

1986

## Superiority and Generalized Binding

Norbert Hornstein

*University of Maryland, College Park*

Amy Weinberg

*University of Maryland, College Park*

Follow this and additional works at: <https://scholarworks.umass.edu/nels>



Part of the [Linguistics Commons](#)

---

### Recommended Citation

Hornstein, Norbert and Weinberg, Amy (1986) "Superiority and Generalized Binding," *North East Linguistics Society*. Vol. 17 , Article 20.

Available at: <https://scholarworks.umass.edu/nels/vol17/iss1/20>

This Article is brought to you for free and open access by the Graduate Linguistics Students Association (GLSA) at ScholarWorks@UMass Amherst. It has been accepted for inclusion in North East Linguistics Society by an authorized editor of ScholarWorks@UMass Amherst. For more information, please contact [scholarworks@library.umass.edu](mailto:scholarworks@library.umass.edu).

Superiority and Generalized Binding\*

Norbert Hornstein and Amy Weinberg  
University of Maryland, College Park

In this paper, we would like to offer an explanation within the theory of Generalized Binding for Superiority Effects. We will explain these data by assuming that the syntactic format of LF structures conforms to that of unrestricted quantification, the format familiar from standard treatments of the predicate calculus. We will also argue that this approach to Superiority is to be preferred to other analyses current in the literature. In particular, we will focus on a recent interesting proposal in Pesetsky (1985) and show that our analysis is superior.

I. The Basic Theory

In the standard case Superiority Effects obtain when one moves a WH element over another WH element higher in the tree. Compare the general questions in (1):

- (1) a. Who bought what  
       b.\*What did who buy  
       c. John needs to know who bought what  
       d.\*John needs to know what who bought

(1a and c) are clearly more acceptable than (1b and d). Generalized Binding explains this contrast in terms of the Binding Theory<sup>1</sup>. There are three principles of binding:

- (2) Where X = A or A-bar,  
       A. an X-anaphor must be X-bound in its domain  
       B. an X-pronoun must be X-free in its domain  
       C. R-expressions must be A-free

The main difference between Generalized Binding and the more standard version of the Binding Theory is that the former extends to A-bar relationships. This is crucial for accounting for Superiority Effects, as we shall see. Generalized Binding assumes that WH elements such as 'who' and 'what' leave traces that are both A-bar anaphors and R-expressions, and so fall under the Binding principles A and C. This means to say that these traces are anaphors that must be A-bar bound in their domains. The domain of an A-bar anaphor is the smallest NP or clause containing it and a SUBJECT accessible to it. For these traces, we assume the definition of accessibility in (3)<sup>2</sup> and the definition of SUBJECT in (4)<sup>3</sup>:

(3) A SUBJECT S is accessible to a trace (t) iff one can index S and t without violating principle C.

(4) S is a SUBJECT iff S is AGR, [NP,S] or [NP,NP]

Consider how these definitions apply to the sentences in (1).<sup>312</sup>  
 (1a and b) have the structures at LF displayed in (5 a and b).

- (5) a. [<sub>S</sub> [<sub>C<sub>1</sub></sub> who<sub>i</sub> what<sub>j</sub>] [<sub>S</sub> t<sub>i</sub> AGR<sub>i</sub> bought t<sub>j</sub>]]  
 b. [<sub>S</sub> [<sub>C<sub>3</sub></sub> what<sub>j</sub> who<sub>i</sub>] [<sub>S</sub> t<sub>i</sub> AGR<sub>i</sub> bought t<sub>j</sub>]]

We assume that percolation of an index from an element in the complementiser position to the dominating COMP node occurs at S-structure in languages that allow syntactic WH-movement.

Therefore in (5a) the C[COMP] carries the index 'i' while in (5b) it carries the index 'j'. In (5a) the 'i' indexed COMP binds the subject trace 't<sub>i</sub>'. In (5b) 't<sub>i</sub>' is free. In both structures the domain for 't<sub>i</sub>' is the matrix clause. In the matrix clause 't<sub>i</sub>' has an accessible SUBJECT, *i.e.* the AGR element. Coindexing AGR and 't<sub>i</sub>' does not violate principle C as the AGR is not a nominal in an A position. Therefore, 't<sub>i</sub>', an A-bar anaphor, falls under principle A and must be A-bar bound if the structure is to be grammatical. This occurs in (5a) as the 'i' indexed COMP binds the subject trace. However, this fails to obtain in (5b) where the COMP bears the index 'j' while the subject has the index 'i'.

