RECONSTRUCTION, BINDING THEORY AND THE INTERPRETATION OF CHAINS*

DANNY FOX
MIT

This paper uses Condition C of the Binding Theory to argue (a) that Scope Reconstruction effects are the result of syntactic mechanisms that restore a moved constituent to its base position, (b) that Binding Theory applies at a single level of representation at which scope is determined; i.e. that Binding Theory 'sees' the effects of Quantifier Raising and Quantifier Reconstruction and (c) that the restrictor of a moved quantifier is interpreted (whenever possible) at the tail of the chain as well as the head.

In the early days of generative grammar, overt movement was characterized as involving a disparity between the position at which an item is interpreted and the position at which it is overtly realized. However, since the 60s, it has been known that this is not strictly true. Although certain interpretive properties of a moved constituent are determined in the base position, other properties can be determined at the landing site.¹ Specifically, although aspects of interpretation having to do with predicate argument relations -- with theta assignment -- are determined at the base position, aspects of interpretation having to do with scope and variable binding are determined at the landing site (see Chomsky (1977) and references therein.)² This has led to a different view of the grammar's architecture. Under this view, overt displacement affects meaning as well as

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¹Some suggestions that this is the case were already present in Chomsky (1957). For a collection of many of the original arguments, see Jackendoff (1972).

²Other aspects of interpretation which are affected by movement (e.g. topic/focus) are outside the scope of this paper.
Structures involving movement serve as the input for both the conceptual and the articulatory systems. In the articulatory system, the base position is ignored. However, in the conceptual system, both positions are taken into account, and the interpretive properties are distributed among them according to the division outlined above.

This new picture itself had to be revised given the observation that the effects of movement on scope and variable binding are not obligatorily present; there are cases where the semantic effects of movement (predicted by the new picture) are "undone" (henceforth, cases of "Scope Reconstruction"). The attempts to deal with Scope Reconstruction, and the resulting accommodation to the picture, can be divided into two types. The first type of accommodation assumes that Scope Reconstruction is the outcome of semantic procedures. What is claimed is that the interpretive principles can deal with movement chains in at least two ways. One way results in an interpretation in which scope is determined at the base position; the other, in which scope is interpreted at the landing site. The second type of accommodation assumes that Scope Reconstruction is already determined in the syntax. In other words, it is claimed that the structures that serve as the input to semantic interpretation (the structures of LF) determine whether or not there is Scope Reconstruction.

This Paper argues that Scope Reconstruction is syntactic. In particular, condition C of the Binding Theory (henceforth, BT(C)) will serve to demonstrate that (at the level at which this condition applies) the position of a scope-bearing element differs depending on whether or not there is Scope Reconstruction. This correlation cannot be accounted for under the semantic approach to Scope Reconstruction. However, it follows straight-forwardly from the syntactic approach under the assumption that Binding Theory is sensitive to LF positions.

Once the syntactic approach is established, the paper spells out the nature of the syntactic mechanisms that yield reconstruction. I argue for a version of the Copy Theory of Movement suggested by Chomsky (1993) on the basis of data from Antecedent Contained Deletion. Under this version, A-bar movement leaves a copy at the tail of the chain. This copy can be reduced to a standard variable only when necessary. The result is that A-bar movement can bleed BT(C) if:

- (a) the copy at the tail is reduced or
- (b) an adjunct is added after movement (Lebeaux (1988)).

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3 This new view (together with the postulation of traces) paved the road for an account of scopal ambiguity in terms of movement operations that are invisible to phonology (such as Quantifier Raising).

4 To make this proposal precise one would need to spell out the semantic mechanism. What was (implicitly) assumed is that the sister of a moved element is interpreted as an open formula and the composition rule yields wide scope for a moved quantifier in a manner somewhat similar to the composition in first-order predicate calculus (for an alternative, see section 1.2).
Syntactic Reconstruction is the result of the elimination of the head of the chain, which is impossible under the conditions that Bleed BT(C) (conditions (a) and (b) above).

The structure of the paper is as follows. In section 1, I will elaborate on the two approaches to the phenomenon of Scope Reconstruction and establish that a specific correlation between this phenomenon and BT(C) effects is predicted by the syntactic approach. In sections 2 and 3, I will demonstrate that the prediction is born out, for A-bar and A movement respectively. In section 4, I will discuss the ramifications of the arguments in favor of syntactic reconstruction for the status of the semantic mechanism of type lifting. In section 5, I will discuss the ramifications for the architecture of the grammar, and, more specifically, for the placement of Binding Theory therein. The correlation between scope and BT(C) will obviously argue that BT(C) is sensitive to LF positions, i.e. that this condition applies also at LF. I will further specify, recapitulating ideas from Chomsky (1993) and Fox (1995b), how the correlation fits into a broader picture in which Binding Theory applies only at LF. This discussion will provide the outlines of a theory of syntactic Scope Reconstruction which I present in sections 6-7.

1. SEMANTIC VS. SYNTACTIC ACCOUNTS OF SCOPE RECONSTRUCTION

It is well known that overt movement can affect scope. This has been established in many ways. The simplest examples are probably from scrambling languages (see Hoji (1985)).\(^5\) However, we can also see this by English examples such as (1).\(^6\) In (1b), the embedded object is overtly displaced and the result of this displacement allows it to receive wide scope relative to another

5For some reason, which is not completely clear to me, the ability to affect scope is restricted to short-distance scrambling. See Tada (1993).

6The English examples that are standardly invoked to make this point are simpler. For example, Jackendoff (1972), argues that movement affects scope based on contrasts such as (i); In (ia) many prefers to have wide scope relative to negation; in (ib) the preference goes in the other direction.

(i) a. Many arrows didn't hit the target.
   b. The target wasn't hit by many arrows.

The examples demonstrate that overt movement affects interpretive preferences. However, they do not demonstrate that overt movement yields interpretations that would not be available otherwise. Given the availability of covert scope shifting operations, both sentences in (1) are ambiguous. In order to demonstrate that scope is affected by movement, overt movement must do something that QR cannot do. In other words, the demonstration is dependent on the existence of constraints which apply to QR and not to overt movement. In (1) the constraint presumably follows from the "clause-boundedness" of QR. There might be additional constraints on specific types of quantifiers (e.g. monotone decreasing, see McCawley (1988: 618-628)) which will yield a similar argument. (See Liu (1990), Beghelli (1993) and Beghelli and Stowell (1995) for a detailed investigation of the properties of different quantificational elements.)
scope-bearing element (the existential quantifier). This scope relation would have been impossible without overt movement, as demonstrated in (1a).\(^7\)

(1)  
\(a.\) John seems to a (#different) teacher \[ t \text{ to be likely to solve every one of these problems}\].
\[ (\exists > \forall) \wedge (\forall > \exists) \]
\(b.\) [Every one of these problems] seems to a (different) teacher \[ t \text{ to be likely } t \text{ to be solved } t \text{ by John}\].
\[ (\exists > \forall) (\forall > \exists) \]

However, overt movement does not obligatorily affect scope. This has been known at least since May (1977). Consider constructions that involve successive cyclic raising such as those in (2). In these constructions the scope of the moved quantifier can be affected by movement. However it need not; the scope may be construed in the base position or in any of the intermediate landing sites.

(2)  
\(a.\) Someone from New York is very likely \(t\) to win the lottery.
\(b.\) Someone from New York seems \(t\) to be very likely \(t'\) to win the lottery.
\(c.\) Many soldiers seem \(t\) to be very likely \(t'\) to die in the battle.

Take (2a), which is two-ways ambiguous. Under one reading the quantifier takes its scope in the final landing site. This scope yields an interpretation which requires (for its truth) that there be a person from NY who is very likely to win the lottery. In other words, the sentence requires a (perhaps) non-existent situation. Under the second interpretation, in which the quantifier has scope in the position of \(t\), the truth conditions are much less demanding; they merely require that there be enough ticket buyers from NY to make it likely that the city would yield a winner.\(^9\)

The examples in (2) demonstrate the availability of Scope Reconstruction. This availability can be further demonstrated in ways that are not based on any

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\(^7\)A similar point can be made when we consider variable binding. In (ia), the universal quantifier cannot bind a variable which is outside of its scope. In (ib), overt movement gives the quantifier wider scope and allows it to bind the variable.

\(^8\)The impossibility of wide scope for the universal quantifier can be seen by the ungrammaticality of (1a) when different receives a bound interpretation as in a different guard is standing on top of every building. We can further demonstrate the impossibility of the \((\forall > \exists)\) scope relation by considering cases in which the alternative scope relation results in an interpretation which is cognitively anomalous, e.g.: # This soldier seems to someone to be likely to die in every battle. or #The ball seems to a boy to be under every shell. (c.f. Every shell seems to a boy to be over the ball.)

\(^9\)One might suggest that we deal with the ambiguities via movement of the modal verb. However, verb raising would predict many impossible interpretations in cases that involve more than one modal verb, such as (2b) and (2c).
assumptions regarding the interpretation of modality. The demonstration is based on the constructions in (3, 4), partially due to Lebeaux (1994).10

(3) a. [At least one soldier]$_1$ seems (to Napoleon) [t$_1$ to be likely to die in every battle].
   b. [At least one soldier]$_1$ seems to himself$_1$ [t$_1$ to be likely to die in every battle].
   c. [At least one soldier]$_1$ seems to his$_1$ commanders [t$_1$ to be likely to die in every battle].

(4) a. One soldier is expected (by Napoleon) [t to die in every battle].
   b. One soldier$_1$ is expected by his$_1$ commander [t$_1$ to die in every battle].

In the (a) sentences in (3,4) the universal quantifier in the embedded clause can take scope over the matrix subject ($\forall > \exists$). In other words, the sentences can be understood with the soldiers varying with the battles. The sentences can also receive an interpretation in which the matrix subject takes wide scope ($\exists > \forall$). This is the implausible interpretation which asserts the existence of a single soldier who is expected to die in all of the battles.

One could imagine that the source of the ambiguity in the (a) sentences is the availability of long distance Quantifier Raising (QR). The universal quantifier can move by QR over the existential quantifier, and the optionality of this movement, one might think, is the cause of the ambiguity. However, this is most likely not the case. The (b, c) sentences show that the ambiguity in the (a) sentences requires Scope Reconstruction. If QR was sufficient to yield the ambiguity in the (a) sentences, we would expect to find the same kind of ambiguity in the (b,c) sentences. However, the latter sentences are unambiguous. Their meaning is restricted to the implausible interpretation which results from assigning wide scope to the existential quantifier. While this restriction is unaccounted for under the assumption that QR alone is the source of the ambiguity in the (a) sentences, the assumption that Scope Reconstruction is needed accounts for the restriction straight-forwardly. In the (b) and (c) sentences, the existential quantifier must bind a variable in a position outside its scope as determined by Scope Reconstruction. Hence Scope Reconstruction is

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10 Similar data is noted in Aoun (1982), attributed to Rizzi. I changed Lebeaux’s examples slightly. The first change has to do with the choice of lexical items. I tried to make the interpretation resulting from wide scope for the matrix subject ($\exists > \forall$) conflict with world knowledge. This change makes the unavailability of the alternative scopal relation in (b,c) ($\forall > \exists$) very striking. The second change is the addition of (3c) and (4b) which contain a bound pronoun (rather than a reflexive) within the dative PP (see also Hornstein (1994:160)). This change is meant to explain why I don't draw the same conclusions that Lebeaux does. Lebeaux draws more radical conclusions regarding the interaction of Scope Reconstruction and Binding Theory (in particular BT(A)) (see next note).
impossible.\textsuperscript{11} We must assume that the \((\forall > \exists)\) interpretation of the (a) sentences results from a combination of Scope Reconstruction and short distance QR. The matrix subject receives scope in the position of \(t\) and the universal quantifier receives scope above this position (via QR).

