Superiority Effects and Interpretation of WH-Expressions

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1. Superiority Conditions

1.1 An ECP-Style Theory of Superiority Effects

When a construction has two sources of WH-movement, and one is superior to the other, WH-movement must pick the superior one. To this end, Chomsky (1973:246) notes superiority condition as follows: "No rule can involve X, Y in the structure, ...X...[a...Z...W Y V...]... where the rule applies ambiguously to Z and Y and Z is superior to Y," adding that "...the category A is superior to the category B in the phrase marker if every major category dominating A dominates B as well but not reversely." Consider the following examples.

(1) a. Who [t bought what]?
     b. *What [did who buy t]?

An ECP-style theory is presented to account for the subject/object asymmetries[1] characteristic of superiority effects. Assuming that a WH-phrase at LF should be moved to Comp position, the LF structure of (1) is as follows:

(2)   a. [$_{COMP}$ What$_j$ who$_i$]$_i$ [t$_i$ bought t$_j$]?
      b. [$_{COMP}$ Who$_i$ what$_j$]$_j$ did [t$_i$ buy t$_j$]?

In (2a), t$_i$ is antecedent-governed by the same coindexed Comp and t$_j$ is lexically governed by *buy*. In (2b), t$_j$ is lexically governed but t$_i$, which is not c-commanded by *who*, is not antecedent-governed, thus violating ECP.

There are however well-known empirical puzzles that this sort of analysis inadequately addresses:

(3)   a. Who did you tell t [to read what]?
      b. *What did you tell who [to read t]?
(4)   a. What did you give t to whom?
      b. *Who did you give what to t?

The structures of (3, 4) at LF are those in (5).

(5)   a. [What who] did you tell t [PRO to read t]?
      b. [Who what] did you tell t [PRO to read t]?

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1. In a sentence, "John put the book on the shelf," verb's two internal argument---NP *the book* and PP *on the shelf*---should not be assumed to be mutual c-command. Instead, NP *the book* c-commands PP *on the shelf* but not reversely.

All traces are lexically governed by verb, thus not violating ECP. Thus an ECP-style analysis cannot account for the ungrammaticality of the sentences above[2].

1.2. Pure Superiority Condition

Hendrick and Rochemont (1982) note that the above sentences display superiority effects without either of the WHs being in subject position. The superiority condition can account for these cases straightforwardly as *who* is superior to *what*. However, an ECP-style analysis has to postulate that *who* in such cases is actually a kind of subject or adjunct and that this is what prevents its LF movement. Though it is possible to elaborate such an ECP-style theory, it is not convincing.

Hendrick & Rochemont and Lasnik & Saito (1989) argue that the superiority condition cannot be subsumed under the ECP and must be maintained as an independent condition. Lasnik and Saito propose (6) to handle superiority violations.

(6)   a. A wh-phrase X is operator-disjoint from a Wh-phrase Y if the assignment of the index of X to Y results in the local A'-binding of Y by X. (S-structure)

   b. If two wh-phrases X and Y are operator-disjoint, then they cannot undergo absorption.

Lasnik and Saito argue that all superiority violations must be handled by the condition in (6). They assume that the subject position in English is always properly governed by Infl at LF. Hence, ECP will rule out neither standard nor pure superiority violations. These violations will be ruled out solely by (6). Let us note that (6a) applies

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2. Lasnik and Saito (1987) refer to the superiority effect phenomena that cannot be accounted for by ECP as Pure Superiority Effects.

at S-structure. Representations violating (6a) are not interpreted as multiple questions since they, at LF, fail to undergo absorption[3]. They observe that the superiority condition operates always and only when two WH-phrases terminate in the same CP-Spec. Hence, they formulate the condition in terms of a relation between WH-phrases. By the superiority condition, (1b) is ruled out. Let's see how (6) operates. Consider the examples in (7), which do not fall under the ECP. That is, they are instances of the so-called pure superiority.

(7)   a. .Who$_i$ [did] you expect [t$_i$ to read what$_j$]
      b. ?? What$_j$ [did] [you expect [who$_i$ to read t$_j$]]

At S-structure, (6) will mark *what* and *who* in (7b) as operator-disjoint since assigning the index "j" of *what* to *who* in (7b) will result in the local A'-binding of *who* by *what*. This is shown in (8a).

(8)   a. *[$_{CP}$ what$_j$ [did] [$_{IP}$ you expect [who$_i$ to read t$_j$]]]
      b. *[$_{CP}$ who$_i$ what$_j$ [did] [$_{IP}$ you expect [t$_i$ to read t$_j$]]]

The LF representation derived from (8a) will then be ill-formed since absorption fails. On the other hand, in (7a), *who* and *what* will not be marked operator-disjoint at S-structure. Assignment of the index "i" of *who* and *what* will not yield local A'-binding of *what* by *who* because of the intervening trace *t*. This is shown in (9a).

