Connectivity Effects in Pseudo Cleft Sentences*

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1 Introduction

In his 1973 dissertation, Roger Higgins revealed how difficult it is to analyze cleft constructions without making too many construction specific assumptions. Sometimes it might even be difficult to decide whether a particular assumption is construction specific or not. A case in point is Higgins' main thesis, which he calls the Null Hypothesis stated in (1):

(1) *Higgins' Null Hypothesis:*
"The surface structure of a specificational pseudo cleft sentence is essentially identical to its deep structure form." (Higgins 1973: 22)

In modern terminology this means that S-structure and LF must coincide in all relevant respects. Since by definition a Null-Hypothesis can not actually be a principle (of grammar), it is plausible to assume that (1) should in fact be a theorem, resulting from deeper principles which in turn do not explicitly mention the specificational pseudo cleft construction.

In this paper, however, I will not be concerned with the theoretical status of (1) as either construction specific or not. Rather I will be concerned with the seemingly much simpler question of whether it is true or false.

I take it for granted that Higgins' arguments against previous analyses were correct. What needs to be examined is the question of whether they are still correct today, against the background of more recent developments. In re-examining some of the problems that arise with (1) and some of the proposed solutions, I will concentrate on the issue of connectivity as discussed by Akmajian (1970), Higgins (1979), Barss (1986), Heycock (1995), and others.

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2 Binding and Connectivity

Let us first analyze the sentences in (2):

(2) a. What nobody$_1$ did was buy a picture of himself$_1$
b. Buy a picture of himself$_1$ was what nobody$_1$ did

Here the obvious problem is that the anaphor is not c-commanded by its antecedent. If I understand Higgins correctly, his general solution to binding problems of this sort is to assume an understood big-PRO-like subject which serves as the local c-commanding antecedent of the anaphor. Accordingly, *buy a picture of himself* has a silent subject-NP which is the antecedent of the anaphor *himself* and which, according to the theory of the early seventies, is erased by an EQUI-NP-deletion rule.

Solutions like the above — as well as many other proposals involving EQUI- or SUPER-EQUI-NP-deletion — have rarely been made precise, so that Higgins is in good company when treating control as a more or less semantic phenomenon. Nonetheless, such an appeal to other components of grammar is unsatisfactory, for at least three reasons.

Firstly, cases like (3) cannot plausibly be accounted for by an NP-internal subject-PRO.

(3) What nobody$_1$ bought was a picture of himself$_1$

Higgins demonstrates that *picture* nouns behave somewhat exceptionally anyhow, but this fact alone cannot be considered a solution to the problem.

Secondly, and most importantly, even if we grant an invisible subject, Higgins does not explain how this subject can in turn be bound by its antecedent. To illustrate, consider the structure in (4):

(4) [What nobody$_1$ did] was [PRO$_1$ buy a picture of himself$_1$]

The relevant observation here is that the antecedent is a quantifier, and that binding by a quantifier is possible only in a configuration of c-command. This is made explicit in the Binding Hypothesis formulated in (5):

(5) *The Binding Hypothesis:*
For a pronominal to be semantically interpretable as a bound variable, it must be c-commanded by its binder.

Unless one is prepared to postulate Quantifier Raising out of a relative clause — which seems to be a wild and unmotivated device — the Binding Hypothesis simply contradicts Higgins' Null Hypothesis.

Thirdly, the behavior of anaphors seems to be governed by the derivational history of movement within the free relative. This has been shown by Barss (1986) in his dissertation, from which I have taken the examples in (6):

(6) a. [What$_i$ *John* wants [*Mary* to paint t_i]] are pictures of himself/herself
b. [What$_i$ *Joyce and Shaw* believed [I like t_i]] are each other's plays

The point is that the anaphoric possibilities cannot be determined by the base position of *what* alone. If this were true, sentence (b) would be ungrammatical, and sentence (a) would not permit *himself*. However, if we analyze *what* as having the same content as the post copular phrase, the observed binding possibilities could be explained.

By contrast, Higgins' explanation would have to be that the relevant properties of EQUI-NP-deletion must, in cases like these, be identical to the conditions of Binding Theory. This, however, strongly suggests that a generalization has been missed. Apparently, the behavior of anaphors in these constructions does not depend on an obscure theory of control, but directly on Binding Theory itself.

However, as Barss himself has shown, this conclusion does not contradict Higgins' Null Hypothesis. This is because Barss reformulated Binding Theory in a representational way, such that the relevant properties can be checked at the surface level (which is, according to Higgins, identical to LF.) I will return to this in Section 7.