Consider next the contrast between the sentences in (5,6). Some speakers find the (a) sentences slightly marginal. This is accounted for by Weak Crossover (WCO) under the assumption that QR involves A-bar movement. However, the (b) sentences are acceptable. This contrast is explained if we assume that QR is not necessary to get wide scope for the universal quantifier. This assumption, in turn, is explained by the availability of Scope Reconstruction in the (b) sentences.

(5) \begin{align*}
a. \quad &???[\text{Someone from his\textsubscript{1} class}]_2 \text{ shouted to every professor}_1 \text{ [PRO}_1 \text{ to be careful].} \\
&b. \quad [\text{Someone from his\textsubscript{1} class}]_2 \text{ seems to every professor}_1 \text{ [t}_2 \text{ to be a genius].}
\end{align*}

(6) \begin{align*}
a. \quad &???[\text{His\textsubscript{1} father}]_2 \text{ wrote to every boy}_1 \text{ [PRO}_1 \text{ to be a genius].} \\
&b. \quad [\text{His\textsubscript{1} father}]_2 \text{ seems to every boy}_1 \text{ [t}_2 \text{ to be a genius].}
\end{align*}

\textbf{1.1 Syntactic Accounts of Scope Reconstruction}. Under the syntactic accounts of Scope Reconstruction, the ambiguous sentences in (2-4) are disambiguated at LF. Under one disambiguation the Quantifier Phrase is in its surface position and binds a variable in the trace position. Under other disambiguations, the Quantifier Phrase is in one of the intermediate trace positions (or, alternatively, in a position that binds such positions\textsuperscript{12}). This is illustrated with the two LF structures of (2a) given in (2a')

\begin{align*}
\text{(2a') LF}_1. \quad &\text{[Someone from NY]}_1 \text{ is very likely [t}_1 \text{ to win the lottery]} \\
\text{LF}_2. \quad &\text{is very likely [[Someone from NY] to win the lottery].}
\end{align*}

This syntactic reconstruction could be achieved by various mechanisms. Among these mechanisms is quantifier lowering suggested for A-movement by May (1977) and the copy theory of movement suggested for A-bar reconstruction by Chomsky (1993) and extended by many to A-movement (see, among others, Hornstein (1994)). However, at the moment I will abstract away from the details of the implementation (see, however, sections 6-7). What

\textsuperscript{11}Lebeaux (1994) draws a more radical conclusion. Given the unavailability of \((\forall > \exists)\) in (3b), he concludes that BT(A) must be satisfied at LF. Although the conclusion seems plausible to me, I don't think the example shows that it is correct. All we can argue for on the basis of (3b), as is perhaps clearer from (3c) and (4b), is that \((\forall > \exists)\) in the (a) sentences requires Scope Reconstruction. The facts follow with the addition of a (virtual) tautology that a quantifier cannot bind a variable outside of its scope.

\textsuperscript{12}Such binding would be the result of a Quantifier Lowering operation as in May (1977).
matters right now is the property that all the syntactic accounts share; they all assume that Scope Reconstruction involves an LF structure in which the Quantifier Phrase is literally in the reconstructed position. This account of Scope Reconstruction extends straightforwardly to all the cases discussed including the cases of variable binding. I.e., under this account it is straightforward to explain the fact that the (b) sentences in (5,6) do not show a WCO effect.

1.2 Semantic Accounts of Scope Reconstruction. Semantic accounts assume that syntactic reconstruction is not necessary for Scope Reconstruction. (See Chierchia (1995a), Cresti (1995) and Rullmann (1995).) In other words, they assume that there is a semantic mechanism that yields the two interpretations of sentence such as (2a) from a structure with no syntactic reconstruction such as LF$_1$ (in (2a')). The existence of such a semantic mechanism is tacitly assumed in the scope principle suggested by Aoun and Li (1994) and explored by Frey (1989)\textsuperscript{13}, Kitahara (1994) and Krifka (forthcoming), among others.

The semantic nature of this mechanism has been developed explicitly within frameworks which assume that a semantic type is associated with each syntactic expression. A further assumption is that the sister of a moved constituent is interpreted as a function which can be expressed with λ abstraction over a variable in the trace position. The question is, of course, a variable of what type. The assumption is that in cases in which a Quantifier Phrase undergoes movement, the variable can either range over individuals (i.e. be interpreted as a variable of type $e$) or over generalized quantifiers -- that is, second order predicates (i.e. be interpreted as a variable of type <$et,t$>). For an incomplete illustration, consider the two options for interpreting LF$_1$. (For a more complete discussion, see Heim and Kratzer (forthcoming).) These two options are represented in (2'') where $x$ ranges over individuals and $Q$ ranges over generalized quantifiers.

\begin{itemize}
  \item [(2'')] a. [Someone from NY] λ$x$ (is very likely \[x to win the lottery\])
  \item [(2'')] b. [Someone from NY] λ$Q$ (is very likely \[Q to win the lottery\])
\end{itemize}

In (2"a), where the variable is of type $e$, the sister of the moved Quantifier Phrase is interpreted as a function from individuals to truth values (type $et$). Since the moved Quantifier Phrase is of type <$et,t$>, the Quantifier Phrase takes its sister as argument. It is easy to see that the resulting interpretation is one in which the existential quantifier has scope over the modal verb. In (2"b), the sister of the quantifier is interpreted as a function from generalized quantifiers to truth-values (type $<$<$et,t$>,t$>). In this case the Quantifier Phrase is the argument.

\textsuperscript{13}Thanks to Uli Sauerland for conveying to me the contents of this work (in German) which I unfortunately am unable to read.
of its sister, and it is easy to see (once we consider lambda-conversion) that the modal verb receives wide scope.\textsuperscript{14}

The semantic account of Scope Reconstruction extends straightforwardly to all the cases discussed besides the cases of variable binding via reconstruction (the (b) sentences in (5,6)). A few further assumptions need to be made in order for semantic reconstruction to allow for variable binding (into the reconstructed element). I will not go over the assumptions and instead refer the reader to Engdahl (1986), Sternefeld (1997), Chierchia (1995b) and Sharvit (1997).

1.3 Distinguishing the two Accounts via BT(C). Consider the structural configuration in (7), in which linear precedence represents c-command. If BT(C) is sensitive to LF structures, the syntactic account predicts that Scope Reconstruction would be impossible in (7). This prediction is stated in (8).

(7) \[
[\text{QP } \ldots \text{r-expression}_1 \ldots]_2 \ldots \text{pronoun}_1 \ldots \text{t}_2
\]

(8) \textbf{Scope Reconstruction feeds BT(C):} Scope Reconstruction should be impossible in the structural configuration in (7).

In order for this prediction to follow under the semantic account of Scope Reconstruction, one would have to assume that condition C makes reference to the semantic type of traces and that the LF in (7) is ruled out iff the semantic type of the trace is \langle \text{et}, \text{t} \rangle. (See Sternefeld (1997).) This, however, cannot be considered an explanation. The necessary assumption is a post hoc stipulation which doesn't tell us why things are the way they are. In particular, it would be just as plausible to make the opposite assumption (i.e., that BT(C) rules out (7) when the semantic type of the trace is e) from which it would follow that Scope Reconstruction is obligatory in (7).

Under the syntactic account of Scope Reconstruction (8) is explained. Condition C receives the simple definition based on constructions for which the structural analysis is not debated (constructions without movement). Under the natural assumption that an interpretive principle (such as Binding Theory) is sensitive to LF structures, (8) follows. Therefore, if we can show that the prediction holds, we will have an argument in tandem for both the syntactic account and the assumption that BT(C) applies at LF. In the following sections I will demonstrate that the prediction holds and that indeed we have the argument.\textsuperscript{15}

\textsuperscript{14}Note that this semantic account, just like the syntactic account, captures straightforwardly the virtual tautology that Scope Reconstruction to a position of a trace is incompatible with the binding of a variable outside the c-command domain of this trace. For example, this account is on a par with the syntactic account with respect to the contrasts in (3-4). See notes 10 and 11.

\textsuperscript{15}Romero (1996) presents additional arguments against the semantic account. In particular, she spells out the modifications in the Binding Theory that the semantic approach would
2. A-BAR RECONSTRUCTION

In this section I will show that the prediction in (8) holds for A-bar movement. The section has three parts. Section 2.1 will focus on how many questions and will contain an elaboration on data from Heycock (1995). Section 2.2 will explore standard constituent questions. The discussion will be based on data from Lebeaux (1990) which uses variable binding as diagnostic of Scope Reconstruction. Section 2.3 will continue the discussion of standard constituent questions. This time, indirect binding via adverbs of quantification will serve as the diagnostic for Scope Reconstruction.

Before we begin, a point of caution is in order. It is well known that certain cases of A-bar movement cannot bleed BT(C) (van Riemsdijk and Williams (1981), Freidin (1986) and Lebeaux (1988)). This inability holds independently of Scope. Consider for example Lebeaux's pair in (9).

(9) a. [Which argument that John₁ made] did he₁ believe t?
   b. ??/*[Which argument that John₁ is a genius] did he₁ believe t?

(9b) is bad independently of Scope Reconstruction. The discussion in this section will focus on cases such as (9a) in which A-bar movement does bleed BT(C). We will see that in these cases bleeding is incompatible with Scope Reconstruction. In other words, we will see that if an A-bar construction of the type in (7) is acceptable, it is disambiguated in favor of the non-Scope-Reconstructed interpretation.

2.1 How Many questions - an elaboration on Heycock (1995). Consider how many questions of the sort in (10). A plausible analysis of such questions assumes that the Wh-phrase how many NP has two parts. One part consists of the Wh-word how (which could be paraphrased as what n) and the other consists of the DP many NP (see Frampton (1991), Cresti (1995), Rullman (1995)). Roughly speaking a how many question asks for an integer n, such that n many people satisfy some proposition φ. This is illustrated in (10') and schematized in (11).

(10) [How many people]₁ did you meet t₁ today.

(10') How n: n many people λ₁ you met t today.

What is the number n, s.t. there are n many people that you met today

require and displays their stipulative nature. Furthermore, she develops additional unwelcome results related to the interpretation of sluicing.
Consider now what happens when scope-sensitive elements intervene between the final landing site of the moved constituent and its trace position. In such a case, the scope of the quantificational DP, many NP, can be construed either above or below this element (see, among others, Longobardi (1987), Cresti (1995)). This is demonstrated by the question in (12).

(12) How many people did Mary decide to hire.

Two readings:

a. many > decide:
   What is the number n, s.t.
   there are n many people x, s.t.
   Mary decided to hire x.

b. decide > many:
   What is the number n, s.t.
   Mary decided to hire n many people

The two readings of the question become visible once we consider situations in which they would demand different answers. Consider the following scenario:

(S1) After a day of interviews, Mary finds 7 people who really impress her, and she decides to hire them. None of the other people impress her. However she knows that she needs more than 40 people for the job. After thinking about it for a while she decides to hire 50 -- the 7 that she likes and 43 others to be decided by a lottery.

It is clear that under (S1) there are two appropriate answers for (12). One answer is seven, which corresponds to the interpretation of (12a), and the other, which corresponds to the meaning of (12b), is fifty.
The ambiguity of (12) shows that the DP *many NP* can undergo Scope Reconstruction in *how many* questions. In this section I will present evidence from Heycock (1995) and expand on it to demonstrate that this reconstruction obeys the predictions in (8). This evidence will argue that Scope Reconstruction in *how many* questions should be dealt with by syntactic mechanisms.

