrary to fact:

(65) * Someone was given who liked Steinbeck an interesting book.

Kayne (1994) in fact discusses such cases, and suggests (p. 166, fn. 4) that their deviance may be “an extreme case of the constraint against complex specifiers…”. However this constraint is formulated, it would seem to have to distinguish between specifier positions to which Case is assigned, and specifier positions to which Case is not assigned (or checked), given that the former positions, which don’t allow stranding of the relative, do allow the entire DP to occur in them, and the entire DP is presumably more complex than the stranded relative.
If we look again at Culicover & Rochemont’s examples, (13) and (14) repeated here, we see that stranding must be possible under A-bar movement:

(13) *He, [VP [VP invited several girls to the party]] [CP that John, dated in high school]].
(14) How many girls did [IP he, invite to the party][CP that John, dated in high school]?

This would, of course, be possible, if wh-movement first involved movement to an intermediate A-bar position that is higher than the surface subject position, as suggested for other cases by Chomsky (1986). However, we then have no account, other than the necessarily extremely refined constraint against complex specifiers, as to why relatives cannot be stranded in object position, as in (66):

(66)*How many girls did he consider who were from Boston interesting?

(14) would furthermore require first movement of the object to pre-IP position, and then subsequent preposing of the IP as remnant movement to the left of the preposed object. These movements would require independent motivation.

In short, the stranding analysis captures some facts rather neatly, such as the distinction between demonstratives and definite-determiner headed DPs as extraposition “hosts”, but it also suffers from some shortcomings, such as the binding facts that indicate that extraposition hosts must be lower than the extraposed material (64), the lack of a precise characterization of the positions from which stranding would take place, and the Ross-Perlmutter observation that extraposed relatives can have split antecedents.

VI. Extraposition of PP

(Barbiers 1995), in discussing extraposition of PPs in Dutch, notes that focus particles cannot precede extraposed PPs, although they can precede PPs that are moved by other processes, such as topicalization. He cites the following pattern:

(67) (Barbiers’ Ch. 4, ex. (6)):

a. Jan heeft (PP pas in EEN stad) gewerkt
John has just in one city worked.

b. Jan heeft (FoP pas) [VP gewerkt] [PP in EEN stad]
John has just worked in one city.

The afore-mentioned contrast is between (6)(d) and (6)(e). Assuming that PP extraposition is rightward movement of the extraposed constituent, we must ask why a PP that is introduced by a focus particle cannot be extraposed. As seen from (6)(f), focus particles can occur within extraposed PPs; they just cannot introduce them.

Barbiers’ account of this fact relies on a general account of the syntax-semantics mapping that he proposes and motivates within that work, and a detailed account of that proposal is beyond the scope of this case. Briefly, he proposes a principle of semantic interpretation:
(68)  (Barbiers’ 4.10) Principle of Semantic Interpretation

I. A node Z establishes a S(EMANTIC)-RELATION between a node X and a node Y iff X immediately c-commands Z and Z immediately c-commands Y.

II. Z is a QUALIFIER of X iff Z establishes a S(emantic)-relation between X and Y, and X and Y are coindexed.

Barbiers, in Chapter 2, defends a notion of c-command that differs somewhat from standard definitions. It is presented as (69) (his Chapter 4, fn. (7)):

(69)  (a) C-command

X c-commands Y iff
(i) X does not dominate Y and Y does not dominate X
(ii) There is a (connected) path of left branches from Z, the minimal node that dominates X and Y, to X

(b) Immediate c-command

X immediately c-commands Y iff X c-commands Y and there is no closer c-commander W such that X c-commands W and W commands Y

(c) Connected path of left branches

Two paths of left branches A and B are a connected path of left branches AU B iff there is no node that intervenes between the two paths

Armed with this machinery, we are now in a position to describe Barbiers’ analysis of extraposition. In essence, the Principle of Semantic Interpretation yields the syntactic configurations for the modification relation (or the Qualifier Relation), and, assuming Chomsky’s ([Chomsky 1986]) Principle of Full Interpretation, an element that occurs at LF that receives no interpretation causes the structure to be ruled out. A PP argument of a verb must be interpreted as a qualifier of the VP. In order to accomplish this, such PP arguments are generated as left-adjuncts of the VPs of which they are arguments, and the VP then moves leftward to the specifier position of the PP adjunct. Hence, the partial initial structure of (70) (the unfocussed variant of (67)(a), (71):

(70)  Jan heeft in een stad gewerkt.

    Jan heeft [VP [PP in een stad][VP gewerkt]]

The afore-mentioned movement of the adjoined VP to the specifier of its adjunct PP can take place either before or after Spell-Out (Chomsky (1995)), i.e. either overtly or covertly. In any event, the VP movement is motivated by the need to establish the qualification relation, and the LF is, in the essential respects, (72):

(72)  Jan heeft [VP[PP [VP' gewerkt][PP[PP in][DP een stad]]][VP t']]

In other words, the extraposition phenomenon is really the leftward movement of the host of the extraposition, in this analysis, motivated to yield the requisite qualification configuration. If the VP and its argument PP do not end up in this configuration, and if there is no other interpretation available, the structure will run afoul of the Principle of Full Interpretation.

