1

Extraposition and Scope: A case for overt QR*

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1 Introduction

This paper argues that "covert" operations like Quantifier Raising (QR) can precede "overt" operations. Specifically we argue that there are overt operations that must take the output of QR as their input. If this argument is successful there are two interesting consequences for the theory of grammar. First, there cannot be a "covert" (i.e. post-spellout) component of the grammar. That is, what distinguishes operations that affect phonology from those that do not cannot be an arbitrary point in the derivation ("spellout") before which the former apply and after which the latter do; all syntactic operations apply in the same component (henceforth 'single component grammar'). Second, there must be some alternative means for distinguishing "overt" from "covert" operations. One such alternative, which we can call the 'phonological theory of QR', was suggested by Bobaljik (1995), Pesetsky (1998), Groat and O'Neil (1994). These authors proposed that the distinguishing property has to do with principles of the syntax-phonology interface. Assume that movement is a copying operation with phonology targeting one copy in a chain for pronunciation. The distinction between "overt" and "covert" movement, these authors suggest, is this: "overt" movements are the result of phonology targeting the head of a chain for

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pronunciation, while "covert" movements result from phonology targeting the tail of a chain. We will tentatively adopt this phonological theory of QR (but see footnote 4).

The argument that covert operations sometimes precede overt operations is based on extraposition from NP. Specifically, we argue that certain instances of extraposition result not from movement of the extraposed material but rather from QR of an NP and subsequent merger of an adjunct phrase. Phonology will determine that the NP is pronounced in its pre-QR position. But the late-inserted NP-adjunct is not present in the pre-QR position — it can only be pronounced in the position in which it was merged into the structure. QR followed by merger of an adjunct which is "overt" is impossible if covert operations apply after spell-out, hence the consequences for the architecture of the grammar noted above.

We start this paper with a well-known puzzle: extraposition seems to violate a robust generalization about movement, namely that adjuncts cannot be extracted from NP. A possible resolution for this puzzle is provided by the assumption that extraposition is not a unified phenomenon. Adjunct extraposition does not involve movement of the adjunct, hence does not violate the constraint. We argue in the remainder of the paper in favor of a resolution of this sort. Specifically, we argue that adjunct extraposition is derived by post-QR merger of the adjunct. Extraposition of complements, by contrast, is derived in a traditional manner, i.e. by movement of the complement.[1] The argument is based on two observations. First, the "extraposed constituent" in adjunct extraposition — in contrast to complement extraposition — shows no sign that it has been moved (and every sign that it has not). Second, in adjunct extraposition and not in complement extraposition, the NP with which the extraposed constituent is associated shows every indication that it has undergone QR.

2 Extraposition from NP — a puzzle

Consider the paradigm in (1). This paradigm illustrates a well-established restriction on movement: a complement can be extracted from NP (1a), and an adjunct cannot (1b).

(1) a. Of whom did you see [a painting t]?
b. *??From where/*??By whom did you see [a painting t]?

[1] For reasons of space, this paper will not deal with extraposition from subject NPs, which has somewhat different properties from the cases of extraposition that we investigate here. We discuss subject extraposition in Fox and Nissenbaum (in progress).

Extraposition from NP doesn't seem to obey this restriction, as exemplified in (2) (noted by Culicover and Rochemont 1990, 1992).

(2) a. We saw [a painting t_i] yesterday [of John]$_i$.
b. We saw [a painting (t_i)] yesterday [from the museum]$_i$.
c. We saw [a painting (t_i)] yesterday [by John]$_i$.

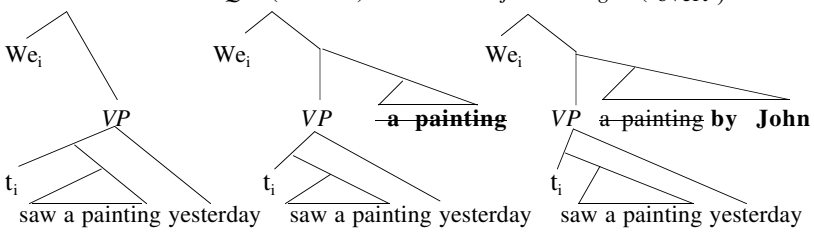
3 The proposal — post-QR merger of adjuncts

The fact that an adjunct can be "extraposed" from an NP is puzzling under the assumption that extraposition uniformly involves movement of the "extraposed constituent" (EC). However, as Culicover and Rochemont point out, this fact is not puzzling if the assumption is abandoned. Consequnetly, Culicover and Rochemont suggest that extraposition never involves movement of the EC. In this paper we argue for an alternative resolution of the puzzle. Specifically, we argue that complement extraposition *is* derived by movement of EC — a movement which obeys the restriction on extraction from NP — and that adjunct extraposition has a totally different derivation for which the constraint is irrelevant.