Consider the sentences in (13-15). In none of these sentences is BT(C) an issue. The sentences, however, differ minimally in a way that Heycock exploits to test the prediction in (8). The semantics of the embedded predicates in the (a) sentences forces, or at least highly prefers, Scope Reconstruction. The (b,c) sentences, by contrast, are compatible with the non-reconstructed reading. The sentences in (b,c) are ambiguous along the lines of (12), whereas the (a) sentences are limited to the interpretation in which the DP *many NP* has narrowest scope.

However, I think that this is not a real alternative. Take a sentence parallel to (12) which is not scopally ambiguous such as (i). If the ambiguity in (12) stems from variability in the interpretation of Tense, we would expect to find a similar ambiguity in (i). However, this is not the case. There is a clear pragmatic tendency to give an answer which corresponds to Mary’s final decision. Without any clear context, it makes no sense to give an answer that would correspond to tentative decisions that Mary made along the way.

(i) *which people did Mary decide to hire.*

Note that not much bears on this pragmatic explanation. The arguments in this section can be restated with the verb *want*, which can appear in the present tense (e.g. *How many people does Mary want to hire*). Furthermore, the French examples in note (19) make it pretty clear that the ambiguity in (12) has to do with scope. Thanks to Kai von Fintel for a helpful discussion of this issue.

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(i) a. *Combien de personnes* Marie a-t-elle décidé d’engager?
b. ? *Combien* Marie a-t-elle décidé d’engager de personnes?
c. *Combien* Marie a-t-elle décidé d’en engager?

(ii) a. *Combien de livres* Marie a-t-elle décidé d’acheter?
b. ? *Combien* Marie a-t-elle décidé d’acheter de livres?
c. *Combien* Marie a-t-elle décidé d’en acheter?

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David Pesetsky suggested the use of the pair in (13) for the exposition of Heycock’s results.

I am not entirely sure whether what follows is entirely faithful to Heycock. The reason for this uncertainty is that Heycock alternates between an account of the ambiguity in (12) in terms of scope and an account in terms of a notion of referentiality (that will extend to an explanation of why VPs must reconstruct). Under the referentiality account that Heycock suggests, "non-referential" phrases (whatever exactly this means, see Cinque (1991), Rizzi (1990), Frampton (1991)) must show connectedness effects (i.e. BT Reconstruction). The reason we get connectedness effects in the (b) sentences is that the DP is interpreted non-referentially. However, once we consider the structural configurations in (22) below we will see that scope is not only the clearer notion, it is also the empirically appropriate one.

The sentences in (15b,c) are actually three-ways ambiguous. However, for the moment, we can ignore the intermediate scope (*think > many > should*).
(13) a. [How many stories] is Diana likely to invent t? (likely > many; *many > likely)
   b. [How many stories] is Diana likely to re-invent t? (likely > many; many > likely)

(14) a. [How many houses] does John think you should build t? (think > many; *many > think)
   b. [How many houses] does John think you should re-build t? (think > many; many > think)
   c. [How many houses] does John think you should demolish t? (think > many; many > think)

(15) a. [How many papers that he 1  writes] does John 1  think t will be published? (think > many; *many > think)
   b. [How many papers that he 1  wrote] does John 1  think t will be published?

To see the contrast between the (a) and the (b) sentences, let's focus on (13b). Consider what an interpretation without Scope Reconstruction would be like. Such an interpretation would presuppose that there are certain stories such that Diana is likely to invent them. However, such a presupposition is virtually a contradiction; we think about the objects of invention as being created at the time of invention and we, therefore, can't talk about these objects at earlier moments, hence the weirdness of #John will invent this story, #Which of these stories is John likely to invent?

As Heycock notes, this difference allows us to test the prediction in (8). Consider the sentences in (16-18). Only in the (a) cases, in which Scope Reconstruction is forced, do we get a BT(C) effect. (Only the (a) cases are unacceptable.)

(16) a. *[How many stories about Diana's 1  brother] is she 1  likely to invent t? 23

23 The sentence should be understood with a future interpretation for the tense in the relative clause. Wide scope for many would require John to have thoughts about specific papers. However, at the time of thinking there are no papers to have thoughts about; the papers will come to exist only in the future.

24 In section 5-6 I will follow Lebeaux (1988) in assuming that A-bar movement can bleed BT(C) only if an adjunct is inserted after movement. The discussion in section 5-6 will, thus, imply that the PPs in (16-17) are adjuncts. This implication, which might seem problematic at first sight, is argued for in Heycock (1995). See Schütze (1995) to appreciate the hairiness of the complement adjunct distinction (at least within the nominal domain).

I would like to point out that a few speakers I've consulted find the (b) sentences in (16) and (17) slightly degraded. These speakers find the (a) sentences still worse. It seems plausible to suggest that these speakers prefer to analyze the PP as a complement. Still, they can marginally analyze it as an adjunct, which would allow BT(C) obviation in (b) but not in (a).
b. [How many stories about Diana’s brother] is she likely to re-invent t?\(^{25}\)

(17) a. *[How many houses in John’s city] does he think you should build t?  
     b. [How many houses in John’s city] does he think you should re-build t?  
     c. [How many houses in John's city] does he think you should demolish t?

(18) a. *[How many papers that John writes]  
          does he think t will be published?  
     b. [How many papers that John wrote]  
          does he think t will be published?

We can also demonstrate that the unacceptability of the (a) cases is related to BT(C) when we compare these sentences with the sentences in (19). The latter sentences demonstrate that aside from BT(C) there is nothing the matter with the coindexation in the (a) sentences.

(19) a. [How many stories about her brother] is Diana likely to invent t?  
     b. [How many houses in his city] does John think you should build t?  
     c. [How many papers that he writes] does John think t will be published?

A similar paradigm to Heycock's can be constructed when we consider sentences in which the Definiteness Effect (DE) holds. Consider the contrast between the sentences in (20). In (20a) the DE forces Scope Reconstruction. (See Heim (1987), Frampton (1991)). Therefore, this question is restricted to

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\(^{25}\) There is a potential problem with (16a). The problem is that this sentence might be bad independently of Reconstruction. To see this consider the contrast in (i) and (ii). This contrast might be accounted for by postulating a PRO in the subject of the NPs in the (b) sentences along the lines of Chomsky (1986b), (See also Higgenbotham (1983) and Williams (1985, 1987)). If the correct account is along these lines, (16a) would have a BT(C) violation (in the moved position) irrespective of whether or not there is Reconstruction. This confound is overcome in (17) and (19).

(i) a. Diana objected to many stories about her.  
     a. *Diana invented many [PRO stories about her].

(ii) a. Clifford expected many lies about him to be effective.  
     a. *Clifford is planning to come up with many [PRO lies about him].
the interpretation in which *many people* has narrow scope relative to the verb *think*. (20b), by contrast, is ambiguous.$^{26}$

(20) a. How many people does Diana think there are at the party?
   *many > think*

   b. How many people does Diana think are at the party?

Consider now the contrast in (21). (21a) is unacceptable because the obligatory Scope Reconstruction yields a BT(C) violation. (21b) and (21c) are minimally different. In (21b) Scope Reconstruction is not obligatory and in (21c) it doesn't yield a BT(C) effect. The latter sentences are, thus, both acceptable.

(21) a. *How many people from Diana's neighborhood does she think there are at the party?*

   b. How many people from Diana's neighborhood does she think are at the party?

   c. How many people from her neighborhood does Diana think there are at the party?

(13-21) demonstrate that when Scope Reconstruction is forced there are ramifications for BT(C). This provides strong support for the assumption in (8) that Scope Reconstruction feeds BT(C). However, there are further predictions that (8) makes for *how many* questions that we should be able to put to test. To see the range of these predictions, let's look again at (8) and the structural configuration, (7), to which it applies:

(7) \[ QP ...r-expression_{1}... ]_{2}......pronoun_{1}....t_{2}\]

(8) **Scope Reconstruction feeds BT(C):** Scope Reconstruction should be impossible in the structural configuration in (7).

If (8) is right, there are two predictions for the configuration (7). On the one hand, QP is obliged to take scope over all of the scope-bearing elements c-commanded by the pronoun. On the other hand, such an obligation does not hold with respect to the scope-bearing elements that c-command the pronoun. This is stated in (22).

(22) **Predictions of (8):**
   a. In (23), QP must take scope over the scope-bearing element SB$^{1}$.

---

$^{26}$ To see the difference between the sentences, it might be helpful to construct scenarios parallel to the one in (S1).
b. In (24), QP need not take scope over the scope-bearing element SB\textsuperscript{2}.\textsuperscript{27}

(23) \[\text{QP} \ldots \text{r-expression}_1 \ldots \]_{2} \ldots \ldots \ldots \text{pronoun}_1 \ldots \text{SB}_1 \ldots \text{t}_2

(24) \[\text{QP} \ldots \text{r-expression}_1 \ldots \]_{2} \ldots \text{SB}_2 \ldots \text{pronoun}_1 \ldots \ldots \ldots \text{t}_2

(13-21) demonstrate that when independent factors force QP to take narrow scope with respect to SB\textsuperscript{1}, the result is ill-formed. I will now try to show that the predictions of (22) are attested also when these factors are not active. Compare the pairs in (25) and (26).

(25) a. [How many slides of Jonathan's\textsubscript{1} trip to Kamchatka] did he\textsubscript{1} decide to show \textsubscript{t} at the party? (\text{many} > \text{decide}) (*\text{decide} > \text{many})

b. [How many slides of his\textsubscript{1} trip to Kamchatka] did Jonathan\textsubscript{1} decide to show \textsubscript{t} at the party? (\text{many} > \text{decide}) (\text{decide} > \text{many})

(26) a. How many people from Diana's\textsubscript{1} neighborhood does she\textsubscript{1} think \textsubscript{t} are at the party? (\text{many} > \text{think}) (*\text{think} > \text{many})

b. How many people from her\textsubscript{1} neighborhood does Diana\textsubscript{1} think \textsubscript{t} are at the party? (\text{many} > \text{think}) (\text{think} > \text{many})

The (a) sentences in these pairs are instantiations of the structural configuration in (23), with the modal verbs \textit{decide} and \textit{think} standing for SB\textsuperscript{1}. In these sentences \textit{many NP} must have wide scope over SB\textsuperscript{1} as predicted by (22). This can be seen when we compare the possible answers to (a) and to (b) under the crucial scenarios.

The two readings of (25b) are paraphrased in (25'). The difference between them is illustrated by the possible answers given the scenario (S2):

(25') Two readings:

a. \textit{many} > \textit{decide}:

\textit{What is the number \textit{n}, s.t. there are \textit{n} many slides of the trip to Kamchatka \textit{x}, s.t. Jonathan decided to show \textit{x} at the party} (answer given S2: 52)

b. \textit{decide} > \textit{many}:

\textit{What is the number \textit{n}, s.t. Jonathan decided to show \textit{n} many slides at the party} (answer given S2: 100)

\textsuperscript{27}The prediction in (b) depends on the additional assumption that there is a position for reconstruction between SB\textsuperscript{2} and pronoun\textsubscript{1}. This assumption is probably uncontroversial for the cases discussed in this section, since for all of these cases there is a CP node intervening between the two positions. In the next sub-section, there will be evidence for more reconstruction positions (see section 2.2.1.).
Jonathan wants to show slides from his trip to Kamchatka at a party. He tries to figure out how many slides he can show within an hour. After consulting with his roommate, Uli, he decides to show 100 slides (out of the 1000 he has). Now it's time to choose the actual slides. After an hour of internal debate, he decides on 52 slides that he really likes and prepares them for display. The remaining 48 slides will be chosen at random at the time of the party.

By contrast can have only the interpretation of (25’a); the only possible answer to this question given S2 is 52.

(26b) can have either the (think > many) interpretation, the interpretation of (21c), in which Diana doesn't need to have thoughts about any particular person, or the (many > think) interpretation, in which it is presupposed that there are certain people which Diana thinks are at the party and the number of those is inquired. Only the latter interpretation is available for (26a). (I invite the reader to construct the relevant scenarios.)