Observe that 't<sub>j</sub>' need not be bound to meet the Generalized Binding conditions. The reason is that it has no domain. The only potential domain for 't<sub>j</sub>' is the matrix clause once again. There are two potential accessible SUBJECTs; AGR or [NP,S]. However, coindexing either with 't<sub>j</sub>' will lead to a principle C violation. Since t<sub>i</sub> is in an A-position, we cannot coindex t<sub>j</sub> with it without violating Principle C. Therefore [NP, S] t<sub>i</sub> is not an accessible SUBJECT for t<sub>j</sub>. The Agreement element is also inaccessible. Note that it is already indexed with the subject position, *i.e.* it "agrees" with the subject. Therefore, coindexing 't<sub>j</sub>' and AGR will lead to a coindexation of 't<sub>j</sub>' with the subject 't<sub>i</sub>' by transitivity of indices. But this leads to a principle C violation. Therefore, AGR is not an accessible SUBJECT for 't<sub>j</sub>' either. In fact, 't<sub>j</sub>' has no accessible SUBJECT and so has no domain. Consequently, it need not be bound.

The principles we have sketched lead us to expect a subject/object asymmetry when it comes to binding requirements. This is precisely what we observe in sentences such as (1). We will return to other cases of Superiority below and show that essentially the same approach can be extended to cover those cases as well. Wherever there are superiority effects what we are really witnessing is the subject/object asymmetry that Generalized Binding entails. Before turning to these cases, however, we must consider a further important property of Superiority; the fact that it is cancelled in certain environments.

## II. Cancellation of Superiority Effects

An important fact about Superiority Effects, first observed by Richie Kayne, is that they are cancelled if the WH element in subject position is "heavy".

313

- (6) a. \*What did who buy  
 b. What did which man buy  
 c. \*John needs to know what who bought  
 d. John needs to know what which man bought

Under the standard assumption that the whole WH phrase is moved in LF, we have no way of accounting for the difference in acceptability between (6a and c) and (6b and d) in terms of Binding. Under this assumption the LF structures for (6a) and (6b) are identical, i.e. the structure displayed in (5b). Therefore, both sentences should be judged unacceptable.

We can exploit the analysis from section I to explain the facts in (6) if we jettison the standard assumption and assume that we can move the WH element alone in LF. In other words, in some cases the WH element and only the WH element gets moved by 'Move Alpha' in LF. This restriction will lead to LF structures which essentially have the syntactic format of unrestricted quantification. It will also yield the desired empirical results in conjunction with Generalized Binding. Consider the LF structure of (6a and b) given this assumption.

- (7) \*a. [<sub>C</sub> [<sub>C</sub> what<sub>j</sub> who<sub>i</sub>]] [<sub>S</sub> t<sub>i</sub> AGR<sub>i</sub> buy t<sub>j</sub>]]  
 b. [<sub>C</sub> [<sub>C</sub> what<sub>j</sub> which<sub>i</sub>]] [<sub>S</sub> [<sub>NP</sub> t<sub>i</sub> man]<sub>k</sub> AGR<sub>k</sub> buy t<sub>j</sub>]]

(7a) is identical to (5b). We have already seen why the structure is ungrammatical. Let's turn to (7b). As in (7a) 't<sub>i</sub>' is not bound. However, unlike (7a), it need not be in this case because it has no domain. It has no accessible SUBJECT. There are two possible candidates for accessible SUBJECT, either the subject which contains 't<sub>i</sub>' or the AGR marker. The former option is not available, however, as the NP which contains 't<sub>i</sub>' c-commands it<sup>20</sup>. Therefore, coindexing the trace 't<sub>i</sub>' with the containing subject NP would lead to a principle C violation.

The AGR element is also not an accessible SUBJECT. Since AGR is already coindexed with the subject NP, coindexing 't<sub>i</sub>' with AGR would lead to 't<sub>i</sub>' being coindexed with the whole NP which contains it via transitivity of indices. But then the NP subject would be coindexed with 't<sub>i</sub>'. As it c-commands 't<sub>i</sub>' this would lead to a principle C violation once again.