We propose that adjunct extraposition is derived by two different operations, the first covert and the second overt. First the NP with which the EC is associated (the "source NP") undergoes covert movement (QR) to a position (in this case to the right) in which it can be interpreted, and then the EC is adjoined to the source NP. This is illustrated in (3).[2]

(3) We saw a painting yesterday by John.

a. b. *QR* ('covert') c. *adjunct merger* ('overt')



[2] Something needs to be said about how an LF such as (3) is interpreted. Assume for the purposes of this paper, along the lines of Fox (in press), that the copy at the trace position is interpreted as a definite description: *the painting (identical to) x.* As a result, (3c) will receive a straightforward compositional interpretation as (i). For an alternative proposal see Sauerland (1998).

(i) [A painting by John] λx we saw [the painting (identical to) x]

A derivation along these lines was proposed for overt *wh*-movement by Lebeaux (1988). The extension to covert movement is straightforward under the phonological theory of QR. (For related but different proposals see Guéron and May 1984 and Reinhart 1991.)[3]

In the remainder of this paper we will present various arguments in favor of the derivation in (3) for adjunct extraposition. If these arguments are successful, they will strongly support a single component grammar in which covert QR can precede overt merger of an adjunct. Furthermore, the arguments will support the phonological theory of QR, which provides an alternative to a covert component in accounting for the invisibility of QR.[4]

4 Prediction for Scope

Our proposal that adjunct extraposition is derived by the steps shown in (3) makes an immediate prediction: the source NP must have wider scope than its surface position.[5] Specifically, we predict that (4) should hold:

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[3] Gueron and May's proposal shares with ours the property that the adjunct merges into the structure at the position in which it is pronounced. Similarly, they propose that the source NP raises to the position of the EC, in order (under their view) for the former to govern the latter. Thus the predictions for scope of the source NP, which we spell out and test below, are also implicit in Gueron and May, although G&M do not attempt to confirm them. G&M likewise do not spell out the nature of the movement of the source NP, specifically how it simultaneously satisfies the requirement that a moved constituent c-command its trace, and the standard sisterhood condition for semantic composition of an NP with its complement or adjunct. Finally, G&M's proposal (like that of Culicover and Rochement) does not distinguish between adjunct and complement extraposition, and therefore fails to predict the range of asymmetries that we find and investigate in this paper. Reinhart's proposal for elliptic conjunctions is very similar to G&M's proposal for extraposition. However, she argues that her proposal should not extend to extraposition. We don't have space to discuss her proposal here, but we hope to have something to say about it in Fox and Nissenbaum (in progress).

[4] If our proposal for extraposition is correct, a single-component grammar is virtually forced. The arguments in favor of the phonological theory of QR, however, are strong only inasmuch as this theory provides an alternative to a separate covert component in accounting for the invisibility of QR. Another potential alternative to a model with a separate covert component, which is consistent with our proposal, would abandon the assumption that there is a single point of spellout. Assume that there are many instances of spellout, each one updating a previously computed PF. Under this assumption, a principled account of the overt/covert distinction might be based on the idea that each instance of spellout must be local, updating only information that was introduced by the most recent operations. Covert operations would be ones that are not immediately followed by a spellout operation. A suggestion along these lines was made by Chomsky and Pesetsky (class lectures, 1998) and related to the Strict Cycle Condition.

[5] This prediction doesn't necessarily follow from QR alone, given the general possibility for scope reconstruction. However, the prediction does follow from the combination of QR

(4) **Adjunct-extraposition marks scope:** When an extraposed constituent (EC) is an adjunct, the scope of the source NP will be at least as high as the attachment site of EC.

To see a case which bears out this prediction, consider (5). These examples exploit a peculiar property of 'free choice' *any,* namely that it must appear in the scope of some modal operator like *look for* or *would.* This property is illustrated in (5a), where *look for* must outscope *any;* there is no interpretation which requires that there be a particular thing that the speaker was looking for. If (4) is correct then an adjunct extraposed from a source NP headed by 'free choice' *any* will yield an unacceptable result whenever the attachment site of the adjunct is higher than the modal licenser of *any.* Hence the unacceptability of (5b) is predicted. The EC appears to the right of an adverbial that modifies *look for,* signaling that the scope of the source NP must be at least that high — outside the scope of its licenser.