Finally, there are a number of principle (C) effects which could easily be explained on the basis of Barss' theory but which might remain problematic on the basis of Higgins' account. First consider examples like (7) from Bach (1969) and (8) from Higgins:

(7) *What he$_1$ smashed was John's$_1$ car

(8) *What he$_1$ discovered was a proof of Descartes'$_1$ existence (okay with predicational reading)

The ungrammaticality of coreference in these sentences corresponds with that of their unclefted counterparts. This clearly calls for an analysis in terms of obligatory reconstruction, which is indeed independent of any understood subject mechanism. The following data from Heycock (1995) confirm this conclusion. Consider first the contrast in (9):

(9) a. [How many lies aimed at exonerating Clifford$_i$]$_j$ did he$_i$ claim that he$_i$ had no knowledge of t_j
b. *[How many lies aimed at exonerating Clifford$_i$]$_j$ is he$_i$ planning to come up with t_j

The contrast does not lie in the surface structure of the clauses; rather it is the semantics of the embedded verbs that makes the difference. In (b), the verb is intensional, and any meaningful interpretation of the sentence must reconstruct the *wh*-phrase into its scope. The verb in the (a)-sentence, however, is extensional, hence no reconstruction is called for and coreference is grammatical. But consider next the parallel cleft constructions in (10) and compare (9-a) with (10):

(10) *What he$_i$ claimed that he$_i$ had no knowledge of were lies aimed at exonerating Clifford$_i$

Although coreference is okay in the transparent unclefted construction, it must be ruled out in the also transparent cleft construction. This behavior is explained if reconstruction of *what* in clefts is obligatory. Although this assumption in and of itself deserves an explanation, it should be noted that this is exactly what Barss assumes when dealing with condition (B) effects like (11):

(11) a. *What John$_i$ is is proud of him$_i$
b. *What John read was a book about him$_1$
(okay only on predicational readings)

Note also that at the time of Higgins' dissertation any explanations via reconstruction would have been inconsistent with his Null Hypothesis; so the question is whether alternative explanations are available. When discussing examples like (7) and (8), Higgins seems to subscribe to the view that backwards anaphora is restricted to a special context that requires the referent to be already known or given. Arguing along these lines, he cites Hankamer's rule stated as (12):

(12) *Hankamer's Conjecture:*
All pronominalzation is from left to right.

Higgins comments:

(13) "Hankamer's conjecture may well be too strong, but Specificational pseudo cleft sentences probably fall into the class of cases which can be explained by it." (Higgins, p. 316)

He also cites examples showing that backwards pronominalization is ungrammatical even though it is okay in the unreconstructed form:

(14) *What the man who lived next door to him$_i$ also discovered was a proof that Descartes$_i$ existed

The point is that the ungrammaticality of (14) cannot be explained by condition (C), regardless of whether or not we reconstruct.

On the other hand, inverted structures like (15) show the same reconstruction effects, although this time Hankamer's rule cannot work:

(15) a. *John's$_i$ car was what he$_i$ smashed
b. *Shave John's$_i$ beard was what he$_i$ forced Mary to do

We conclude from (15) that applying condition (C) at a reconstructed LF still yields correct results, although examples like (14) suggest that additional factors might also come into play.

In search of a unifying explanation, Higgins briefly discusses an alternative to Hankamer's rule. It relies on the meaning of a pseudo cleft as specifying a *list*. He observes that something from within a list can never pronominalize an element outside it. This

is exemplified in (16):

(16) *He$_i$ discovered the following: Mary's books, John's$_i$ trousers, ...

I am not convinced, however, that this is entirely satisfying. For one thing, the generalization itself is still left unexplained; for another, I do not see how the widely shared semantic intuition that *lists* are essential for the semantics of the construction under discussion can be justified. Firstly, this assumption introduces a very construction specific property which does not become apparent from a mere inspection of the surface. Secondly, it does not square well to the connectivity effects we observed with anaphors and negative polarity items to be discussed further below. Thirdly, I do not see why lists should do better than sets: For sure, lists are ordered sets, but it is precisely this aspect of an ordering which never plays a role in any explanation based on lists. For sure, we sometimes allude to *incomplete* or *open* lists, and it seems to be a commonly shared intuition that clefts specify *complete* list. However, this difference has no counterpart with sets: we simply do not have any notion of an *incomplete set*. Since sets are "complete" by definition, it seems to me that a proper formalization cannot take advantage of the concept of a list, but should proceed in terms of sets, as one would expect from ordinary model theoretic semantics.