In sum, if we assume that (6b) has the structure (7b) then 't<sub>i</sub>' has no domain and so need not be bound. This will properly distinguish (6a) from (6b). In the former case, the underlying structure (7a) violates principle A of Generalized Binding. In contrast, (7b), the structure underlying (6b), is fully in accord with these principles.

We have had to make crucial use of the assumption that WH Raising at LF can move the specifier without moving the whole NP which contains it. Many others have argued against pied piping in LF altogether<sup>21</sup>. The following new piece of evidence also suggests that pied piping is forbidden in LF.

- (8) a. Which picture of himself<sub>i</sub> did Helen persuade Frank<sub>k</sub>  
 that Sheila liked

- b. \*Who persuaded Frank<sub>i</sub> that Sheila liked which picture of himself<sub>i</sub>

In (8a) it is possible to have 'Frank' bind 'himself'. It has long been known that an anaphor that has been overtly pied piped by syntactic WH-movement can be bound by any NP whose domain it was in at any point during its successive cyclic movements through the structure.<sup>7</sup> Thus, 8a is acceptable at the point when the phrase 'which picture of himself' is moved to the COMP of the lowest clause of this sentence, it is in the domain of the NP 'Frank' and so can be bound by this category. Assuming Pied piping in LF though, we would assume that the same interpretation was possible in 8b. In other words, if pied piping is permitted in LF, what prevents WH Raising from moving the entire WH phrase 'which picture of himself' COMP to COMP thereby permitting 'Frank' to bind 'himself' just as in the case of overt syntactic movement? We know that successive COMP to COMP movement must be allowed in certain cases of LF movement<sup>8</sup>. Why then is (8b) unacceptable? If we assume that pied piping is forbidden in LF then we have a simple answer to this question. Only 'which' moves. Therefore, 'himself' is A-free in its domain, the embedded clause. This violates principle A of the Binding theory and the structure is ruled ungrammatical.

One might try to argue that it is COMP to COMP movement that is forbidden in LF rather than pied piping. However, this will not help matters. All that we require is the assumption that the formation of general questions involves the movement of a WH-in-situ to a WH filled COMP in LF. Consider the sentence in (i):

- (9) a. \* The men<sub>i</sub> wonder which woman likes which pictures of each other<sub>i</sub>.  
 b. The men<sub>i</sub> wonder which pictures of each other<sub>i</sub> Susan likes

In (9b) we see overt movement feeding binding. In this case 'each other' can be bound by 'the men' to yield an acceptable sentence. In (9a), however, this seems to be impossible. However, if pied piping is permitted in LF the WH-in-situ would be moved to the embedded COMP, yielding a structure like (10a). Nonetheless, the 'each other' cannot be bound by 'the men'. This is what we would expect if pied piping were forbidden in LF and (9a) had the structure (10b) at LF.

- (10) a. The men<sub>i</sub> wonder [<sub>S</sub> which woman<sub>j</sub>, [which picture of each other<sub>i</sub>]<sub>k</sub> [<sub>S</sub> t<sub>j</sub> likes t<sub>k</sub>]]  
 b. The men<sub>i</sub> wonder [<sub>S</sub> which woman<sub>j</sub>, which<sub>k</sub> [<sub>S</sub> t<sub>j</sub> likes [<sub>NP</sub> t<sub>k</sub> picture of each other]]]

In this section, we have argued that the account of Superiority Effects outlined in (I.) could explain why these effects were cancelled in cases such as (6b and d). We required the assumption that LF movement does not permit pied piping. We then provided independent motivation for this assumption. We

turn now to a comparison of our proposal with the one developed in Pesetsky (1985).

### III. D-Linking or Structural Complexity?

As noted in section II, an important fact about Superiority Effects is that they are cancelled in certain unexpected cases. Consider the sentences in (6) repeated here for convenience:

- (11) a.\* What did who buy  
 b. What did which man buy  
 c.\* John needs to know what who bought  
 d. John needs to know what which man bought

A recent analysis by Pesetsky (1985) tries to explain the difference between the examples (11a and c) and (11b and d) by suggesting that the former have structures like (12) in LF.