(5) *'Free choice'* any *is licensed in the scope of the verb look for.*

a. I looked very intensely for anything that would help me with my thesis.

b. * I looked for anything very intensely that will/would help me with my thesis.

c. I looked for something very intensely that will (likely) help me with my thesis

d. I would buy anything without making a fuss that will/would help me with my thesis.

(5c) and (5d) are control cases. An EC outside the scope of *look for* is in principle allowable as long as the source NP isn't required to have narrow scope (5c). (In fact, the source NP in (5c) can *only* have wide scope; the sentence would be false if there is no particular thing that the speaker was looking for.) And extraposition is allowed in principle even from a source NP headed by 'free choice' *any,* as long as the EC does not appear outside the scope of the modal licenser of *any.* This is shown by (5d). There, the EC appears to the right of an adverbial modifier of the main VP; the modal is the auxiliary verb *would,* which is (at least under one available structure)

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and late merger of an adjunct as we have proposed. If an adjunct is present only at the head of a chain, and if scope reconstruction results from interpreting only the tail of a chain (i.e. the head of the chain is deleted at LF), then late merger will block reconstruction; the adjunct would not be interpretable as a modifier of the source NP. Exactly these considerations are needed independently (as pointed out by Fox 1999) to account for correlations between scope reconstruction and binding theory.

higher than the site of extraposition. Hence QR of the source NP does not bring it out of the scope of its licenser in this case.

These facts suggest that the correlation predicted in (4) is correct: extraposition of an adjunct marks wide scope for the source NP. The correlation would be quite unexpected under the traditional view of extraposition as movement of the EC, but is exactly what is predicted if adjunct extraposition is derived by the steps in (3). This result is replicated in a range of other tests correlating the scope of source NPs with the surface position of ECs. (A fuller paradigm is given in Fox and Nissenbaum, in progress. A few more examples are provided in section 7 of this paper.)

5 Complements vs. adjuncts — further predictions

So far we have considered only cases of adjunct extraposition, and provided evidence that in such cases extraposition signals that QR has taken place. Our proposal makes additional predictions, but in order to test these we need to cover some background relating to the interaction of movement and binding theory, and the consequences for late merger. (6a) illustrates a general property of A-bar movement, namely that it doesn't bleed Condition C of the binding theory. The pronoun *he* in (6a) cannot be co-referent with *John*. From the perspective of Condition C, it looks as if the wh-phrase is in its trace position and *he* c-commands the r-expression *John*. Under the copy theory of movement, this is just what is expected: since movement leaves a copy of the wh-phrase, the pronoun c-commands *John* in the lower copy. However, (6b) is perfectly natural under the co-referent interpretation. Sentences like this, in which the r-expression is in an adjunct rather than a complement, are well-known exceptions to the generalization that A-bar movement doesn't bleed Condition C (see van Riemsdijk and Williams 1981, Freidin 1986).

(6) a. ??/*[Which book about John's$_i$ library] did he$_i$ read?
b. [Which book from John's $_i$ library] did he$_i$ read?

Lebeaux (1988) proposed an explanation for this contrast, which Chomsky (1993) modified to render consistent with his proposal that binding theory applies at LF. While (6a) is ungrammatical due to the presence of *John* in the lower copy of the wh-phrase, (6b) is acceptable because it has an alternative derivation, illustrated in (6b'). The lower copy of the wh-phrase merges into the structure without the adjunct modifier (6b'.i). After wh-movement brings the wh-phrase out of the scope of the pronoun (6b'.ii), the adjunct

containing *John* is merged into the structure, adjoining to the higher copy of the wh-phrase (6b'.iii).

(6b') i. he_i read [Which book]
ii. *wh-movement* --> [**Which book**] did he_i read [Which book]
iii. adjunct merger -->
[Which book **from John's$_i$ library**] did he_i read [Which book]

Lebeaux argued that the late-merger component of such a derivation is impossible on principled grounds for NP-complements (the Projection Principle)[6] hence the unacceptability of (6a).