Putting aside the issue of lists, the least one can say by now is that the application of condition (C) at a reconstructed level is consistent with the observed facts. This is an important observation: If reconstruction is obligatory, as suggested by Barss in order to account for condition (B) effects, then we would expect that condition (C) likewise holds after reconstruction, and this is exactly what we have seen above.

Summarizing so far, the evidence we collected suggests that the Binding Theory depends on reconstruction and must therefore apply at a level different from surface structure. Although this seems to contradict the Null Hypothesis, Barss has shown how to reconcile these requirements with Higgins' thesis: By reformulating Binding Theory in such a way that the effects of movement and reconstruction are captured at S-structure, Barss provides a necessary step in showing that there is no need to postulate an LF that differs from surface structure. However, what remains troublesome is the semantic issue, namely the conflict between the Null Hypothesis and the Binding Hypothesis. That is, Barss' theory would be undermined if it turned out that reconstruction is necessary for independent semantic reasons. Before demonstrating that semantic binding does not require c-command, let us look at two further arguments in favor of reconstruction.

3 Negative Polarity

Another well known problem is NPIs as exemplified in (17):

(17) [What John$_1$ *didn't* do] was buy *any* picture of himself$_1$

The surface structure of (17) seems to contradict the commonly held view that *any* must be in the scope of and c-commanded by negation. This view implies the necessity of reconstruction.

By way of generalizing the Binding Condition we thus arrive at the Scope Condition given in (18):

(18) *The Scope Condition:*
NPIs as well as bound variables must be the scope of (i.e. c-commanded by) the operators they depend on.

Cleft constructions show that this condition cannot be met at S-structure, hence a solution is called for that seems to contradict Higgins' Null-Hypothesis.

Moreover, clefts exhibit an interesting asymmetry that emerge in inverted structures like (19):

(19) *Buy *any* picture of himself$_1$ was [what John$_1$ *didn*'t do]

Observe that the example was chosen in such a way that reconstruction is independently necessary for the binding mechanism to work properly. It thus follows that the reason for the contrast between (19) and (17) must be a linear precedence condition that holds for NPIs at surface structure, but is apparently irrelevant for anaphors or bound variables (cf. sentence (2-b)). Note that a certain precedence condition is already contained in Ladusaw's Polarity Hypothesis stated in (20):

(20) *The Polarity Hypothesis* (Ladusaw, 1980, p. 112):
"A NPI must appear in the scope of a trigger (a downward entailing element). If its trigger is in the same clause as the NPI, the trigger must precede the NPI."

Ladusaw restricted precedence to elements of the same clause because he was aware of examples like (21), where the NPI precedes the negative verb:

(21) [That *anyone* invited her on Monday] Mary *forgot*

Here the negative trigger is not in the same clause as *anyone* and therefore must be allowed to precede the NPI. However, if we adopt Progovac's (1993) analysis — namely that there is something inherently negative in the COMP position of sentential complements of certain downwards entailing verbs, and that this invisible element of the fronted clause is the trigger for the NPI — the *if*-clause in Ladusaw's condition can be dropped. We may thus generalize the condition by saying that the trigger must *always* precede the NPI. This explains the contrast between (17) and (19): in the grammatical sentence (17) the trigger precedes the NPI, whereas in the ungrammatical (19), the NPI precedes the trigger.

Chris Wilder (p.c.) kindly provided me with more data that illustrate the relevance of precedence:

(22) a. *Any picture of Fred was what John didn't buy

b. *Steal anything was what nobody did
c. *Pictures of anyone John didn't buy.
d. *It was pictures of anyone that John didn't buy
e. *Pictures of anyone are easy to ignore
f. *... but steal anything, nobody did

Since reconstruction reverses the surface order, it is obvious that the *linear* licensing condition must apply at the level of surface structure. On the other hand, it seems that the *structural* licensing condition for *any* is not met at the surface of pseudo clefts. This again calls for a solution in terms of an LF that differs from the surface.

On the other hand, we could assimilate the licensing conditions for *any* to the binding conditions for anaphors as stated by Barss. I will now demonstrate that this is in fact a plausible conclusion.

One piece of evidence is derived from NPIs other than *any*. For example, although sentence (23-a) is perfectly grammatical, the corresponding cleft in (23-c) is not:

(23) a. John didn't give a talk until he was 25.
b. *John gave a talk until he was 25.
c. *What John didn't do was give a talk until he was 25.