(25-26) show that QP in (23) cannot take scope under SB1. Now I would like to show that it can take scope under SB2 in (24). Furthermore, I would like to show that when SB2 and SB1 appear in the same construction (when we put (23) and (24) together), QP can have scope under the former but must take scope over the latter.28

Consider the contrast between the sentences in (27). (27a) is an instantiation of (23) and (27b) is an instantiation of (24). (Decide is the instantiation of both SB2 and SB1.) As (8) (/((22))) predicts, Scope Reconstruction is possible only in (27b). We have already concluded that Scope Reconstruction is impossible in (27a (=25a)) with the assistance of (S2). (S3) is a minimal variation on (S2) (with the changes in boldface), which demonstrates the contrast between the two questions. Under (S3) there are two possible answers to (27b), which correspond to the two possible scope relations.

(27) a. [How many slides of Jonathan's trip to Kamchatka] did he decide to show at the party?

b. [How many slides of Jonathan's trip to Kamchatka] did Susi decide that he would show at the party?

(28) The importance of this prediction is in demonstrating that the phenomena should be accounted for by reference to scope and not to a notion such as referentiality as is perhaps suggested by Heycock (see note 21). This is also the logic of Frampton’s argument that scope (and not referentiality) is the relevant notion for the account of certain weak island phenomena (Frampton (1991)).
consulting with their roommate, Uli, she decides that Jonathan will show 100 slides (out of the 1000 he has). Now it's time to choose the actual slides. After an hour of internal debate, she decides on 52 slides that she really likes and prepares them for Jonathan's display. The remaining 48 slides will be chosen at random at the time of the party.

Consider now (S4) which starts with (S2) and then has a short continuation:

(S4) Jonathan wants to show slides from his trip to Kamchatka at a party. He tries to figure out how many slides he can show within an hour. After consulting with his roommate, Uli, he decides to show 100 slides (out of the 1000 he has). Now it's time to choose the actual slides. After an hour of internal debate, he decides on 52 slides that he really likes and prepares them for display. The remaining 48 slides will be chosen at random at the time of the party.

After all of this Jonathan tells Susi about his two decisions, and wishes to show her the 52 chosen slides. He shows her 30 of the slides, at which point Susi gets bored and asks to go to sleep. Jonathan tells her that there are 22 more slides to see, and Susi says that she will see them during the party.

The relevant facts:

1. Susi knows a. that Jonathan decided to show 100 slides at the party.  
   b. that there are 52 slides such that J. decides to show them.

2. There are 30 slides such that Susi knows that J. decided to show them.

With the use of (S4) we can see that (28) is three-ways ambiguous; under (S4), (28) has three possible answers.

(28) How many slides did Susi know that Jonathan decided to show at the party?  
Answers:  
a. 30 (many > know > decide)  
b. 52 (know > many > decide)  
c. 100 (know > decide > many)

Now consider the contrast in (29). (29b) is three-ways ambiguous, just as (28) is. (29a), by contrast, is only two-ways ambiguous. In (29a), many can take scope either above or below know (= SB^2). However, the scope of many relative to decide (= SB^1) is fixed (many > decide); under (S4), the only possible answers to (29a) are 30 and 52. This is exactly the prediction of (22).
(29) a. [How many slides of Jonathan's trip to Kamchatka] did Susi know that he decided to show at the party?
b. [How many slides of his trip to Kamchatka] did Susi know that Jonathan decided to show at the party?

We have thus seen that the predictions of syntactic reconstruction hold for *how many* questions. Scope Reconstruction has consequences for BT(C) in exactly the manner predicted by (8).

2.2. Variable binding - an elaboration on Lebeaux (1990): Consider the option for variable binding in the constituent questions in (30). As is well-known, this option is available only if the trace of the wh-element is c-commanded by the binder of the variable. This is illustrated by the unacceptability of the questions in (31).

(30) a. Which of his students did every professor talk to t?
b. Which student of his did no professor talk to t?
c. Which student of his did you think every professor talked to t?
d. Which of his students did you think no professor talked to t?

(31) a. *Which of his students talked to every professor?
b. *Which student of his talked to no professor?
c. *Which student of his did you think talked to every professor?
d. *Which of his students did you think talked to no professor?

Just as in the previous cases we’ve looked at, there are two possible approaches. Under one approach, which is due to Engdahl (1980), part of the wh-element is in the trace position, and this syntactic configuration allows for variable binding (Syntactic Reconstruction). Under another approach, due to Engdahl (1986), various semantic mechanisms are postulated to yield the semantic effects of variable binding without actual reconstruction (Semantic Reconstruction).

These two approaches can be distinguished by the prediction (of the syntactic approach) that Scope Reconstruction feeds BT(C). If the cases in (30) require reconstruction in the syntax, there should be consequences for BT(C). If, however, there are semantic mechanisms that allow for the interpretations in (30) without actual reconstruction, there should be no such consequences. Lebeaux’s pair in (32) demonstrates that the prediction of syntactic reconstruction is correct.

(32) a. [Which (of the) paper(s) that he gave to the teacher] did every student hope that she will read t?
b. *[Which (of the) paper(s) that he gave to the teacher] did she hope
t’ that every student₁ will revise t’?

In both sentences in (32) part of the *wh*-phrase must undergo Scope Reconstruction to a position c-commanded by the Quantifier Phrase *every student* (the antecedent of the bound-variable *he*). In (32b), *every student* is c-commanded by the pronoun *she* which is, in turn, co-indexed with *the teacher*. Therefore, in (32b) Scope Reconstruction yields a BT(C) effect. In (32a), *every student* is not c-commanded by the pronoun, *she*, and therefore there is a position for reconstruction (perhaps the position of t’) which is within the scope of the antecedent of *he*, but not low enough to yield a BT(C) effect. The contrast is thus explained under the assumption that Scope Reconstruction feeds BT(C).

In fact, once we understand the logic of (32), we see that the conclusion regarding the relation between Scope Reconstruction and BT(C) can be demonstrated with additional examples, some of which come close to real minimal pairs. The logic is basically the logic of (7) and (8), repeated below:

(7) \[ QP \ldots r\text{-expression}_1 \ldots ]_2 \ldots \text{pronoun}_1 \ldots \text{t}_2 \]

(8) **Scope Reconstruction feeds BT(C):** Scope Reconstruction should be impossible in the structural configuration in (7).

(32b) is bad because it is an instance of (7) which requires Scope Reconstruction to a position below the pronoun. We know that Scope Reconstruction is necessary because there is a quantifier below the pronoun that must have a variable dominated by QP within its scope. In (32a), the quantifier is above the pronoun and hence Scope Reconstruction need not bring about a BT(C) effect.

The predictions of (8) for the constructions that Lebeaux investigated can be summarized by the schemes in (33), in which the underlined blanks represent potential reconstruction positions. Instances of (33a) should be acceptable because they do not require Scope Reconstruction of the *wh*-element to a position below pronounⱼ; there could be reconstruction to a position between the pronoun and QP in which the variable is bound and nevertheless BT(C) is satisfied.\(^{29}\) Instances of (33b) should be unacceptable because Scope Reconstruction of the *wh*-element must be to a position below QPᵢ which is, in turn, below pronounⱼ; any form of reconstruction that would allow the variable to be bound will necessarily bring about a BT(C) effect.

(33) a. *[Which \ldots \text{pronoun}_i \ldots \text{r}\text{-expression}_j \ldots ]_j \ldots \text{QP}_i \ldots \text{_.pronoun}_i \ldots \text{*.__}]
   b. *[Which \ldots \text{pronoun}_i \ldots \text{r}\text{-expression}_j \ldots \text{pronoun}_i \ldots \text{*.__} \ldots \text{QP}_i \ldots \text{*.__}]

---

\(^{29}\)Note that the prediction holds only under the assumption that there is a reconstruction position between QPᵢ and pronounⱼ. See section 2.2.1.
The important difference between the schemes in (33) is that in (33b), and only in (33b), does the kind of Scope Reconstruction that is needed bring about a BT(C) effect. However, there is an additional difference between the structures. In (33b), a more radical kind of Scope Reconstruction is needed. We should therefore add a control to the paradigm. We need to compare (33b) with (34) which needs the same kind of Scope Reconstruction but is irrelevant to BT(C).

(34) [Which ...pronoun_i .... pronoun_j] .....r-expression_j...∗_QP_i ..........∗_..∗

Even with the control, we continue to get the predictions of syntactic reconstruction. This is demonstrated in (35-37). The (a) and (b) examples are instantiations of (33a) and (33b) respectively; the (c) examples are instantiations of the control in (34). The results show that Scope Reconstruction, which is diagnosed by variable binding, feeds BT(C).

(35) a. [Which of the books that he_i asked the teacher_j for] did every student_i get from her_j ∗?
   b. *[Which of the books that he_i asked the teacher_j for] did she_j ∗ give every student_i ∗?
   c. [Which of the books that he_i asked her_j for] did the teacher_j ∗ give every student_i ∗?

(36) a. [Which (of the) paper(s) that he_i wrote for the teacher_j] did every student_i get her_j ∗ to grade?
   b. *[Which (of the) paper(s) that he_i wrote for the teacher_j] did she_j ∗ get every student_i ∗ to revise?
   c. [Which (of the) paper(s) that he_i wrote for her_j] did the teacher_j ∗ get every student_i ∗ to revise?

(37) a. [Which (of the) paper(s) that he_i gave the teacher_j] did every student_i ask her_j to read ∗ carefully?
   b. *[Which (of the) paper(s) that he_i gave the teacher_j] did she_j ∗ ask every student_i to revise ∗?
   c. [Which (of the) paper(s) that he_i gave her_j]

30 From the tests I conducted it seems that it is really important to put pronoun_j and QP_i in (33) as close as possible to each other, so as to minimize the differences between the sentences with respect to the distance between the bound variable and its antecedent. It seems that when the distance is very great, (33b) and (34) involve a terrible parsing load. This parsing load makes the judgment very difficult and it is hard to detect the effects of BT(C). Thus, although (i) seems better than (32b), it seems worse than (32a).

(i) ?? [Which (of the) paper(s)that he_i gave to her_j] did the teacher_j hope
t′ that every student_i will revise t?
did the teacherₐ ask every studentᵢ to reviseᵢ?  

2.2.1. The multitude of intermediate landing sites: In the previous subsection, we have used the scheme in (33) (repeated below) to argue that Scope Reconstruction feeds BT(C).

(33) a. [Which ... pronounᵢ ... r-expressionᵢ] ....QPᵢ .......pronomᵢ...*... ___ .
   b. *[Which ...pronounᵢ ... r-expressionᵢ] ....pronomᵢ...*QPᵢ .......*..

A crucial assumption of the investigation was that in (33a) there is an intermediate position for Scope Reconstruction between QPᵢ and pronounᵢ. Now, I would like to point out that one could conduct an investigation in the other direction. In particular (assuming that the arguments in this paper are compelling) one can attempt to take for granted the assumption that Scope Reconstruction feeds BT(C), and use the scheme in (33) to test what type of intermediate Scope Reconstruction positions are available. Such an investigation is beyond the scope of this paper. Nevertheless, I would like to point out one conclusion that would necessarily follow. This conclusion, although irrelevant at this point in the discussion, will play a crucial role in later sections. (See, in particular, 5.1.)