The derivation in (6b') is exactly parallel with the derivation that we have proposed for adjunct extraposition (3), and thus supports it. But we are now ready to specify two conclusions that our proposal leads us to. First, given the prohibition against adjunct extraction from NP (section 2) we can conclude that the derivation involving QR followed by late merger is the *only* derivation possible for adjunct extraposition.

Second, Lebeaux's explanation for the contrast in (6) leads us to opposite conclusions for complement extraposition. Specifically, complement extraposition must have a derivation that does not involve QR and late merger (given the Projection Principle). However, we have already seen (section 2) that complement extraposition can be derived by (rightward) movement of the EC. In other words, adjunct extraposition can be derived only by QR of the source NP and late merger of the EC, while complement extraposition can be derived only by rightward extraction of the EC from the source NP.

From these two conclusions we derive the following pair of predictions:

(7) **Further Predictions:**
a. Indications that the EC has undergone rightward movement from the source NP will be detectable if the EC is a complement but not if it is an adjunct.
b. Indications that the source NP has undergone QR will be evident if the EC is an adjunct but not if it is a complement.

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[6] The projection principle states that the theta criterion must be satisfied at every level of representation. Consequently an argument of a head must be merged with the head at D-Structure; hence there can be no late (post movement) merger of arguments. Alternatively, if we assume (with Chomsky 1993) that a copy of the restrictor in A-bar movement is interpreted in the trace position, then the prohibition against late merger of arguments would be an immediate consequence. If the restrictor contains a noun which needs an argument, it would not be interpretable with the argument absent.

6 Testing whether the Extraposed Constituent moves

In this section we will attempt to show that the EC behaves like a moved constituent in complement extraposition but not in adjunct extraposition as predicted in (7a). The properties of movement that we will investigate relate to definiteness, Condition C, coordination and parasitic gap licensing.

6.1 Definiteness: Consider the pair in (8). This pair illustrates the well-known fact that extraction of NP is slightly marked when the NP is definite (see Fiengo and Higginbotham 1980).[7]

(8) a. Who did Mary see [a (good) picture of t]?
b. ??Who did Mary see [the (best) picture of t]?

From this perspective EC in adjunct extraposition behaves like it has not been extracted out of the source NP (9a,10a). Complement extraposition, by contrast, shows the definiteness restriction that one would expect under the assumption that EC is extracted. (Compare 9b to 9c and 10b to 10c.)

(9) a. I saw the (best) picture yesterday from the museum.
b. ??I saw the (best) picture yesterday of the museum.
c. I saw a (very good) picture yesterday of the museum.

(10) a. I heard the same rumor yesterday that you were spreading.
b. ??I heard the same rumor yesterday that you were quitting.
c. I heard a similar rumor yesterday that you were quitting.

6.2 Condition C: As discussed in section 5, standard cases of movement are not expected to bleed Condition C (given the copy theory of movement). However, it has been known since Taraldsen (1981) that adjunct extraposition does not meet this expectation:

(11) a. I gave him$_i$ a picture yesterday from John's$_i$ collection.
(Cf. ??/**I gave him$_i$ a picture from John's$_i$ collection yesterday.*)

b. I gave him$_i$ an argument yesterday that supports John's$_i$ theory.
(Cf. ??/*I gave him$_i$ an argument that supports John's$_i$ theory yesterday.)

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7 The definiteness restriction holds only under the "absolute reading" (Szabolcsi 1986), in which the definite description refers to the best picture in the class of pictures of some individual *x* (bound by *who*). Szabolcsi argues that under other interpretations there is no real definite description.

c. I told you that he$_i$ will accept the argument when you and I last spoke that I presented to John$_i$ yesterday.
(Cf. **I told you when you and I last spoke that he$_i$ will accept the argument that I presented to John$_i$ yesterday.*)

This fact is not puzzling under our hypothesis that adjunct extraposition does not involve movement of EC but rather late merger of the type proposed by Lebeaux (1988). As we saw in section 5, Lebeaux proposed late merger to account for the cases in which overt movement appears to bleed condition C. The same reasoning should hold for covert QR. Furthermore, our proposal makes an additional prediction: complement extraposition, which does involve movement, should be unable to bleed Condition C. This prediction appears to be borne out:

(12) a. ??/*I gave him$_i$ a picture yesterday of John's$_i$ mother.
b. ??/*I gave him$_i$ an argument yesterday that this sentence supports John's$_i$ theory.
c. * I said that he$_i$ would accept the argument when we met that what we presented to John$_i$ yesterday is correct.