Here again it is the surface structure that counts. Marcel den Dikken pointed out to me that the same might be true for idioms. For example, the idiomatic interpretation is lost in (24):

(24) What Mary didn't lift was a finger

These findings militate against a pure LF account of negative polarity in general. Thus, one might argue that the above counterexamples call for S-structure locality, whereas *any* requires locality at LF. However, such a solution would, perhaps unduly, multiply levels beyond Occam's razor. Moreover, evidence from positive polarity also speaks against such a conclusion. To this I turn in the next section.

4 Positive Polarity

Note first that the local licensing of NPIs is sensitive to the scope of quantifiers at LF. Linebarger (1987) gives the following examples:

(25) a. *John didn't give *a red cent* to every charity
b. *She didn't wear *any* earrings to every party
(Available reading: Wide scope of *any* over *every*) NOT available for (b): It wasn't to every party that she wore any earrings

At S-structure the NPI is as close to the negation as can be; nonetheless, the reading with *every* having wide scope over the NPI is impossible. This can be explained by looking at LF, where the quantifier is closer to the negation than the NPI. This produces

an intervention effect: there is an intervening operator between the NPI and its licenser which blocks the strictly local licensing requirement of the NPI.

Interestingly enough it turns out that a switch from the negative to the corresponding positive polarity item *rules in* the previously unavailable reading. For example, compare (25-b) with (26), which seems fairly acceptable in the intended reading:

(26) ?She didn't wear *some* earrings to every party

This is unexpected if we check licensing conditions only at surface structure where the positive polarity item is immediately preceded by the negation. We must conclude, then, that LF is the relevant level not only for *any* but also for positive PIs. Accordingly, the PPI *some* is grammatical in (26) because at LF an operator intervenes.

Given all this, consider next (27):

(27) What John (also) didn't do was drink any/some wine

The grammaticality of both *some* and *any* in this context is unexpected if the LF of the sentence involves (obligatory) reconstruction. This observation supports Higgins' thesis. If the locality condition for *some* must be checked at LF — as suggested by (26) — then this LF should be identical to the surface, for otherwise the PPI would be in the immediate scope of negation. On the other hand, given that no syntactic reconstruction is involved, the licensing conditions of *any* seem to go hand in hand with that of bound variable pronouns, which can be demonstrated by (28):

(28) What nobody$_i$ did was beat some/any (friends) of his$_i$ children

As noted above, the analysis of *some* in (28) would become paradoxical on the view that binding requires reconstruction at LF: such an LF would clearly violate the licensing condition for *some*. I conclude that neither the LF required for binding nor the LF required for *any* can involve real reconstruction, and that the licensing conditions for *some* and NPIs other than *any* can be satisfied only if LF and S-structure are identical.

To summarize this section, the polarity item *any* behaves much like an anaphor in that it can be licensed only via reconstruction. Other PIs, however, are incompatible with reconstruction, although an analysis of their distribution seems to involve considerations of LF. From this I conclude that Higgins' hypothesis is in fact the correct generalization, so that Binding Conditions as well as the locality condition for *any* must be stated in a Barssian way, at a level of LF that is not different from the surface in relevant respects. Given this, it only remains to show how variable binding can be accounted for. Before going into this, I would like to discuss one final argument that was designed to establish a genuine semantic argument in favor of Higgins' thesis.

5 Conjunction

As pointed out by Sharvit (1997), the following pseudo cleft has a cumulative reading:

(29) What John read and what Mary bought is/was Huck Finn, Tom Sawyer, A Connecticut Yankee, and The Prince and the Pauper.

Syntactic reconstruction at LF cannot account for this reading, hence no reconstruction can ever be involved in the analysis of pseudo clefts.

This would, if correct, establish an excellent argument in favor of Higgins' hypothesis. Unfortunately, however, I am not convinced that the argument reveals anything about specificational clefts. Consider first similar examples with predicates that call for a plural subject:

(30) a. What John bought and what Mary bought go together well
b. What John believes and what Mary claims is (mutually) incompatible.