- (12) [<sub>S</sub> [<sub>CP</sub> What<sub>i</sub> did [<sub>CP</sub> Which man AGR buy t<sub>i</sub>]]]

Pesetsky's analysis claims that in (12) which man is in situ in LF. Therefore there is no gap. The absence of a trace suffices to explain the absence of superiority effects. In this section, we will defend our account of superiority effects presented above and show that it is superior to the one proposed in Pesetsky (1985).

Pesetsky's account exploits a distinction between D-linked and non D-linked Wh-operators earlier advanced in Heim (1982). D-linked operators such as 'which' presuppose a discourse determined set of appropriate answers known to speaker and hearer alike from which the answerer picks his response. The non D-linked question operators such as 'who', 'what', etc., interpretively differ from 'which' as they involve no similar presuppositions. It is possible to get the flavor of the distinction between D-linked and non D-linked WH elements by considering the discourse situation in (13). Tom, Bill Hank and Fred walk into the room. Dialogue A seems a more appropriate question for this scene than dialogue B.

- (13) A: Which man ate a cake?  
 Harry.  
 B:\* Who ate a cake?  
 Harry.

Pesetsky (1985) ties obligatory LF movement to being non D-linked. D-linked operators, in contrast, can remain in situ in LF. Concretely, 'who', 'what', etc., must move at LF while 'which N' constructions need not. The contrast between (11a and c) and (11b and d) is explained by observing that only moved quantified phrases induce superiority effects. Pesetsky (1985) blocks Superiority Effects by permitting non D-linked operators like 'which man' to remain unmoved.

On our account we explain the differences observed in (11) in purely structural terms. 'Which man' differs from 'who', 'what' in having parts. In particular 'which man' has a lexical specifier, viz. 'which', while 'who', 'what' etc. are single lexical items. Thus even if one assumes that all Wh-elements in situ at S-structure must be moved to COMP in LF we still derive the observed distinctions in (11) along the lines of our discussion in sections I and II above.

There are several facts that we believe favor our account. First, adopting the suggestion in Pesetsky (1985) will require adding an additional rule of interpretation. Sentences such as (14) are interpreted as general questions.

(14) who bought what

They require buyer/buyee pairs as appropriate answers. This interpretive requirement has been standardly related to the fact that at LF such sentences have two operators in COMP. If one adopts the approach advocated in Pesetsky (1985) we will have to add a second disjunct to this interpretation procedure. The reason is that (15) is also interpreted as a general question.

(15) Which book did which boy buy

However, in this case, according to Pesetsky (1985), 'which boy' has not moved to COMP in LF. Nonetheless to derive the correct interpretation, it must be associated with the COMP filled by 'which book'. This end can be achieved adopting the disjunctive procedure (16)

(16) interpret 'Wh....wh... wh... ' as a general question just in case at LF all the wh-operators are in the same COMP or they are in situ but are somehow "associated" with the COMP.

The main point is that within an account like Pesetsky (1985) wh elements can come to be interpretively linked by two very different LF procedures.

The same complication does not affect our proposal. In both (14) and (15) there are two WH elements in COMP at LF cf. (5a) and (7b). Consequently, the interpretation rule for multiple questions need not be revised to extend to these cases.

An empirical advantage of our proposal is that it extends to cases of complex WH phrases which are not D-linked.

(17) What type of book does what type of man read

(17) uses 'what' as a specifier. In contrast to the examples in (11), (17) involves no presupposed set of appropriate answers among which the answerer must select. Interpretively, 'what' in (17) is a non D-linked WH-operator. Nonetheless, (17) is as

317

acceptable as (11b and d). This clearly constitutes a problem for the analysis in Pesetsky (1985) which predicts that since the quantifier is non D-linked it must move to COMP position in LF. The structure in (17) should therefore be on a par with (11a and c). We should, in short, observe the standard Superiority Effects. By contrast, our approach predicts the acceptability of these sentences. In (17) 'what' is in specifier position. At LF (17) has the structure (18):

(18) [<sub>S</sub> [<sub>CP</sub> what type of book<sub>i</sub>, what<sub>j</sub>] [<sub>S</sub> [<sub>NP</sub> t<sub>j</sub> type of man] AGR<sub>tc</sub> read t<sub>i</sub>]]

(18) is virtually identical to (7b) and the explanation we advanced for the well formedness of (7b) will carry over wholesale to this case. As in the former case 't<sub>j</sub>' has no domain because it has no accessible SUBJECT. Consequently, it need not be bound so (18) does not violate any binding Requirements. In short, lack of Superiority Effects is tied to the fact that in cases such as (7b) and (18) we are extracting a WH element out of a more complex NP while in cases such as (11a and c) this is not a possible option. Whether the WH operator is D-linked or not seems to be irrelevant.