6.3 Coordination: The behavior of extraction in coordination is distinctive and can serve as an additional test for movement. Extraction of a constituent is possible out of coordination only if it occurs across the board (ATB). In this section, we will see that displacement is attested ATB in complement extraposition but not in adjunct extraposition. This will provide further evidence that the EC is a moved constituent in complement extraposition but not in adjunct extraposition.

Consider the pairs in (13-14). The (a) sentences involve ATB complement extraposition and are acceptable, as predicted.

(13) a. I wanted to [present an argument__] and [discuss evidence__] very badly that what John told me is right.
b. * I wanted to [present an argument__] and [discuss evidence__] very badly that John told me about.

(14) a. I wanted to [read a book__] and [understand an article__] very badly about the museum we visited last year.
b. *I wanted to [read a book__] and [understand an article__] very badly from the library we visited last year.

The (b) sentences, by contrast, involve adjunct extraposition. Adjunct extraposition is impossible ATB given our hypothesis that adjunct extraposition involves QR of the source NP rather than rightward movement of the EC;

there is no NP that can move ATB and be modified by the late inserted adjunct. (In section 7.2 we will discuss the properties of QR in coordination and see that adjunct extraposition is possible in exactly those environments that allow the source NP to move by QR.)

6.4 Parasitic Gaps: Finally consider the following pairs:

(15) I presented an argument__ before having evidence__
  a. that what you told me is right.
  b. *that you told me about.

(16) I read a book__before reading an article__
  a. about John.
  b. *from John's library.

The (a) sentences show that complement extraposition licenses Parasitic Gaps and therefore suggest that complement extraposition is derived by movement of the EC. The (b) sentences show that adjunct extraposition cannot license Parasitic Gaps, thus suggesting that it is derived in some other manner, as we have hypothesized.

7. Testing whether the Source NP undergoes QR

In this section we turn to the second prediction stated in (7). We will attempt to show that the source NP behaves as if it has undergone QR in adjunct extraposition but not in complement extraposition. The properties of QR that we will investigate relate to scope and the behavior of quantifiers in coordination.

7.1 Scope of the source NP: The most obvious reflex of QR (plus late merger of an adjunct, which blocks scope reconstruction; see footnote 5) is the relative scope of the NP undergoing movement with respect to some other operator. The prediction is that adjunct extraposition should — but complement extraposition should not — signal wide scope for the source NP. We have already seen (in section 3) evidence for the first half of the prediction, that an adjunct EC sets a lower bound for the scope of the source NP. Evidence of this sort is repeated below as (17a).

(17) a. * I looked for any clue very desperately that the detective might have overlooked.
  b. I looked for any clue very desperately that the detective might have overlooked important evidence.

The deviance of this sentence results from the fact that, on the one hand 'free choice' *any* has to have scope narrower than the modal verb *look for,* but on the other hand extraposition of the adjunct marks scope which is wider. As we saw earlier, this sentence should be acceptable if the source NP weren't required to undergo QR. What we haven't seen yet is (17b). This example stands in sharp contrast to the unacceptable (17a). It differs only in that the EC in (17b) is a complement of the source NP rather than an adjunct. The fact that it is perfectly acceptable shows that the EC in complement extraposition — as opposed to adjunct extraposition — does not set a lower bound for the scope of the source NP.

Further examples illustrating this point are shown in (18)-(19). The (a) examples involve adjunct extraposition and the (b) examples involve complement extraposition. Consequently we predict that the source NP will be required to have scope over *look for* in (a) but not in (b). To see that this prediction is borne out, let's focus on the contrast in (18). (18a) is true only in a situation in which there is a particular picture from John's factory that the speaker was looking for. It cannot be true when the speaker's search would be satisfied by any picture from John's factory; e.g. it would be false if the speaker was merely interested in finding out about the quality of film used and to this end is looking for a sample. (Compare this with *I looked very intensely for a picture from John's factory,* which could be true in this situation.)

(18) a. I looked for a picture very intensely from John's factory.
*∃ > look for, * look for > ∃*

b. I looked for a picture very intensely of John's factory.
∃ > look for, look for > ∃

(19) a. I looked for a picture very intensely by this artist.
*∃ > look for, *look for > ∃*

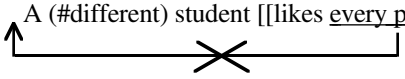
b. I looked for a picture very intensely of this artist.
∃ > look for, look for > ∃

The source NP in (18b), by contrast, *can* have narrow scope with respect to *look for:* it could be true under scenarios parallel to the two described above.