Adopting Schwarzschild's (1991) union theory of coordination we arrive at the correct readings only if the free relative clauses are referring expressions and the entire cleft construction is predicational. Sharvit's example (29) also results from the theory correctly if we analyze the free relatives as terms and the conjunction as a set theoretic union, as shown in (31):

(31) $\{X$: John *read $X\} \cup \{X$: Mary *bought $X\}$ = {Huck Finn, Tom Sayer, A Conneticut Yankee, The Prince and the Pauper}

Here '*' denotes Link's plural operator, cf. Link (1991) or Sternefeld (1994) However, according to Higgins' typology, (29) would be classified as *identificational*. And as is well known, neither predicational nor identificational clefts show the usual connectivity effects.

A genuine testing case would be true specificational sentences, perhaps of the form in (32):

(32) What Max also wanted to buy and what Mary intended to read was a book on syntax and a book on semantics

Due to the presence of the intensional verbs, (32) must be specificational. But now the relevant question is this: do we get a cumulative reading? Unfortunately, I only get the distributional construal, with Max wanting to buy both books.

The conclusion is that the coordination of the free relatives in specificational clefts can not involve a conjunction of terms. This is corroborated by the behavior of reciprocals. First note that these are grammatical in specificational constructions like (33-a) and (33-b), which sharply contrast with the ungrammatical sentences in (33-c) and (33-d):

(33) a. The only people they really liked were each other
(Chomsky (1971))
b. What those two like even more than they like themselves is each other
(from Oren Percuss: Unmasking the Pseudocleft, 1997, unpublished)
c. *What John really liked and what Mary really liked was each other

d. ??What John did and what Mary did was send letters to each other

One might argue that these sentences are out for reasons of agreement; the real testing case should therefore be:

(34) ??What some critics really admire and what some authors really dislike is/are each other

But this, if grammatical at all, only has the distributional reading, with the critics admiring each other and the authors disliking each other.

In conclusion, then, coordinations in real specificational clefts do not, contrary to first appearance, count against a reconstruction account. On the contrary, examples like the above suggest that across the board reconstruction is essential in order to get the semantics right.

It emerges, then, that there are a number of semantic properties that are left unexplained by Higgins' thesis, and these are precisely the properties that would speak against his Null Hypothesis.

6 An *in situ* Semantics for Reconstruction

Now, in order to maintain the Null Hypothesis, we need a surface semantics which solves the connectivity problems in a straightforward way. Any such semantics is in conflict with the Binding Hypothesis (5) and the Scope Condition (18), which therefore must be assumed to be wrong.

A major task therefore is to develop an alternative theory that interprets variable binding at the surface, without c-command. As it turns out, this problem is largely independent of the properties of cleft sentences, hence any solution of it will still satisfy the Null Hypothesis.

In fact, there are several possibilities to interpret variable binding without c-command. A particularly simple solution is implicitly contained in an old paper of Bennett's, cf. Bennett (1979). It is simple because it is very general. Although Bennett does not directly address the issue of interpreting pronouns, his framework easily allows expression of the idea that referential pronouns and bound variables do not have the same meaning. Whereas referential pronouns do, as usual, denote individuals, this no longer holds for bound variable pronouns, whose meaning must be something more complex.

Let us first look at the interpretation of quantified sentences in predicate logic. The usual semantics given to a universally quantified sentence like (35-a) is the metalinguistic statement in (35-b):

(35) a. $(\forall x_1)(P(x_1) \rightarrow Q(x_1))$
b. $(\forall a \in D)(\forall g' \in G)(g'[a/1]g \rightarrow (I_P(g'(1)) \rightarrow I_Q(g'(1))))$

Now, the logical problem with doing semantic reconstruction by means of lambda

conversion at a surface level is that (36-a) is not equivalent to (35). Rather, a logically equivalent alphabetic variant of (36-a) would be (36-b), with x_1 still being free a free variable not bound by the universal quantifier:

(36) a. $\lambda x_2(\forall x_1)(P(x_1) \rightarrow Q(x_2))(x_1)$
b. $(\forall y)(P(y) \rightarrow Q(x_1))$

Lambda conversion is not permitted in a context where a formerly free variable such as the last occurrence of x_1 in (36-a) would become bound as the result of that operation.

Let us illustrate the problem with a lingustic example. Assume that P stands for *man*, and R for *loves*. Let I be the function that assigns an interpretation to these predicates in a model. Adopting the notation of (35-b), *every man*$_1$ *loves him*$_2$ would be represented as something like (37), where $g'[a/n]g$ is true if and only if g' (possibly) differs from g by assigning the individual a to the variable x_n:

(37) $(\forall a \in D)(\forall g' \in G)(g'[a/1]g \rightarrow (I_P(g'(1)) \rightarrow I_R(g'(1), g'(2))))$

This is the usual way of stating the truth conditions in the meta language. But next consider a slight modification of (37).