Last of all, Pesetsky's analysis has little to say about the acceptability of cases such as (19):

- (19) a. What did whose mother buy  
b. What did which man buy

'Whose' is clearly not a D-linked operator, yet (19) is as acceptable as (11b) above, repeated here as (19b). Pesetsky's analysis could be extended to cover cases such as (19a). Thus it might be proposed that 'whose mother' remains *in situ* in LF. However, this would sever the connection between D-linking and LF movement which lies at the heart of the account.

Another possibility would be to countenance movement of 'whose' in cases such as (19a) to yield LF structures such as (20).

(20) [<sub>S</sub> [<sub>CP</sub> what<sub>j</sub> whose<sub>i</sub>] [<sub>S</sub> [<sub>NP</sub> t<sub>i</sub>'s mother] buy t<sub>j</sub>]]

The acceptability of (19a) could then be accounted for by observing that (20) is a perfectly grammatical structure. In (20), 't<sub>i</sub>' does not have an accessible SUBJECT. Hence, it has no domain. Therefore, 't<sub>i</sub>' need not be bound in (20) and the fact that it is free does not lead to a violation of the Binding Theory. This reasoning is identical to that we outlined in connection with (7b) above, (*i.e.* (19b)).

However, this treatment of (19a) effectively adopts our proposal. It would be odd to do this and still retain the D-linking/non movement hypothesis to account for the properties of (19b). Thus accepting our analysis for (19a) would render Pesetsky's analysis of (19b) superfluous. As we've seen its a very small step from (19a) to (19b). Structures like (7b) suffice to explain why Superiority Effects are cancelled in



sentences such as (19b) once one has made all the assumptions necessary to account for (19a).

Pesetsky (1985) briefly considers linking Superiority Effects to a complex WH/simple WH distinction, much as we have done. He interprets this distinction within an analysis proposed by May and Gueron (1983). Pesetsky suggests that the unacceptability of a sentence like (21) is problematic for this sort of approach.

(21) \* I need to know who(m) how many people voted for

These sorts of examples, however, act in the way that a theory which incorporates principles of Generalized Binding would predict. In fact, sentences related to (21) yield further reasons for preferring our analysis to Pesetsky's.

Notice that the unacceptability of (21) is directly related to the type of quantifier that occurs in the specifier position as shown by the acceptability of (22):

(22) I need to know who(m) {what type of people/which people} voted for

This distinction replicates itself when 'what' and 'how' move in LF as heads of WH phrases:

(23) a. I wonder who ate what  
b.\* I wonder who the cake how

Generalized Binding handles the examples in (23) by exploiting the typology of variable types that it presupposes. In particular, 'what', 'who', 'when' and 'where' fall under principles A and C of (2) above. This has the effect, as we have seen, that these sorts of WH elements in object position have no governing category. In contrast, WH elements such as 'why' and 'how' are not subject to principle C at all because they are not R-expressions.<sup>10</sup> They are pure A-bar anaphors.<sup>11</sup> This has the effect of cancelling the subject/object asymmetry discussed in section I above. To see this consider the structure underlying (23b) at LF:

(24) I wonder [<sub>S</sub> [<sub>C</sub> who<sub>i</sub> how<sub>j</sub>] [<sub>S</sub> t<sub>i</sub> AGR<sub>i</sub> eat the cake t<sub>j</sub>]]

We explain the unacceptability of (23b) by observing that 't<sub>j</sub>', an A-bar anaphor, is free in its domain. Its domain is the embedded clause. In this clause 't<sub>i</sub>' is an accessible SUBJECT. The subject trace can function in this way for 't<sub>j</sub>' because the trace of 'how' is not subject to principle C. Thus, unlike the trace of 'what', for example, it will have a domain in a structure such as (24) and so must be bound within it. However, 't<sub>j</sub>' is A-bar free and so the structure fails to meet the binding conditions.