Consider the acceptability of the (a) sentences in (35-37). Under the assumption that Scope Reconstruction feeds BT(C), the grammatical status of these sentences forces the conclusion that there is a reconstruction position between the subject and the object. To illustrate this, I repeat the examples below with the crucial reconstruction position in brackets:

(35a) [Which of the books that heᵢ asked the teacherᵢ for] did every studentᵢ [___] get from herᵢ *?  
(36a) [Which (of the) paper(s) that heᵢ wrote for the teacherᵢ] did every studentᵢ [___] get herᵢ * to grade?  
(37a) [Which (of the) paper(s) that heᵢ gave the teacherᵢ] did every studentᵢ [___] ask herᵢ to read* carefully?

If we believe that reconstruction should follow from the copy theory of movement (Chomsky (1993)), we have a direct argument that there must be an intermediate landing site for A-bar movement between the subject and the object. For presentational purposes I will assume that the landing site is adjunction to VP, along the lines of Chomsky (1986a).³¹

³¹From a rudimentary investigation of constructions that fall under the scheme in (33) it seems to me that a stronger conclusion will follow. In particular, I believe one can construct an argument for the existence of intermediate landing sites in every maximal projection.
2.3. Unselective Binding: In the previous sub-section we have used variable binding as diagnostic of Scope Reconstruction. We have seen that when part of a constituent Wh-question needs to be reconstructed for variable binding there are consequences for BT(C). In this sub-section we will see that the same holds for unselective binding.

Consider the sentences in (38) and (39). In (38) we can get an interpretation in which the indefinite is bound by the unselective binder. In (39), this interpretation is unavailable. To see what is meant, let's focus on the (a) sentences. (38a) has an interpretation under which the indefinite an artist is bound by the unselective binder, usually. Under this interpretation the question can be paraphrased as something like which are the types of friends of x s.t. you said that for most artists y x-type friends of y are available? The question in (39a) does not have a comparable interpretation.

(38). a. [Which friends of an artist₁ ]
    [did you say that are usually₁ available]?
    b. [Which of the people that an artist₁ meets]
    [did you say that never₁ impress him₁]?

(39) a. *[Which friends of an artist₁ ]
    [said that they are usually₁ available]?
    b. *[Which of the people that an artist₁ meets]
    [said that they never₁ impress him₁]?

The contrast follows straightforwardly from the assumption that an indefinite which is bound by an adverb of quantification must be within its scope at LF. In (38) the trace of the Wh-phrase is within the scope of the adverb and the necessary configuration can be achieved via Scope Reconstruction. In (39), the trace of the Wh-phrase is outside the scope of the adverb and the necessary configuration for binding cannot be achieved.

The sentences in (38) and (39) contrast with respect to the availability of the intended interpretation. We can make the judgment sharper by considering constructions in which the intended interpretation is the only one available. Specifically, we will consider constructions in which independent factors require that the indefinite be bound by the adverb of quantification. In such constructions, the parallels of (38) will be ungrammatical independently of interpretation.

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32 The idea of using unselective binding as diagnostic of Scope Reconstruction was inspired by Chapter 3 of Chierchia (1995a) (although the construction I test and the conclusion I draw are very different). Thanks to Orin Percus for help in constructing the experimental paradigms.

33 Many different theories have been proposed for the binding of indefinites by adverbs of quantification. I think that all the theories share the assumption that the indefinite must be within the scope of the adverb.
Kratzer (1995a) observes that in individual-level predicates, an adverb of quantification must co-occur with an indefinite. This observation is demonstrated by the contrast in (40). (40a) is ungrammatical because there is no variable that is supplied to the adverb of quantification (vacuous quantification). (40b) is licensed because the indefinite supplies the variable.

\[(40)\]
\[
a. \text{*John usually}_1 \text{ knows French.} \\
b. \text{A Moroccan}_1 \text{ usually}_1 \text{ knows French}
\]

Consider now the contrast in the grammaticality of the questions in (41). In (41a,b) the indefinite can get into the scope of the adverb via Scope Reconstruction. In (41c), this is impossible since the trace of the Wh-element is outside the scope of the adverb. (41c) is ungrammatical because binding of the indefinite is on the one hand impossible and on the other hand required (given the ban on vacuous quantification).

\[(41)\]
\[
a. \text{[Which residents of a French town}_1 \text{ [t usually}_1 \text{ know English]?} \\
b. \text{[Which residents of a French town}_1 \text{ [did you say t usually}_1 \text{ know English]?} \\
c. \text{*[Which residents of a French town}_1 \text{ [t said that they usually}_1 \text{ know English]?}
\]

With this much at hand, we have an additional test for the prediction that Scope Reconstruction feeds BT(C). In this test the binding of an indefinite by an adverb of quantification will serve as diagnostic of Scope Reconstruction and the consequences for BT(C) will be examined. The examination will be based on the assumption that, as far as BT(C) is concerned, an indefinite acts like an r-expression even when it is bound by an adverb of quantification. (See Lasnik (1976) and Chierchia (1995b).) This assumption is based on contrasts such as those in (42).

\[(42)\]
\[
a. \text{*He}_1 \text{ usually}_1 \text{ thinks that an artist}_1 \text{ is creative.} \\
b. \text{An artist}_1 \text{ usually}_1 \text{ thinks that he}_1 \text{’s creative.} \\
c. \text{His}_1 \text{ parents usually}_1 \text{ think that an artist}_1 \text{ is creative.} \\
d. \text{The parents of an artist}_1 \text{ usually}_1 \text{ think that he’s}_1 \text{ creative.}
\]

Although the case of unselective binding seems a little more complicated than the cases we have looked at before, the logic is identical. Just as before, we will look at constructions such as those in (7) and test the prediction in (8). The r-expression in our test will be an indefinite, and the diagnostic for Scope Reconstruction will be the binding of this indefinite by an adverb of quantification.

\[(7)\]
\[
[Q\text{P ...r-expression}_1 ...]_2 \text{......pronoun}_1\text{....t}_2
\]
(8)  **Scope Reconstruction feeds BT(C):** Scope Reconstruction should be impossible in the structural configuration in (7).

It seems that the prediction in (8) is correct. To see this, consider first the contrast between the sentences in (43). In (43a), the principle that bans vacuous quantification forces Scope Reconstruction. Scope Reconstruction, in turn, yields a BT(C) effect, and the sentence is ruled-out. In (43b,c), by contrast, Scope Reconstruction does not yield a violation of BT(C). In (43d), the individual level predicate is replaced by a stage level predicate. For this reason, Scope Reconstruction is not forced and BT(C) is not affected.

(43)  a.  *[Which languages spoken in the country a linguist \(_1\) comes from] does he\(_1\) usually\(_1\) know t

   b.  [Which languages spoken in the country he\(_1\) comes from] does a linguist\(_1\) usually\(_1\) know t

   c.  [Which languages spoken in the country a linguist\(_1\) comes from] do his\(_1\) students usually\(_1\) know t

   d.  [Which languages spoken in the country a (certain) linguist\(_1\) comes from] does he\(_1\) usually\(_1\) like to speak t

Consider next the contrast in (44). In (44a) the position of the adverb of quantification forces Scope Reconstruction to a position c-commanded by the pronoun. In (44b), by contrast, there is a position, \(t'\), which satisfies the requirements of the adverb, and yet does not yield a BT(C) effect. In (44c,d), Scope Reconstruction is forced to the position of \(t\), but the result does not violate BT(C). (This indicates that the problem with (44a) is related to BT(C) and is not an independent problem with Scope Reconstruction.)

(44)  a.  *[Which languages spoken in the country a linguist\(_1\) comes from] did you say that he\(_1\) **usually**\(_1\) knows t ?

   b.  [Which languages spoken in the country a linguist\(_1\) comes from] do you **usually**\(_1\) say \(t'\) that he\(_1\) knows t ?

   c.  [Which languages spoken in the country that he\(_1\) comes from] did you say that a linguist\(_1\) **usually**\(_1\) knows t ?

   c.  [Which languages spoken in the country a linguist\(_1\) comes from] did you say that his\(_1\) students **usually**\(_1\) know t ?

(43) and (44), thus, provide us with an additional argument that Scope Reconstruction feeds BT(C).

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34I am ignoring various questions regarding the necessary focus structure of the constituent questions. My hope is that the answer to these question will not affect the results reported here.
3. A-RECONSTRUCTION

In the previous section, we have seen that A-bar Reconstruction feeds BT(C) and thus obeys the predictions of the syntactic account. In this section, I argue that the same is true of A-reconstruction. Unfortunately, the data on A-reconstruction is not as clear as the data from the previous section. Nevertheless, I think it goes in the right direction (see next note).

Let's look at cases of A-reconstruction of the sort we introduced in section 1. Consider the ambiguous sentences in (45), and focus on (45a). Under one of its interpretations, the sentence would be true only if there were a particular first-year student who David believed was at the party ($\exists > \text{seem}$). Under the other interpretation, there doesn't need to be such a student. The sentence would be true if David is at the party and happens to hear a conversation regarding the topics discussed in the intro-class, and if this conversation prompts him to conclude that at least one first-year student had to be in the room ($\text{seem} > \exists$).

(45) a. [A first-year student] seems to David to be at the party.
   b. [Someone from NY] is very likely to win the lottery.

As I argued in section 1, this ambiguity should be accounted for by the availability of Scope Reconstruction to the position of the trace. If Scope Reconstruction does not occur, we have the ($\exists > \text{seem}$) interpretation. If Scope Reconstruction occurs we have the ($\text{seem} > \exists$) interpretation.

Now we can test whether Scope Reconstruction feeds BT(C) in the case of A-movement. It seems that it does. To see this consider the sentences in (46-47). It seems that the (a) sentences are disambiguated in favor of the ($\exists > \text{seem}$) interpretation. To see this focus on (46a). This sentence would be true only if David had a thought about a particular student of his. It would not be true in the situation I used for illustrating the ($\text{seem} > \exists$) interpretation of (45a). This follows straightforwardly from the assumption that Scope Reconstruction feeds BT(C).³⁵

³⁵(46-47) were tested up to this point with 12 speakers. Eight of the speakers got the effect and some of them thought that the judgments were strong. Four speakers got no effect. Data similar to that which I'm presenting was reported independently in Romero (1996) and Sportiche (1996). I assume that this lends support to the reality of the effect. I also got more or less the same results using Lebeaux's observation that inverse scope in constructions such as (i) and (ii) depends on Scope Reconstruction (see section 1 above). I got the same kind of split. A little more than half the speakers get inverse scope only in (i).

(i) a. At least one of his₁ soldiers is expected by Napoleon₁ to die in every battle.
   b. One of his₁ soldiers is expected by Napoleon₁ to die in every battle.

(ii) a. At least one of Napoleon₁'s soldiers is expected by him₁ to die in every battle.
   b. One of Napoleon₁'s soldiers is expected by him₁ to die in every battle.
(46) a. [A student of David's$_1$] seems to him$_1$ t to be at the party. 
   \[ \exists (\exists > \text{seem}) \ast (\text{seem} > \exists) \]
   b. [A student of his$_1$] seems to David$_1$ t to be at the party.  
   \[ \exists (\exists > \text{seem}) \ast (\text{seem} > \exists) \]

(47) a. [Someone from David's$_1$ city] seems to him$_1$ t to be likely to win the lottery.  
   \[ \exists (\exists > \text{seem}) \ast (\text{seem} > \exists) \]
   b. [Someone from his$_1$ city] seems to David$_1$ t to be likely to win the lottery. 
   \[ \exists (\exists > \text{seem}) \ast (\text{seem} > \exists) \]

4. RAMIFICATIONS FOR THE INTERPRETATION OF CHAINS

In the previous sections we have seen that Scope Reconstruction feeds BT(C). This fact, which follows straightforwardly from syntactic accounts of Scope Reconstruction, cannot be explained by the semantic account. We thus have an argument in favor of syntactic accounts. This argument has certain consequences for semantics. In particular, it implies that the procedures that were suggested for semantic reconstruction must be restricted.