(38) $(\forall a \in D)(\forall g' \in G)(g'[a/1]g \rightarrow (I_P(g'(1)) \rightarrow I_R(g'(1), X_2(g'))))$

In (38) we replaced the translation of the pronoun *him*$_2$ by a complex variable that ranges over assignments. Now assume that X_2 is in fact the semantic interpretation of a syntactic trace. This variable applies to the assignment function g' used at the current stage of semantic evaluation. The next step is lambda abstraction over that variable as shown in (39-a), which semantically represents (39-b):

(39) a. $\lambda X_2(\forall a \in D)(\forall g' \in G)(g'[a/1]g \rightarrow (I_P(g'(1)) \rightarrow$
$I_R(g'(1), X_2(g'))))$
b. λX_2 every man$_1$ loves t_{X_2}

Let us now apply (39) to the aforementioned more complex translation of a bound variable pronoun. That is, we actually want to represent the sentence in (40):

(40) Himself$_1$, every man$_1$ loves t

Since *himself* must be interpreted as bound by *every man*, its meaning must be as shown in (41):

(41) himself$_1$ = $\lambda g.g(1)$

By combining (41) and (39-a), we get (42):

(42) $\lambda X_2(\forall a \in D)(\forall g' \in G)(g'[a/1]g \rightarrow (I_P(g'(1)) \rightarrow$
$I_R(g'(1), X_2(g'))))(\lambda g.g(1))$

But observe now that lambda conversion (of X_2) has become unproblematic, since

the converted material no longer contains any free variables. The result of lambda conversion applied to X_2 is shown in (43-a). Applying conversion again to g' yields (43-b). In traditional object language notation this is equivalent to (43-c):

(43) a. $\forall a \in D)(\forall g' \in G)(g'[a/1]g \rightarrow (I_P(g'(1)) \rightarrow I_R(g'(1), \lambda g.g(1)(g'))))$

b. $\forall a \in D)(\forall g' \in G)(g'[a/1]g \rightarrow (I_P(g'(1)) \rightarrow I_R(g'(1), g'(1))))$

c. $\forall x(P(x) \rightarrow R(x, x))$

This demonstrates that lambda conversion can bring a syntactically free pronoun into the scope of its semantic binder, but only if the semantic value of a semantically bound pronoun is not the same as that of ordinary variables. Rather it must be the meaning of a variable in the meta-language, where assignments (or simply: sequences of individuals) are part of the language we talk about.

Of course it remains to be shown that all this can be done in a systematic way. But this is exactly what Bennett has shown in his paper, where all translations of natural language expressions into a typed predicate logic are of the general form $\lambda g.\alpha$. Accordingly, if an expression is to be interpreted as dependent on a quantifier, its value depends on an assignment, as the bound variable pronoun in (41). By contrast, a referential pronoun would have to be translated as $\lambda g.x_1$.

A systematic exposition of the semantics can be found in Sternefeld (1997), where I also have shown how such a theory can apply to semantic reconstruction in cleft constructions as discussed above. For reasons of space this analysis cannot be repeated here; instead I will briefly indicate how Barss' theory can be accommodated in the light of recent developments.

7 An *in situ* Theory of Syntactic Binding

In this section I intend to reformulate Barss' theory. The aim is to account for the above mentioned data and to integrate into the theory two further features that are absent from Barss 1986 theory: First, we want to get a mono-representational reformulation of Lebeaux's basic intuition that adjuncts can be inserted on the way to S-structure, and that anaphors can be checked at any point of the derivation. Second, we want to integrate Heycock's finding that condition (C) effects at LF occur if and only if there is semantic reconstruction.

The basic intuition to begin with is to redefine Barss' accessibility paths as a subtree and an ordering of nodes in that tree. That is, an ordered "Binding Tree" is roughly equivalent to a Barssian accessibility path. A condition (C) effect is encountered if and only if an R-expression γ has a Binding Tree that leads to a coindexed binder, i.e. there is a node α in the Binding Tree such that some β is a sister of α and β is coindexed with γ. Condition (A) can be satisfied by finding a *subtree* of the Binding Tree of the anaphor which leads to a coindexed antecedent.

Accordingly, the main idea is this: the requirement that condition (C) be satisfied

at all levels is fulfilled by considering the entire Binding Tree. The requirement that condition (A) must be satisfied at some arbitrary stage of the derivation can be satisfied by looking at only a partial Binding Tree.