This distinction among variables will also suffice to account for the unacceptability of (21). It has the underlying structure (25):

(25) I need to know [<sub>S</sub> [<sub>C</sub> who<sub>i</sub> how<sub>j</sub>] [<sub>S</sub> [<sub>NP</sub> t<sub>j</sub> many people] AGR voted for t<sub>i</sub>]]

In (25)<sup>319</sup>, 't<sub>j</sub>' has an accessible SUBJECT, namely the the NP which contains it or the AGR marker . Because 't<sub>j</sub>' is not subject to principle C, coindexing it with either element will not violate the binding theory. However, 't<sub>j</sub>' is not bound in (25). Therefore, the structure is ill formed and (21) is judged to be unacceptable.

This approach in fact predicts that sentences analogous to (22) that do not involve Superiority will nonetheless be unacceptable. Consider (26):

(26) \* I need to know [who/which candidate] [was introduced/talked] to how many people

In (26), Superiority cannot be invoked to account for the unacceptability of these sentences because in neither case has the inferior WH phrase moved "over" the superior one. However, the Generalized Binding account that we outlined will work for this case as well. The LF structure of (26) is (27):

(27) I need to know<sub>[S]</sub> [<sub>CP</sub> who<sub>i</sub> how<sub>j</sub>] [<sub>S</sub> t<sub>i</sub> AGR<sub>i</sub> talked to [<sub>NP</sub> t<sub>j</sub> many people]]

In (27), the domain of 't<sub>j</sub>' is the embedded clause. It must be A-bar bound in this domain. Since COMP indexing applies at S-structure, it is free and so (26) is unacceptable.

We have argued that our approach to superiority is preferable to the one proposed in Pesetsky (1985). Our analysis is simpler. It dispenses with an additional interpretive rule. It is more empirically adequate. It correctly predicts that complex NPs with non D-linked Wh specifiers will act just like D-linked ones as regards Superiority Effects. It also has greater empirical coverage. It covers cases that the D-linked/non movement account does not apply to. In the next section we would like to extend this account to other instances of the Superiority Effect that, at first blush, might appear to be troublesome for an account such as ours.

#### IV. Further Cases of Superiority

The Generalized Binding approach to Superiority Effects sees these effects as part of a more general subject/object asymmetry.

We will outline how our approach can be extended to cover two further cases. Doing this will require us to adapt certain grammatical proposals of Stowell (1982) and Kayne (1983a) and (1983b).

Rochemont and Hendrick (1982) point out that we get Superiority Effects in cases such as (28):

(28) \* What did John expect who to buy

This sort of case poses a problem for a Generalized Binding approach. Given other standard assumptions. (28) involves Exceptional Case Marking (ECM). The LF structure is (29).

(29) [<sub>S</sub> [<sub>C</sub> what<sub>j</sub> who<sub>i</sub>] [<sub>S</sub> John expect [<sub>S</sub> t<sub>i</sub> to buy t<sub>j</sub>]]]

In (29) 't<sub>i</sub>' does not appear to have an accessible SUBJECT. There is no AGR marker in the embedded clause. 'John' cannot be an accessible SUBJECT as coindexation of 'John' and 't<sub>i</sub>' would lead to a principle C violation. Therefore, (29) should be well formed and (28) should be acceptable.

To accommodate this case, we can adopt a suggestion of Stowell (1982) and adapt it to ECM structures. Let's assume, following Stowell that all clauses have INFL nodes. Let's further assume that what characterizes ECM constructions is that the ECM verb is able to transfer its case marking properties to the embedded INFL node which then can assign case to the embedded subject. In effect, ECM verbs can transfer case to INFL making it analogous to the AGR/INFL which assigns nominative case in finite clauses. In this case, however, AGR assigns the case of the verb from which it receives its case. Given these assumptions the embedded clause of sentences such as (29) has an AGR marker. This AGR marker is coindexed with the matrix verb from which it receives its case features<sup>11</sup>. Under these assumptions, the structure of (28) is (30):