To appreciate this implication, let's look again at the chain in (2), repeated as (48). As mentioned in section 1.2., the known principles for the interpretation of chains (Heim and Kratzer (forthcoming)) yield the interpretations in (48")

(48) [Someone from NY] is very likely [t to win the lottery]

(48") a. [Someone from NY] \( \lambda x \) (is very likely [x to win the lottery])
   b. [Someone from NY] \( \lambda Q \) (is very likely [Q to win the lottery])

(48"b) yields the semantic effects of Scope Reconstruction without actual reconstruction. If this semantic interpretation is possible, we incorrectly predict no correlation between Scope and BT(C). We, therefore, need to rule out (48"b). We need a principle from which it would follow that a trace in a theta position is interpreted as a variable which ranges over individuals (type \( e \)). Space limitations do not allow me to discuss various possibilities. (See Beck (1996) for a promising proposal.) Nevertheless, I think it is important to stress the obvious consequence for semantics: If type-shifting operations are allowed in the semantic component at all, they must be restricted; something must be added in order to insure that the scope of moved constituents will be reflected in the syntax.
5. WHERE DOES BINDING THEORY APPLY?

The correlation between Scope Reconstruction and BT(C) argues in favor of two conclusions. First, it argues that Scope Reconstruction should be represented structurally (i.e., that there is syntactic reconstruction). Second, it argues that Binding Theory should be sensitive to the LF position of quantificational expressions, that is, it argues that Binding Theory applies at LF. However, it is widely believed that covert Quantifier Raising does not affect BT(C) (Chomsky (1981)). This can be taken as an argument that BT(C) applies at SS, as well as at LF (Lebeaux (1994)).

What I would like to claim now is that Binding Theory, or at least BT(C), applies only at LF. My argument will have two steps familiar from Chomsky (1993). The first step -- which was actually already taken by Chomsky and in which I will basically follow his assumptions (though perhaps not the details of the implementation) -- argues that, contrary to initial appearance, there is a coherent story to be told in which Binding Theory applies only at LF. The second step argues that the alternative, in which Binding Theory, and specifically BT(C), applies also at other levels of representation, is empirically inferior. This second step of the argument is based on Fox (1995b).36

5.1. The First Step (Chomsky (1993)): Let's begin by reviewing the evidence that is taken to show that BT(C) applies at SS. Consider the contrast between (49) and (50). Under certain assumptions about the nature of covert QR (Chomsky (1977), May (1977; 1985)), the LF structures of the sentences in (49) are those in (49'). These structures are identical with respect to BT(C) to the surface structures in (50). If BT(C) applied only at LF, there would be no obvious way of accounting for the contrast. If BT(C) applied also at SS, the contrast would follow straightforwardly.37

(49)  a. */?? you bought himi every picture that Johni liked.
     b. * Hei bought you every picture that Johni liked.

36 Chomsky (1993) also presents the second step of the argument. His argument, however, is based on BT(A) and is unrelated to scope.
37 Given the proposal made in Fox (1995a), the structures in (49) involve very short QR, or perhaps no QR at all. Under this proposal, the LFs of (49) are very different from (49’) and it is thus far from obvious that they pose a problem for the assumption that BT(C) applies only at LF. However, it turns out that the argument based on (49) carries over to structures for which this objection does not hold:

(i)  a. */?? A different girl bought himi every picture that Johni liked.
     b. * A different girl wanted himi to buy every picture that Johni liked.

(ii) a. A different girl bought Johni every picture that hei liked.
     b. A different girl wanted Johni to buy every picture that hei liked.
Chomsky (1993), however, provides a way of accounting for the contrast without the assumption that BT(C) applies at SS. In particular, he suggests that A-bar movement always leaves a copy and that this copy (under certain circumstances) yields a BT(C) effect, even if BT(C) applies only to the output of movement. In (49), the true output of QR is quite different from (49'). Specifically, it still has a copy of the moved constituent at the position of the trace and it is the r-expression within this copy that yields the violation of condition C. In (50) -- Chomsky claims (following Lebeaux (1988)) -- A-bar movement applies prior to the insertion of the relative clause that contains the r-expression. Therefore, in (50), the copy of the moved constituent does not yield a BT(C) effect. The difference between overt and covert movement under this proposal is not related to their respective ordering relative to Binding Theory but rather to their respective ordering relative to lexical insertion.38 Covert movement is never followed by lexical insertion, and therefore never appears to get around a BT(C) violation.

As it turns out, certain cases of overt movement are similar to the cases of covert movement in that they are unable to get around a BT(C) violation. These cases are demonstrated by Lebeaux’s (1988) contrast that was mentioned in (9) and is repeated in (51). Chomsky accounts for this contrast on the basis of a distinction between the timing of adjunct and complement insertion, which he also borrows from Lebeaux. According to this distinction the insertion of complements, in contrast to adjuncts, must take place prior to movement (in accordance with the extension/projection principle). From this it follows that complements, such as the boldfaced phrases in (51b), in contrast to adjuncts, such as the relative clauses in (51a), cannot bypass BT(C) via overt A-bar movement.39

38 Note that the claim that overt and covert movement differ in their ordering relative to lexical insertion is strongly motivated on independent grounds. There is strong independent motivation for the claim that lexical insertion cannot follow covert operations (at least not without severe constraints). If this claim were false, it is hard to imagine how we would account for any correspondence between meaning and sound.

39 The reader might wonder whether the possibility of inserting adjuncts at various points in the derivation is consistent with the observation in section 2 that A-bar Scope Reconstruction feeds BT(C). In section 6, I will show that it is consistent. The basic idea is that Scope Reconstruction is the result of interpreting a large part of the copy at the base position. I will show that such an interpretation is available only if the adjunct is inserted at the base position; the option of late insertion necessarily yields the non-reconstructed interpretation.
(51)  a. [Which argument that John made] did he believe t?
b. ??/*[Which argument that John is a genius] did he believe t?

It turns out that overt A-bar movement of certain phrases (phrases that contain complements and no adjuncts) is identical to covert movement with respect to Condition C. This weakens the argument from (49-50) that Condition C makes an overt/covert distinction. Nevertheless, this provides us only with the first stage of the argument that BT(C) applies only at LF. It is still possible to account for all the data under the assumption that BT(C) applies both at SS and at LF (See Lebeaux (1988, 1994)). In the remainder of this section, I would like to present the argument from Fox (1995b) that BT(C) must apply only at LF. The argument is based on an observation of Fiengo and May (1994) that certain cases of covert movement do in fact obviate BT(C). This observation cannot be accounted for under the assumption that BT(C) applies at Surface Structure.

5.1.1: The Interpretation of A-bar Chains: The discussion thus far hasn't spelled out the nature of the structures that get interpreted. As noted by Chomsky (1993), interpreting an operator variable construction probably requires some alterations of the copies created by movement. In particular, Chomsky suggests that the output of movement in structures such as (52), which is fully represented in (52'), undergoes a later process which forms one of the structures in (52'').

(52) Which book did Mary read t?
(52') Which book did Mary read which book?
(52'') a. Which book x did Mary read x?
b. Which x did Mary read book x?40

Further he stipulates that the structure in (52''b) is preferred to the structure in (52'a), thus accounting for the BT(C) violation in (51b). I will basically follow this assumption, but will make a small modification in the implementation. This modification will make the interpretation of the QRed structures more straightforward and will perhaps allow the stipulation to follow from general principles of Economy. Under the modification, the two structures are those in (52'''). (52''''a) is interpreted standardly. (52''''b) receives an interpretation paraphrasable as which is the book, x, such that Mary read x and x is a book.41

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40It is conceivable that these structures should be interpreted via quantification over choice functions (Reinhart (1995), Kratzer (1995b), Winter (1995) and Engdahl (1980: 131-141). However, as pointed out to me by Irene Heim, Uli Sauerland and Yoad Winter, it is not clear how such an analysis would extend to proportional quantifiers (e.g. most, almost every, etc.) This is one of the motivations for the modification that follows.

41The intuition for this analysis is based on the idea that Natural Language Quantifiers are conservative (see Barwise and Cooper (1981)). Given conservativity, the truth conditions are not affected by adding the restrictor of the quantifier as an additional conjunct in the nuclear
General principles of Economy prefer \((52''\text{b})\) to \((52''\text{a})\) since the former is closer to \((52')\). In other words, \((52''\text{b})\) involves fewer operations (of deletion) on \((52')\) and is thus preferred.\(^{42}\)

\[(52'\text{')}\]

\(a.\) Which book\_x did Mary read \_x?  
\(b.\) Which book\_x did Mary read book \_x?

For QR, similar issues arise. A sentence such as \((53)\) has \((53')\) as the output of QR, which can in turn be converted to one of the structures in \((53'\text{''})\).\(^{43}\) Economy principles determine that the interpreted structure is \((53''\text{b})\).\(^{44}\)

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\(\text{scope}.\) However, this intuition is a little misleading given that the restrictor is not added to the nuclear scope but rather at the position of the trace, which in some cases is much lower.

This raises a potential problem. A question such as \((\text{ia})\) has an LF such as \((\text{ib})\), which might seem problematic. The LF in \((\text{ib})\) seems to make an incorrect prediction; it seems to predict that \((\text{ia})\) involves a question about boys which Mary believes are boys (as the paraphrase in \((\text{ic})\) indicates).

\((\text{ia})\)

\(a.\) Which boy did Mary believe was in the room?  
\(b.\) Which boy\_x did Mary believe boy \_x was in the room?  
\(c.\) Which boy\_x did Mary believe \_x is a boy \_x and \_x is in the room?

However, as pointed out by Irene Heim (personal communication) this is not really a problem. A close investigation of nominal predicates in intentional contexts reveals that such predicates must have an implicit world variable (see Heim (1990)). The LF in \((\text{ib})\) does not contain the necessary variable and is thus incomplete. A complete LF of \((\text{ia})\) would be one of the structures in \((\text{ii})\). Given that variables must be interpreted identically in constituents which are copies of each other, \((\text{iiib})\) is the correct LF and the problem is overcome. Once the semantics for implicit world variables is taken into account, the interpretation of \((\text{iiib})\) turns out to be indistinguishable from the interpretation of an LF with a standard (copyless) trace, as indicated by the paraphrase in \((\text{ic})\).

\((\text{ii})\)

\(a.\) Which boy(w)\_x did Mary believe\_w' boy(w')\_x was in the room.  
\(b.\) Which boy(w)\_x did Mary believe\_w' boy(w)\_x was in the room.  
\(c.\) For which boy in the world of evaluation \_w is it the case that  
\[x \text{ is a boy in w and x is in the room in w''}\]

As far as I can see, the only cases which could be problematic for the analysis proposed here involve non-conservative quantifiers, such as \textit{only} (Kai von Fintel (personal communication)). It is possible that these quantifiers allow both of the structures in \((52'\text{''})\) since the interpretation of the two structures is non-equivalent (see Fox (1995a)). There are obvious ramifications for Binding Theory which I haven’t tested yet. Another possibility is that, contrary to appearances, non-conservative quantifiers do not exist in natural language (see Bayer (1996)).

\(^{42}\)For similar, though not identical, ideas see Cresti (1996).

\(^{43}\)I assume, based on Fox(1995a), that in sentences such as \((53')\) QR is limited to the VP level.

\(^{44}\)Note that the assumption that \((53''\text{b})\) is preferred by Economy to \((53''\text{a})\) is very similar to the assumption that Economy prefers feature movement to category movement. On the basis of this similarity, I suggest in Fox (1995b) a restatement of the ideas reported here in terms of feature movement.
(53) John₁ [VP₁ t₁ likes every boy].
(53') John₁ [every boy [VP₁ t₁ likes every boy]].
(53'') a. *John₁ [every boyₜ [VP₁ t₁ likes x]]  
   (ruled out by Economy)
b. John₁ [every boyₜ [VP₁ t₁ likes boy x]]

The explanation of the inability of QR to by-pass BT(C) is the same as the explanation of the inability in the case of overt Wh-movement. The explanation is based on an Economy principle that prefers structures in which the restrictor of the quantifier is not eliminated from the base position.