Let us now define these concepts rigorously (for further details, see also the discussion in Sternefeld (1997)):

(44) **Binding Tree:**
Given a tree Σ and a node $\alpha \in \Sigma$, the Binding Tree for α is the smallest subtree $T \subseteq \Sigma$ that satisfies the following conditions:
a. $\alpha \in T$,
b. the root of T is the root of Σ,
c. if $\beta \in T$ and γ is the local trace of β, then $\gamma \in T$, **unless**
(i) α is an R-expression,
(ii) β (reflexively) dominates an adjunct that dominates α, and
(iii) γ is not a reconstruction site,

The **unless**-clause is a representational version of Lebeaux (1994). It implies that:

a. A trace is always an element of the tree if it is a reconstruction site. This was established by Heycock and the examples in Section 2. A trace is a reconstruction site if and only if it is translated as a variable of the same type as the antecedent (cf. Sternefeld (1997) for details). This means that we actually look at Binding Trees at LF, but for the phenomena to be considered here it is crucial that LF and surface structure coincide.

b. A trace is always an element of the tree in case α is an anaphor. This ensures that principle (A) is in principle independent of reconstruction. That is, we get anaphoric dependency even in examples like "Which pictures of himself$_1$ did he$_{1/2}$ claim he$_{2/1}$ had no kwoledge of", where there is no semantic reconstruction involved.

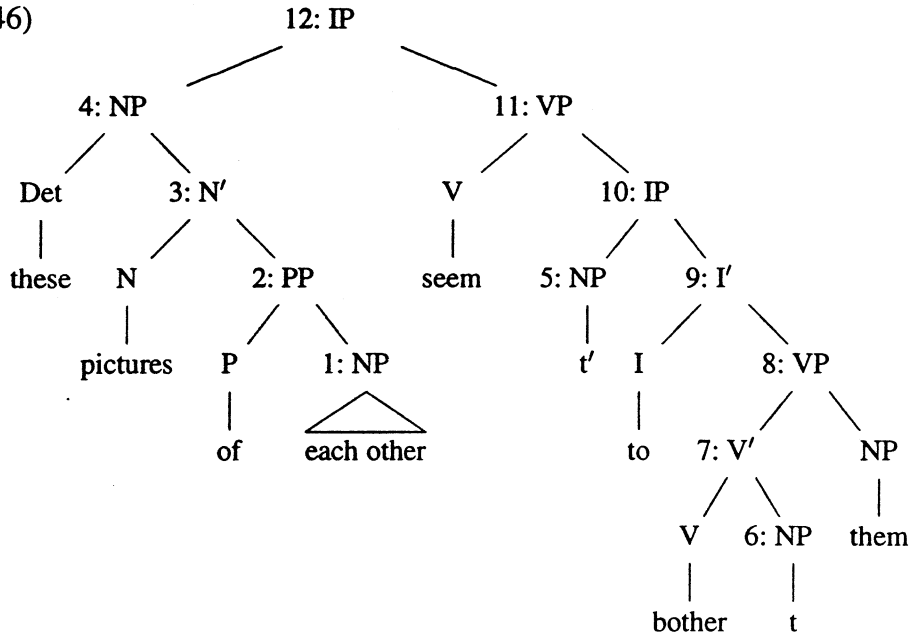
c. A trace may escape from being an element of a Binding Tree for α if it is not a reconstruction site *and* its antecedent (reflexively) dominates an adjunct that dominates the R-expression α. This is basically Lebeaux's observation that R-expressions within adjuncts are not visible at D-structure, i.e. the trace of such an adjunct is not in the Binding Tree, unless it is a reconstruction site.

In order to explain the locality of anaphoric binding, it remains to establish an ordering on the trees. This is done in (45):

(45) **Ordered Binding Tree**:
An ordering $<$ of the nodes of a Binding Tree is BT-compatible iff it is a strict and total ordering that satisfies the following conditions:
a. if α dominates β, then $\beta < \alpha$, and
b. if α precedes β in a reconstruction chain, then $\alpha < \beta$.