7.2 QR in co-ordination: In section 6.3 we looked at a property of coordination that served as a diagnostic for overt movement of the EC. We saw that complement extraposition shows this property and adjunct extraposition doesn't. We will look in this section at a different property of coordination, one that can serve as diagnostic for covert movement of the source

NP. In this case we expect the exact opposite: adjunct extraposition should show this other property while complement extraposition shouldn't.

The property in question was discovered by Ruys (1992). It is well-known that QR in general obeys the coordinate structure constraint (Lakoff 1970, Rodman 1976). This is illustrated by (20), in which the object cannot move by QR over the subject — out of only one of the two conjuncts. Hence, the sentence is limited to the interpretation in which the subject has wide scope.

(20) A (#different) student [[likes every professor] and [hates the dean]]

(∃ > ∀) *(∀ > ∃)

What Ruys noticed, however, was that there is a specific environment in which QR does not appear to obey the CSC:

(21) A (different) student [[likes every professor$_i$] and [wants him$_i$ to be on his committee]] (∃ > ∀) (∀ > ∃)

In (21), unlike (20), *every professor* can have scope over the subject, indicating that QR was able to take place out of the first conjunct alone. Ruys observed that if the second of two conjuncts contains a variable, the QP in the first conjunct is allowed to scope out if (and only if) it is going to bind this variable. The relevant generalization for QR can be stated as (22):

(22) QR of a QP out of a conjunct A (in a structure A & B) is possible iff QP binds a variable in B (Ruys 1992).

We can use (22) as a diagnostic for QR of a source NP. Consider the facts in (23) and (24). The contrast between the (a) and (b) sentences exactly parallels the contrast between (20) and (21) and follows from (22), under the assumption that the source NP undergoes QR in adjunct extraposition. In order for the source NP to undergo QR out of the first of two conjuncts, it must have a variable to bind in the second conjunct.

(23) a. * I wanted to [present an argument__] and [talk about these consequences] very badly that John told me about.
b. ? I wanted to [present an argument$_i$__] and [talk about its$_i$ consequences] very badly that John told me about.

(24) a. * I wanted to [read a book__] and [meet this author] very badly from the library we visited last year.
b. ??I wanted to [read a book$_i$__] and [meet its$_i$ author] very badly from the library we visited last year.

These facts are extremely surprising under the view in which the EC undergoes movement in adjunct extraposition. Not only is this movement impossible across-the-board (as we saw in section 6.3), it can occur in violation of the CSC in the (b) sentences in *exactly* the environment in which QR of a different constituent (an NP) is able to circumvent this constraint.
In the (c) sentences, given below, we see that complement extraposition is different in exactly the expected way, on the assumption that complement extraposition involves movement of the EC rather that QR of the source NP. As we saw in section 6.3, movement of the EC — being overt — is possible only when it occurs in the normal across-the-board manner. There is no reason why a variable in the second conjunct (bound by the source NP) would facilitate non-ATB movement of the EC.

(23) c. * I wanted to [present an argument$_i$__] and [talk about its$_i$ consequences] very badly that what John told me is right.

(24) c. * I wanted to [read a book$_i$__] and [meet its$_i$ author] very badly about the museum we visited last year.

8. Conclusions

Throughout this paper we have seen evidence that complement extraposition shows properties of movement of the EC, whereas adjunct extraposition doesn't. The evidence was drawn from the restriction on movement from adjuncts as opposed to arguments (section 2), the Definiteness restriction on movement (section 6.1), Condition C (section 6.2), the Coordinate Structure Constraint (section 6.3), and parasitic gap licensing (section 6.4). Consequently we need a different derivation for adjunct extraposition. A phonological theory of QR, together with Lebeaux's late-merger proposal, provides us with this derivation. Adjunct extraposition is the result of post QR merger of an adjunct. This proposed derivation leads us to predict that adjunct extraposition would show properties of QR of the source NP — a prediction which is borne out in the investigation of scope (sections 4, 7.1) and the peculiar behavior of QR in coordination (section 7.2).

The post-QR merger of "extraposed" adjuncts is a case of an overt (i.e. pronounced) operation following a covert (i.e. silent) movement. Such an ordering is impossible under the traditional Y-model of the grammar. To the extent that our arguments are successful we need an alternative model, an alternative in which syntax intersperses pronounced operations with silent ones.

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