(30) [<sub>S</sub> [<sub>C</sub> what<sub>j</sub> who<sub>i</sub>] [<sub>S</sub> John expects<sub>k</sub> [<sub>S</sub> t<sub>i</sub> AGR<sub>k</sub> to buy t<sub>j</sub>]]]

Under these assumptions, Generalized Binding makes the correct predictions for a case like (30). Observe that in (30) 't<sub>i</sub>' has an accessible SUBJECT, viz. AGR<sub>k</sub>. This means that it will have to be A-bar bound. However, it is not bound in (30). The matrix COMP, a potential binder, bears the index 'j' rather than 'i'. In short, 't<sub>i</sub>' is free in (30)<sup>12</sup>. Therefore, (30) violates the binding theory. This explains the unacceptability of (28).

These same assumptions can be exploited to give an account of another instance of the Superiority Effect.

(31) \* What did John persuade who to buy

This is a potential problem for our account so far. In all the cases we've surveyed, Superiority Effects are intimately tied to subjects. In this case, however, it appears that movement of an inferior WH element across a superior WH object also leads to a Superiority Effect. What our analysis to this point would lead us to expect is that the LF structure of (31) is (32):

(32) [<sub>S</sub> [<sub>C</sub> what<sub>j</sub> who<sub>i</sub>] [<sub>S</sub> John persuade<sub>k</sub> [<sub>S</sub> t<sub>i</sub> AGR<sub>k</sub> [<sub>S</sub> PRO to buy]]]]

(32) is the structure that we expect if Kayne's Binary Branching Hypothesis is correct<sup>13</sup>. The AGR marker is there to case mark the "object" of 'persuade'. We assume the same mechanism as above and signify this via coindexing. Observe that in this structure 't<sub>i</sub>' is in subject position. Moreover, it has an accessible SUBJECT, viz. AGR<sub>k</sub>. Thus it must be bound. There is no binder for 't<sub>i</sub>' in

this structure. Hence, the structure violates the binding theory. This will suffice to explain the unacceptability of (31).

Is there any justification for the binary branching structure presented in (32)? Some evidence for this comes from considering Quantifier Float. It is easy to float quantifiers from subjects but not from objects.

- (33) a. The men each have eaten a piece of cake  
 b. \*John had seen the men all for a second  
 c. John gave the men each a book  
 d. John had persuaded the men all to leave

In (33a) we have a standard instance of Q Float. (33b) is substantially less acceptable than (33a) where we have floated the quantifier from an object NP. (33c), however, is much better than (33b) despite the fact that here too 'each' has apparently floated from object position. The Binary Branching Hypothesis assimilates this case to (33a) by treating 'the men' as a subject. A similar treatment extends to (33d). Here too floating the quantifier yields a fine sentence. If the structure was Binary Branching then this is what we would expect as once again the quantifier would be floating from a subject position<sup>14</sup>.

#### V. Conclusion

In this paper we have argued that Superiority Effects could be from the theory of Generalized Binding with suitable modifications. Extending Generalized Binding to cover Superiority Effects has led us to forbid pied piping in LF and to adapt proposals advanced by Stowell and Kayne to ECM structures and 'persuade' type structures. We have further argued that our approach to Superiority is to be preferred on theoretical and empirical grounds to the one developed in Pesetsky (1985).

## Footnotes

\* This paper is a small fragment of a more general discussion of the place and properties of LF in current linguistic theory that is contained in Weinberg and Hornstein (1986). In our more extended paper we give several arguments for why linguistic theory must contain a level of LF, we extend the analysis of superiority advanced here to a number of other constructions, and we also discuss the consequences for adopting the "unrestricted quantification analysis" proposed in this NELS paper for current versions of the ECP, particularly for the Barriers framework of Chomsky (1986). We would like to thank the readers of our extended paper :David Lightfoot, Jean-Roger Vergnaud, and Edwin Williams; and the people who gave us comments on the NELS version of our analysis of Superiority: Richard Kayne, David Pesetsky and Ken Safir. We would also like to thank the audiences at NYU and NELS for the opportunity to present this work.