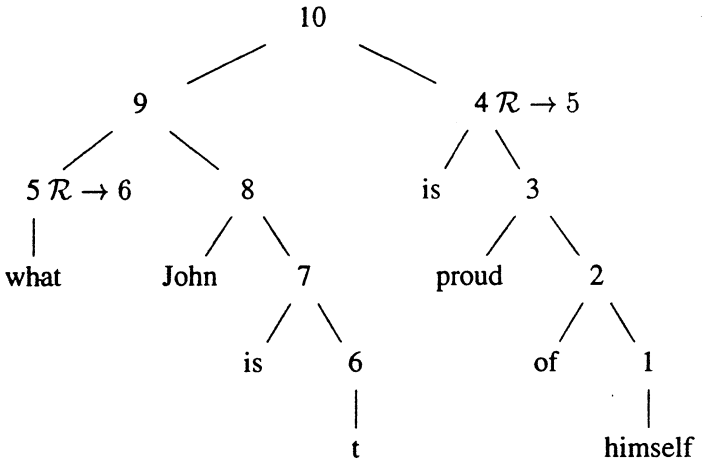
The ordering of a (reconstruction) chain is determined by c-command. For example, one can order the following tree as indicated by consecutive numbers (the structural analysis is taken from (Barss, 1986, p. 116)):

(46)



The closest possible binder on the path of *each other* is the sister of node 7, and indeed this gives us the correct result. Another example involving clefts is the following:

(47)



Here $\mathcal{R}$ is the semantic operation of reconstruction. This basically works like lambda abstraction, with the number following the arrow as the node that translates as the variable that becomes bound by the lambda operator. It is obvious that the anaphor can be bound here only by following its binding path. We thus formulate the conditions (C) and (A) of the Binding Theory as follows:

(48) **Binding Theory:**

a. An R-expression is A-free with respect to its Binding Tree.

b. If α is an anaphor, α is locally A-bound with respect to a subtree of its Binding Tree that satisfies the following conditions:

(i) it contains α,

(ii) its nodes are BT-compatible, i.e. they can be ordered according to (45), and

(iii) it is functionally complete.

To illustrate, consider (6-a) again, here repeated as (49):

(49) [What$_i$ *John* wants [*Mary* to paint t$_i$]] are pictures of himself/herself

It is clear from the above that the Binding Path of *himself* extends from right to left up to the copula, then reconstructs into *what*, then to the trace t$_i$, and finally up to the root. If this were the only BT-compatible tree, then — according to any BT-compatible ordering — the most local binder would be *Mary*, making the wrong prediction. But now observe that (48) crucially requires only a BT-compatible subtree of the Binding Tree. We therefore need not go down from *what* to the trace but could stop somewhere in between, for example at *want*. This clearly gives the correct result, since from this position *Mary* is no longer accessible, so that the closest possible binder is *John*. And this is precisely the result we were after.

8 Conclusion

In general, it seems fairly easy to show that a representational theory can express everything a derivational theory can (cf. also Sternefeld (1991) or Sternefeld (1996)), whereas it is extremely difficult to show that either theory is superior to the other at the level of explanatory adequacy. The above arguments illustrate this claim in a straightforward way: On the one hand, I think it is fairly straightforward to show that a representational *in situ* semantics is feasible. On the other hand, I found it rather difficult to find infallible and water-tight arguments in favor of or against such a method.

As always in linguistics, arguments are theory dependent. For example, assume we adopt the Minimalist Program. Recall that Chomsky (1995) acknowledges only two interfaces (PF and LF) and claims that conditions are either purely derivational or interface conditions. But now recall that (a) for a number of conditions, surface structure rather than a reconstructed structure is relevant, and (b) these conditions are structural conditions on scope, hence unlikely to operate at PF. But given that the Minimalist Program does not allow any conditions on surface structure, these conditions must hold at LF. Given these premises, a contradiction can only be avoided if and only if surface structure is essentially identical to LF. But this is exactly Higgins' Null Hypothesis.

It would therefore be wrong to conclude that since both NPI locality conditions for *any* and binding conditions involve reconstruction, syntactic reconstruction could

yield a unified explanation but semantic reconstruction cannot. For one thing, the locality conditions are still different, but more importantly, they are still syntactic. Being different, there is no a priori reason to assume that there be a uniform level to which they apply. Being syntactic, they can both be spelled out either with respect to another level or with respect to Binding Trees, so reconstruction does not by itself supply an extra degree of uniformity. Finally, the purported argument abstracts away from the cases discussed above where NPIs like *until* do not behave in the predicted uniform way. Some distinctions must be drawn, but there seems to be no explanatory argument to the effect that this could not be achieved at a single level, or that the multiplication of levels would automatically provide an adequate solution.

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