5.2. The Second Step of the Argument (Fox (1995b)): With this much in hand, we are in a position to present the argument that BT(C) must apply only at LF. The logic of the argument is based on the nature of economy principles. These principles choose an object from a set of competitors (a reference set). If under certain circumstances, the reference set is restricted so as not to include the most optimal object, it is predicted that an otherwise unacceptable object will be licensed. In our case, we predict that (53''a) will be licensed under circumstances in which (53''b) is not a member of the reference set. Under such circumstances, QR should obviate BT(C) effects. The question is whether such circumstances exist.

In Fox (1995b) I suggest that they do. In particular, I suggest that in cases involving Antecedent Contained Deletion (ACD), the parallel of (53''b) is not licensed and the parallel of (53''a) is the only element in the reference set and hence is acceptable. As is well-known, QR is needed in ACD constructions in order for VP deletion to be licensed (Sag (1977), May (1985), Kennedy (forthcoming), among others.) However, the problem of ACD is solved only if the restrictor is eliminated from the base position. For illustration, take (54) and suppose a theory of VP ellipsis which involves PF deletion (in our case of the <bracketed> material) licensed by LF Parallelism. If (54''a) were the interpreted structure, all would be well; the antecedent VP (in the squared brackets) would be exactly identical (up to alphabetical variance) to the elided VP. If, however, (54''b) were the chosen structure, Parallelism would not be obeyed; the antecedent VP would still contain within it a copy of the elided VP. For this reason, it is plausible to assume that (54''a) is the only element in the reference set, and is therefore licensed.

45 I believe that there is good evidence for a theory of ellipsis involving PF deletion. (See Lasnik (1972), Tancredi (1992), Chomsky and Lasnik (1992), Fox (1995) and Wold (1996).) However, the ideas developed here do not depend on such a theory. They could just as easily be stated in a theory involving LF copying such as that suggested in Williams (1977). Under such a theory, (54''b) would be eliminated from the reference set because it would not allow LF copying without an infinite regress problem (May (1985)).

46 A plausible conclusion from Fox (1995a) is that Parallelism is not accessible to Economy considerations (See Fox (in progress)). If we put Fox (1995a) together with Fox (1995b), the forced conclusion is that Parallelism is not accessible to the Economy conditions which determine whether or not QR is to apply. However, it is accessible to the considerations
Given these considerations, we predict that QR in ACD constructions will obviate BT(C). In fact, this seems to be the case, as noted by Fiengo and May (1994).

Consider the contrast between (55) and (56). The sentences in (55) end up with the logical forms in (55'), which violate BT(C). The sentences in (56), however, involve ACD, and thus end up with the logical forms in (56') where there is no BT(C) violation.

(55) a. ??/* You sent him the letter that John expected you would write.
    b. ??/* You introduced him to everyone John wanted you to meet.

(56) a. You sent him the letter that John expected you would.
    b. You introduced him to everyone John wanted you to.

which determine how the output of QR is to be converted to an operator variable construction (see section 8).

47 Fiengo and May account for this under the assumption that there is an algorithm which determines at what levels of representation BT(C) applies. In standard cases the algorithm determines that BT(C) applies at all levels of representations and in ACD constructions it determines that BT(C) applies only at LF. In Fox (1995b), I present various arguments against Fiengo and May’s proposal. The most direct argument is the observation that the algorithm proposed, which is based on a notion of an index token, predicts that BT(C) would apply only at LF in the sentences in (i). In order to account for the ungrammaticality of these sentences one would need to appeal to the copy theory of movement. Once such an appeal is made, the algorithm is no longer needed, and the conclusion that BT(C) applies only at LF is virtually forced. (For an additional argument against Fiengo and May’s proposal, see next note.)

(i) a. *He introduced his mother to [QP everyone that John liked].
    b. I expected him to introduce his mother to [QP everyone that John thought I did].

48 Fiengo and May (1994) claim that the sentences in (56) contrast with the sentences in (i), which do not include deletion but are identical in all other respects. All the speakers I have consulted disagree with this judgment.

(i) a. You sent him the letter that John expected you would [send him].
    b. You introduced him to everyone John wanted you to [introduce him to].
(55') a. You [the letter that Johni expected you would write]x
   [sent himi x letter that Johni expected you would write].
b. You [everyone that Johni wanted you to meet]x
   [introduced himi to x one that Johni wanted you to meet].

(56') a. You [the letter that Johni expected you would <send him x>]x
   [sent himi x].
b. You [everyone that Johni wanted you to <introduce him to x>]x
   [introduced himi to x].

It turns out that this line of reasoning makes many additional predictions. However, in order to see the nature of the predictions we have to go over the analysis of ambiguous ACD constructions such as (57). This construction is ambiguous with respect to the size of the VP that has been elided (with the two options specified in (a) and (b)).

(57) I expected Johni to buy everything that hei thought I did.
   a. <bought>
   b. <expected him to buy>.

In addition there is a potential ambiguity with respect to the relative scope of the universal quantifier and the intentional verb expect. Putting aside Parallelism, the sentence in (57) is potentially four-ways ambiguous; the universal quantifier may take scope either below or above the intentional verb expect and VP ellipsis may target either the embedded or the matrix VP. Under the copy theory of movement and the assumption that A-bar movement has an intermediate VP adjunction step (section 2.2.1.) we have the four potential LFs in (57').

(57') a. I expected Johni to
   [QP everything that hei thought I did <buy t>]
   buy [QP everything that hei thought I did <buy t>].  (embedded scope;
   embedded ellipsis)

b. I expected Johni to
   [QP everything that hei thought I did<expected himi to buy t>]
   buy [QP everything that hei thought I did <expected himi to buy t>].  (embedded scope;

As long as the bracketed VPs in (i) are down-stressed, the sentences are acceptable. Since down-stressing, just like ellipsis, must obey Parallelism (Tancredi (1992), Rooth (1992)), this result is expected under the proposal presented here. However, it is highly problematic for Fiengo and May’s proposal.
c. I
\[ \text{[QP everything that he thought I did <buy t>]} \]
expected John  to
\[ \text{[QP everything that he thought I did <buy t>]} \]
buy \[ \text{[QP everything that he thought I did <buy t>]} \].
(matrix scope; embedded ellipsis)

d. I
\[ \text{[QP everything that he thought I did <expected him to buy t>]} \]
expected John  to
\[ \text{[QP everything that he thought I did <expected him to buy t>]} \]
buy \[ \text{[QP everything that he thought I did <expected him to buy t>]} \].
(matrix scope; matrix ellipsis)

However, as pointed out in Larson and May (1990), (57'b) has no way of achieving Parallelism. We are, thus, left with (a) (c) and (d). Each of these must be converted into an operator variable construction under the Economy principle which minimizes deletion of copies. This Economy principle chooses the most optimal operator variable construction that obeys Parallelism. We thus end up with the three structures in (57'').

(57'') a. I expected John  to
\[ \text{[QP everything that he thought I did <buy t>]} \]
buy t. (embedded scope; embedded ellipsis)

c. I
\[ \text{[QP everything that he thought I did <buy t>]}_x \]
expected John  to
\[ \text{[QP x thing that he thought I did <buy t>]} \]
buy t. (matrix scope; embedded ellipsis)

d. I
\[ \text{[QP everything that he thought I did <expected him to buy t>]} \]
expected John  to buy t. (matrix scope; matrix ellipsis)

In (a) there is a single instance of QR, hence a single chain; in (b) and (c) there are two chains. In all three constructions Parallelism forces a simple trace at the theta position. (b) and (c) differ in that Parallelism requires the elimination of the intermediate trace in (b) but not in (c).
Consider now the sentence in (58). This sentence is different from (57) in that it allows only matrix VP ellipsis. This is exactly what is predicted; the structures which involve embedded VP deletion (58'a and 58'c) violate BT(C), while the structure in (58'd) does not.

(58) I expected him\_i to buy everything that John\_i thought I did.
    a. *<bought t>
    b. <expected him\_i to buy t>

(58')

a. I expected him\_i to
    [QP everything that John\_i thought I did <buy t>]
    buy t. (embedded scope; embedded ellipsis)

c. I
    [QP everything that John\_i thought I did <buy t>]\_x
    expected him\_i to
    [QP x thing that John\_i thought I did <buy t>]
    buy t. (matrix scope; embedded ellipsis)

d. I
    [QP everything that John\_i thought I did <expected him\_i to buy t>]
    expected him\_i to buy t. (matrix scope; matrix ellipsis)

The proposal predicts that QR would bleed BT(C) only if the QR is long enough to get out of the c-command domain of the "dangerous" pronoun, and only if the QR is needed for ACD resolution and thus requires elimination of the offending material at the tail of the chain.

That this prediction is correct can be demonstrated with additional examples. Consider the contrast between the sentences in (59). (59a) is ambiguous. (59b) requires matrix VP deletion. Once again, this is predicted; only matrix VP deletion forces the less economical structure which avoids a BT(C) violation.

(59) a. In the end, I demanded that John\_i read exactly those books that he\_i suspected I would. a. <read t> b. <demand that he read t>
    b. In the end, I demanded that he\_i read exactly those books that John\_i suspected I would. a. *<read t> b. <demand that he read t>

Consider now the contrast between (60) and (61). In (60), embedded VP deletion is preferred to matrix VP deletion (for some speakers, the latter is
impossible). In (61), where embedded VP deletion would bring about a BT(C) effect, the judgments are reversed.49

(60) I said that Bill bought everything he thought I did.
   a.  <bought t>
   b.  ? <said that he bought t>
(61) I said that he bought everything Bill thought I did.
   a.  *<bought t>
   b.  ? <said that he bought t>

In sections 2-3, we have seen that Scope Reconstruction feeds BT(C). This forces the conclusion that Binding Theory applies (also) at LF. In this section we have seen that (a) it is possible to maintain that BT(C) applies only at LF albeit what appear to be evidence to the contrary (Chomsky (1993)) and (b) this stance is virtually necessary on empirical grounds (Fox (1995b)).

6. SCOPE RECONSTRUCTION IN A-BAR CHAINS

In the previous section, we have seen that under normal circumstances A-bar movement fails to affect BT(C) irrespective of whether or not the moved constituent is reconstructed. This means that under normal circumstances, we do not expect A-bar movement to show an interesting correlation between Scope Reconstruction and BT(C). This might raise a question regarding the status of the correlation we have seen in section 2. The answer to this question is simple. Normal cases of A-bar movement do not affect BT(C) irrespective of reconstruction. What we've seen in section 2 is that when there is reconstruction the "abnormal" cases of A-bar movement behave like the normal cases. In other words, we have seen that the method which allows A-bar movement to affect BT(C) does not allow for reconstruction. Let's see how this result follows from the view of syntactic reconstruction that the copy theory of movement provides. Under the copy theory of movement, A-bar movement can affect BT(C) only if the r-expression is within an adjunct and only if the adjunct is inserted after movement. This is illustrated schematically in (62-63).