In fact, this is what happens in (67(d), in Barbiers’ account. In his analysis of focus particles (Barbiers (1995), Ch. 3), the focus particle must immediately c-command either its semantic argument or the trace of its semantic argument. The semantic argument can either be a temporal object or a numeral object; in the former case, it corresponds to a VP, and in the latter case, it corresponds either to a DP or a PP that contains the DP. It seems that FocPs can be generated either as left-adjuncts of any maximal projections. However, FocPs must also be interpreted as qualifiers of their semantic arguments, and must hence be in the requisite configuration with respect to the constituents that denote those semantic arguments. With this in mind, the underlying structure of all of the sentences in (67) is (73):

(73)  Jan heeft [VP [FocP pas][VP [PP in een stad][VP gewerkt]]]

Given that the lowest VP must first move into the Spec of the PP adjunct in order to license the PP as its qualifier, the next structure would be (74):

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The movement of VP into the Spec of its PP adjunct may be either overt or covert, as can be the movement into [Spec, FocP]. If the highest PP, with the VP filling the specifier, moves into [Spec, FocP], the focus particle is interpreted as a qualifier of the PP, so that the qualifier would receive a numeral-associated interpretation. Covert movement into [Spec, FocP] of the PP would yield (67)(b), if movement of the VP into [Spec, VP] is overt. If VP-movement into [Spec, PP] is covert, and movement of PP into [Spec, FocP] is covert, we get (67)(a).

To derive a temporal interpretation for the focus particle, the VP must occupy the focus particle’s Spec. This could be accomplished by moving the highest VP overtly into the Spec of FocP, and would correspond to (67)(c). (67)(d) is marginally possible, according to Barbiers, with a temporal interpretation, but is ungrammatical with a numeral association for the focus particle, because there is no derivation that would place the focus particle into the requisite configuration with the PP so as to allow it to receive a numeral-associated interpretation.

Barbiers’ argument, however, is somewhat weak, in that it seems to over-predict the possibilities with respect to the interaction of focus particles and extraposition (here construed as leftward movement). Overt movement of the VP into Spec PP, would cause the VP PP configuration to be a PP. This PP with filled Spec should be permitted to move to [Spec, FocP], where the focus particle will immediately c-command its trace. The result would be (67)(c), which would simply differ from (67)(b) in that the latter would involve covert movement into [Spec, FocP], while the former would involve overt movement of the large PP into [Spec, FocP]. Hence, this argument for PP extraposition involving leftward movement is problematic.

VII. Result Clauses

Finally, another construction that seems to have some affinities with extraposition is the degree complement construction that is exemplified in (75):

(75)  a. John was so hungry that he would eat anything.
    b. John was too angry for us to talk to him.
    c. John was hungry enough that he would eat anything.
    d. John was hungry enough to eat anything.

There is a dependency between the underlined degree words and the clausal phrases to suggest a level of representation at which the clausal phrase is a complement of the degree word (Selkirk 1970), (Bresnan 1973)). For one thing, the clausal phrase cannot appear without the degree word’s presence; for another, the finiteness value of the clausal phrase is determined by the particular degree word, such that so requires that the clause be finite, too that it be non-finite, and enough allows either (75(c-d)).

(76)  a. * John was hungry that he would eat anything.
    b. *John was angry for us to talk to him.
    c. * John was so hungry to eat anything.
    d. *John was too tired that he ate anything.

With these considerations, early analyses of degree phrases posited representations in which the degree word and the clause formed a constituent, in which the clause was a complement of the degree word. An obligatory extraposition process would then move the clause rightward, so that, e.g. (75)(a) would include (77) in its derivational history:

(77)  John was[AP [ Deg” [Deg’ [Deg so ]]C” that he would eat anything] ]]

(Liberman 1974) noted, however, that, unlike the extraposition that we have been considering, a degree complement in clause-final position can have multiple antecedents:

(78)  So many people read so many books so often that it’s hard to keep track of them.
Moreover, there can only be one degree complement in a clause:

(79)  *So many people read so many books so often that the lines are immense that we have to re-stock the shelves that the bookstores are making a mint.

The possibility of split antecedents for the degree complement contrasts with the impossibility of split antecedents for the extraposed relative clause, discussed above in connection with (47).
Furthermore, as Gueron & May (1984) show, the degree complement can occur in a
clause that is higher than the clause in which the degree word resides:

(80) (Gueron & May’s (29)(a)) I told her that so many people attended last year’s concert
that I made Mary nervous.

The fact that (80) does not have the status of a Principle C violation of the binding theory
indicates that the result clause, which contains Mary, must be higher in the tree than the matrix
object object pronoun. Given that the degree word resides in tell’s complement CP in overt
syntax, extraposition of the degree complement into the matrix clause would violate the Right
Roof Constraint.

As Gueron & May note, however, the degree word can scope out of the clause in which it
overtly resides. Hence, (81), originally noted by Liberman (1974), seems to have two
understood interpretations, represented by the following logical forms (Gueron & May’s (33)):

(81) Mary believed that Harry is so crazy that he acted irrationally.

(82) a. Mary believed [ CP so2[CP that Harry is ei2 crazy ej2][CP that he acted
irrationally]2]

b. [ CP so2[TP Mary believed [CP ei2[CP that Harry is [ei2 crazy ej2]ej2]]][CP that
he acted irrationally]2]

The first interpretation of (81), corresponding to (82)a, is one in which the extent of
Harry’s craziness is within the scope of Mary’s beliefs, such that Mary believed that Harry’s
craziness was to such an extent that he acted irrationally. In the second interpretation of (81),
corresponding to (82)(b), Mary believed to such an extent that Harry is crazy that her beliefs
decided him to act irrationally.

These two interpretations are claimed to correlate with the syntactic position of the result
clause, such that the result clause is analyzed as being adjoined to the CP in which the degree
word takes scope. Matrix interpretation of the degree word is said to correlate with the
attachment of the result clause to the matrix CP, and this is analyzed by Gueron & May as a
reflex of the head-complement relation being established at LF, a view that has become
extremely consonant with the tenets of Minimalism (Chomsky (1995)), in which LF and PF are
the only two significant linguistic levels. Therefore, the interpretation of (80), given that the
result clause is adjoined to the matrix clause, is one in which the degree word must take matrix
scope.

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