1. This approach is elaborated in Aoun (1981) and (1985) as well as Aoun & Hornstein (1985), and Weinberg, Aoun, Hornstein & Lightfoot (henceforth referred to as WAHL) (forthcoming).

2. One of the virtues of Generalized Binding is that it yields a typology of variables. Not all WH traces are subject to the same definition of accessibility. For a fuller elaboration of these notions the reader is referred to the references in note 1 as well as Weinberg and Hornstein (1986) and Hornstein and Lightfoot (1986).

3. Cf. Chomsky (1981) chapter 3.

4. For details concerning the percolation conventions for these indices cf. WAHL (forthcoming). The earliest suggestions concerning this sort of percolation are in Aoun, Hornstein and Sportiche (1981). It was further developed in Lasnik and Saito (1984) and WAHL (forthcoming).

5. Cf. Reinhart (1983) for a discussion of c-command. She points out that there is no empirical reason to complicate the definition of c-command by excluding dominating nodes from being c-commanding nodes. In Aoun and Hornstein (1985) it is shown that there are some important empirical advantages to cleaving to the theoretically simpler form of the definition. These advantages are further discussed in Weinberg and Hornstein (1986).

For our purposes here it does not matter whether we assume the Reinhart definition of c-command in terms of branching categories or the Aoun and Sportiche (1983) definition in terms of projections. What is important is that we delete the restriction

against dominating nodes being c-commanding nodes.

6. Cf. Huang (1982) and Aoun (1981). They both argue that if pied piping were obligatory then it would be impossible to explain why ECP like effects do not affect (i) and (ii) in the same way:

(i)\* Who said (that) what impressed Mary

(ii) Who said (that) pictures of what impressed Mary

Only (ii) is well formed when treated as a general question. Huang and Aoun reason that if pied piping were obligatory then there would be no way to distinguish these cases as they would have identical structures at LF.

We should also observe that the assumption that WH Raising in LF moved whole NPs has never been empirically motivated, to our knowledge. The assumption has been that WH movement in LF functions just as it does in cases of overt movement. If we are correct, then it suggests that independent principles such as Subjacency or the ECP is responsible for the integrity of complex WH NPs when overtly moved.

7. See Jackendoff (1972) and Weinberg and Hornstein (1986) for discussion.

8. Cf. Huang (1982), Aoun (1986), Lasnik and Saito (1984), WAHL (forthcoming) for arguments to this effect.

9. See Aoun (1985) who shows that 'why' and 'how' do not have r-expression or nominal like properties.

10. For motivation and discussion of this typology cf. Aoun (1985), WAHL (forthcoming), Hornstein and Lightfoot (1986), and Weinberg and Hornstein (1986).

11. This mechanism for ECM verbs should be reminiscent of the mechanism proposed in Kayne (1983a). In Kayne's proposal, the verb transfers its case assigning properties to a phonetically null preposition. Here, the ECM verb transfers case to the embedded AGR/INFL. Both proposals are ways of extending the domain of the verb by connecting it up to the head of the embedded clause i.e. the INFL/AGR marker. For some discussion of this notion of "extending" domains c.f. Rouveret and Vergnaud (1980). In effect, what makes ECM verbs exceptional is that they can do this transferring. The verb and the INFL/AGR become a discontinuous element by being coindexed.

12. The question of whether the embedded clause containing AGR or the discontinuous constituent of matrix and embedded clause containing the ECM verb and AGR count as the domain for the WH trace is irrelevant to our discussion of (30) because the wh trace is not bound in either domain. However, in other cases we must suppose that the domain for an element in embedded subject of an ECM construction is the next higher clause.

(i) John<sub>i</sub> expects<sub>it</sub> [himself<sub>i</sub> AGR<sub>it</sub> to win]

In (i), 'himself' is bound in the matrix. The sentence is clearly acceptable. This suggests that the domain for the anaphor is the matrix clause. That is, the domain for "Accessible Subject" in these cases is the discontinuous constituent of matrix and embedded clause and an a or A' anaphor must be bound if it has any accessible subject in this extended domain.

13. Further evidence in favor of the assumption adopted here is presented in Franks and Hornstein (forthcoming).

14. This argument using Q Float as a diagnostic for subjecthood was first put to us by Dominique Sportiche. C.f. Sportiche (this volume) for a discussion of Q Float.