(62) *[QP.[complement..r-expression1..]..]2
       ......pronoun1....[QP.[complement..r-expression1..]..]2
(63) a. *[QP.[adjunct..r-expression1..]..]2  (adjunct inserted before movement)

49The (a) readings require focal stress on the pronoun I. This should follow from independent principles (See Rooth (1992)). As David Pesetsky (personal communication) points out, it might be more accurate to state our correlation as a correlation between focal stress and BT(C), which is explained by the proposal I make together with an independently motivated correlation between the size of ellipsis and the site of focal stress.
Reconstruction, on the other hand, is achieved via the deletion of the head of the chain and the interpretation of the tail alone, as in (64).

\[(64) \text{QP}2 \quad \ldots \ldots \text{pronoun}1 \ldots \text{QP}2 \quad \text{---reconstruction---\rightarrow} \quad \ldots \ldots \text{pronoun}1 \ldots \text{QP}2\]

If an adjunct is inserted after movement, reconstruction is blocked since it will not allow the adjunct to get an interpretation. If an adjunct is inserted after movement, reconstruction is blocked since it will not allow the adjunct to get an interpretation.\(^{50}\) It thus follows that A-bar movement cannot affect BT(C) when the moved constituent is reconstructed. This explanation is based on the idea that the moved constituent is fully reconstructed. However, the cases of Wh-movement we've looked at in section 2 involve forms of partial reconstruction; in these cases the Wh-operator is interpreted in the surface position and only a part of it is reconstructed to the base position. What I would like to do, therefore, is show that all the cases we've looked at nevertheless involve reconstruction of a constituent that includes the adjunct and thus are captured by the explanation given above. Furthermore, I would like to show a case of partial reconstruction which does not necessarily include the adjunct. In this case, the prediction of the copy theory is that a violation of BT(C) would occur iff the adjunct that contains the r-expression is reconstructed.\(^{51}\)

6.1. The Cases Discussed in Section 2: In section 2 we've looked at two basic cases of reconstruction. Let's begin with the simple case discussed in section 2.2.-2.3. In this case a relative clause contains a variable which must be bound in the reconstructed position. It was shown that if the relative clause contains an r-expression as well and if the r-expression is bound in the reconstructed position, a BT(C) effect emerges.\(^{52}\)

\[(65) \quad *[\text{Which book that he asked the teacher for}] \quad \text{did she give every student?}\]

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\(^{50}\) There are many ways to capture the idea that unrecoverable deletion of the adjunct is blocked. One possibility, among many others, is that an element can be deleted only under identity with a copy. Late insertion of an adjunct makes the head of the chain nonidentical to the tail.

\(^{51}\) This prediction would follow under any syntactic account of partial reconstruction.

\(^{52}\) Similar considerations apply to the cases of unselective binding in which the relative clause contains a variable bound in the base position by an adverb of quantification (section 2.3.).
This case follows straightforwardly from the copy theory of movement. If the adjunct is inserted after movement, there is no way for the variable to be bound. For concreteness, let's assume, following Engdahl (1980), that (65) has the following LF:

(65') Which (choice function) \( f \) did she\( j \) give every student\( i \) \( f \) (book that he\( i \) asked the teacher\( j \) for)?

This LF has the adjunct in the base position and thus cannot result from its late insertion.

Now let's move to the slightly more complex case which was discussed in section 2.1. In this case a how many question is separated with how interpreted in the surface position and many NP reconstructed to the base position:

(66) How many ideas is John likely to come up with?
How n: John is likely to come up with n many ideas?
What is the number n s.t. John is likely to come up with n many ideas?

In (66) the creation verb come up with requires reconstruction. As we've seen in section 2.1, this reconstruction brings about a BT(C) effect even when an r-expression is contained within an adjunct:

(67) *[How many ideas related to John's\( 1 \) theory] is he\( 1 \) likely to come up with?
How n: he\( 1 \) is likely to come up with n many ideas related to John's\( 1 \) theory?

Once again, the reason for this is straightforward. The adjunct must modify the NP ideas. If the DP many ideas is deleted from the surface position and interpreted at the base position (if it is reconstructed), the adjunct must be in the base position as well.\(^{53}\)

\(^{53}\) A reviewer raised the following question: under the copy theory of movement shouldn't (67) be expected to have the LF in (i) and shouldn't this LF obviate BT(C)?

(i) How \( n \) : \([n\) many ideas related to John's\( 1 \) theory]\)
    is he\( 1 \) likely to come up with[n ideas]?

In fact, the question goes beyond BT(C). The LFs suggested by the reviewer must be ruled out for independent reasons. Thus, a sentence such as How many ideas related to his theory is John planning to come up with? does not have the following LF:

(ii) How \( n \) : \([n\) many ideas related to his\( 1 \) theory]\)
6.2. A Case of Partial Reconstruction that Doesn't Need to Include the Adjunct: Consider the following how many question:

(68) [How many more ideas than what's needed for his tenure] is John planning to come up with?

This question is similar to (66) in that the semantics of the embedded creation verb forces reconstruction of the DP N many ideas. However, in contrast to (66), (68) is ambiguous with respect to the scopal position of the comparative quantifier. This ambiguity is represented by the two LFs in (68').

(68') a. how n: (∃N) N is n-more than (tM)[M many ideas are needed for his tenure] [John is planning to come with N many ideas] (answer given S5: 60)

b. how n: John is planning

is John likely to come up with[n ideas]?

What is the number n s.t. there are n many ideas related to his theory and John likely to come up with [n ideas]?

The putative LF would have had a rather bizarre meaning in which what is questioned is the number of ideas that John is planning to come up with (rather than the number of ideas of the type determined by the relative clause).

As mentioned in section 2, I follow the standard assumption that the Wh-phrase how many NP has two parts. One part consists of the Wh-word how (which could be paraphrased as what n) and the other consists of the DP many NP which is a quantifier over individuals:

(iii) [How many NP] φ(t₁)

How n: n many NP λx φ(x)

Under this assumption, the LF above has to be altered as follows:

(iv) How n : [n many ideas related to his theory] λx is John likely to come up with[n ideas]?

This LF violates the constraint against vacuous quantification (λx does not bind a variable). If we replace n lies with x (lies), we get rid of vacuous quantification. However, now the LF has the wide scope reading, which is expected, and in fact does, obviate BT(C).
(∃N) N is n-more than (t M)[M many ideas are needed for his tenure]
   [PROi to come with N many ideas]
   (answer given S5: 10)

To see this ambiguity consider the following situation:

(S5) John thinks that he needs 100 ideas for tenure. He wants to come up with 110 ideas to be on the safe side (that is to say, he wants to have 10 more ideas than what's needed). However, the truth is that he needs only 50 ideas for tenure.

Under (S5) there are two possible answers to (68). One answer is 60 and the other is 10. The two answers correspond to the two LFs in (68'). If the comparative takes wide scope relative to the intensional verb plan, the value of the definite description (t M)[M many ideas are needed for his tenure] is determined in the actual world to be 50 and the answer to the question is 60. If, on the other hand, the comparative takes narrow scope relative to the intensional verb, the value of the definite description is determined in the belief worlds to be 100 and the answer to the question is 10.

(68) is different from (66) in that in (68) there is an adjunct what's needed for his tenure which is not contained within the DP many ideas. Therefore in (68) it is possible to reconstruct the DP without reconstructing the adjunct. We thus predict that (68) can be transformed into (69) without yielding a BT(C) effect. This prediction is born out. Furthermore, it is pretty clear that (69) has only one answer --"60"-- given the situation described in S5. In other words, it seems that (69) has only the LF in (69'a), in which the adjunct is inserted after movement.

(69)  [How many more ideas than what's needed for John's tenure]
       is he_i planning to come up with?

(69') a. how n: (∃N) N is n-more than
       (tM)[M many ideas are needed for John's tenure]
       [he_i is planning to come with N many ideas]
       (answer given S5: 60)

b. *how n: he_i is planning
   (∃N) N is n-more than (t M)[M many ideas are needed for John's tenure]
   [PROi to come with N many ideas]
   (answer given S5: 10)
What we've seen in this section is that in cases of partial reconstruction late insertion of an adjunct is possible if and only if the adjunct is not contained in the reconstructed material. This is exactly what's expected under the copy theory of movement. Furthermore, this result strengthens the idea that reconstruction is syntactic. It shows us that when there is partial reconstruction, we find syntactic effects for exactly those elements that are reconstructed.

7. A NOTE ON THE A/A-BAR DISTINCTION

The conclusion that Scope Reconstruction feeds BT(C) (sections 2-3) is true for all types of movement. However, the conclusion that movement bleeds BT(C) only when there is reason to get rid of the restrictor (section 5) is true only with respect to A-bar movement. A-movement bleeds BT(C) with no special proviso. This well-known contrast is illustrated in (70) and (71).

(70) Standard A-bar movement fails to bleed BT(C)
   a. ??/*Which argument that John1 is a genius did he1 believe t?
   b. *A different person told him1 about every argument that John1 is a genius.

(71) Standard A-movement bleeds BT(C)
   Every argument that John1 is a genius seems to him1 to be flawless.

I don’t fully understand this distinction. Nevertheless, I will state it explicitly in the following manner:54

(72) a. A-movement leaves a simple trace.
    b. A-bar movement leaves a copy which is converted to an operator variable construction in accordance with economy considerations.

Given this distinction, we would like to know what the nature of Scope Reconstruction is for both types of movement. What I would like to suggest tentatively is that A-movement, which does not leave a copy, requires Quantifier Lowering (QL) for Scope Reconstruction (May (1977)). A-bar movement, by contrast, is reconstructed via deletion (of the relevant part) of the antecedent, as spelled-out in the previous section.

For illustration I provide a sketch of the possible LF structures that are derived from the two types of movement in (73-74).

(73) Scope Reconstruction in A-movement.

54 As pointed out to me by David Pesetsky and Irene Heim, the stipulation could be derived from an assumption that has an air of an explanation to it, namely the assumption that copies must receive Case.
SS: Someone [that she knows] is likely [t to win the lottery].
LF1: Someone [that she knows] is likely [t to win the lottery].
LF2: is likely [Someone[that she knows] [t to win the lottery]].

(74) Scope Reconstruction in A-bar movement.
SS1: How many people [that she knows] (adjunct inserted before movement)
    is Mary likely to hire how many people [that she knows].
LF1,1: How\textsubscript{n} is Mary likely to hire \textsubscript{n} many people [that she knows].
LF1,2: How\textsubscript{n} n many people [that she knows]\textsubscript{x}
    is Mary likely to hire \textsubscript{x} people [that she knows]

SS2: How many people [that she knows] (adjunct inserted after movement)
    is Mary likely to hire how many people.
LF2: How\textsubscript{n} n many people [that she knows]\textsubscript{x}
    is Mary likely to hire \textsubscript{x} people.

For A-movement, there is one SS and two LFs that differ depending on whether or not there is Quantifier Lowering. The latter yields what we have called Scope Reconstruction, and has the consequences we have discussed for BT(C) (section 3). For A-bar movement, there are two SSs that differ depending on whether the adjunct is inserted before or after movement. Only SS\textsubscript{2} can bleed BT(C). However, only SS\textsubscript{1} can bring about Scope Reconstruction (hence the consequences in section 2). 55

55 SS\textsubscript{2} has only one LF in which many has wide scope. SS\textsubscript{1} has two LFs that differ in the scope they assign to many.
8. CONCLUSIONS

In this paper I have presented evidence that the predictions of BT(C) come out right only if we assume that this condition applies to the structures that get interpreted. On the one hand, I have shown that BT(C) "sees" the output of LF operations such as Quantifier Lowering (section 3). On the other hand, I have shown that BT(C) doesn't see the SS input to LF operations such as Quantifier Raising (section 5). The reason it looks as though BT(C) inspects a pre-QR structure relates to a special property of A-bar chains: movement leaves a copy which can be eliminated only when necessary (under Antecedent Contained Deletion). This special property provides a syntactic account of A-bar reconstruction (section 6) which, in turn, account for the correlation with BT(C) (section 2). Reconstruction may work differently for A- and A-bar movement. Nevertheless, in both cases it is reflected at LF. For this reason, the semantic mechanism of type-lifting must be restricted (section 4).

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