(9)   a. [Who$_i$ [did] [you expect [t$_i$ to read what$_j$]]]
      b. [[What who]$_{ij}$ [did] you expect [t$_i$ to read t$_j$]]]

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3. The rule of Absorption proposed in Higginbotham and May (1981) ensures that the set of Wh-operators in Comp at LF behaves like a single operator binding different variables.

The LF representation derived from (9a) will be well-formed since absorption is free to take place at LF.

1.3 Superiority Effects with Adjunct Traces

Lee Eun-ji (1993) shows that the proposal by Lasnik and Saito runs into trouble when the absence of superiority effects with adjuncts is properly dealt with. Let us consider the following examples that the superiority condition must be posited independently of ECP, as noted by Hendrick and Rochemont (1982).

(10)   a. Who did you tell t [to read what]? (repeated)
       b. *What did you tell who [to read t]?

As noted above, in (10a) and (10b), traces are lexically governed at LF. So there is no violation of ECP. However, in (10b) the superiority condition is violated. In (10a), the trace c-commands the position of the wh-in-situ, whereas in (10b) it does not.

ECP does not exclude the sentences in (11), which exhibit superiority effects with adjuncts.

(11)   a. *Why did who buy the books?
       b. *How did who solve the problem?

Lee (1993) notes that the superiority condition is an appropriate mechanism for ruling out these sentences with adjuncts if one assumes that adjunct traces are present at S-structure. Lasnik and Saito claim that, even though they have to be present at LF to avoid vacuous quantification, adjunct traces must not be present at S-structure since they are not subcategorized, hence, not licensed. Lee argues that the superiority condition, together with Lasnik/Saito's proposal of adjunct traces, run into a contradiction.

Lee assumes that adjunct traces are present at S-structure. The S-structure configuration of (11) would be roughly as in (12).

(12) [$_{CP}$ wh-adj$_1$ [wh-subj$_{2/1}$ [$_{VP}$ . .t$_1$]]]

Lee assumes that every adjunct is base-generated under VP. If this is the case, following index assignment, the WH-subject in situ in (12) would be locally bound by the WH-phrase in CP-spec at S-structure, violating the superiority condition. The subject would not be bound by the adjunct trace, not being c-commanded by it.

The grammaticality or the slight marginality of the following sentences is consistent with the superiority condition under the assumption that adjunct traces are present at S-structure. In these examples, a WH-phrase in situ is in object position:

(13)   a. $^?$Why did you buy what t?
        b. $^?$How did you fix what t?
        c. $^?$Where did you buy what t?

The rough S-structure configuration of (13) is as follows:

(14) [$_{CP}$ wh-adj$_1$ [$_{IP}$ . . . [$_{VP}$ V wh-obj$_{2/1}$ t$_1$]]]

In (14), the adjunct trace, which is present under VP, c-commands the object, but not the WH-phrase in CP-Spec. Thus, after index assignment, the WH-object in situ would be locally bound by the adjunct trace, not by the WH-phrase in CP-Spec. No violation of the superiority condition does not result.

Assuming that adjunct traces are not present at S-structure as proposed by Lasnik and Saito, the sentences in (11) are fine, but the sentences in (13) pose a problem for the superiority condition:

(15)   a. [$_{CP}$ wh-adj$_1$ [$_{IP}$ wh-subj$_{2/1}$ . . .]]

       b. [$_{CP}$ wh-adj$_1$ [$_{IP}$. . .wh-obj$_{2/1}$]]

Since there are no traces, after index assignment the only binder for the WH-phrase in situ is the WH-phrases in CP-Spec. The latter, with no alternative, would be local binder of the former. Then the sentences in (13) would be incorrectly ruled out by the superiority condition.

Lasnik and Saito's proposal that adjunct traces are not present at S-structure because they are not subcategorized, hence, not licensed, is motivated by the absence of that-trace effect with adjuncts:

(16)   a. *Who do you think that t likes Mary?

       b. How do you think that Mary solved the problem?

If adjunct traces, which are not lexically governed, are not present at S-structure, but present at LF instead, then ECP-checking of them occur at LF. At this level, *that*, which blocks antecedent government, would be deleted, allowing adjunct traces to be antecedent-governed[4].

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4. This account poses no problem dealing with traces of nonsubcategorized adjuncts such as the one in (16). The problem is that there are still no that-trace effects with subcategorized adjuncts:

(a) "How do you think that John dressed t?"

These traces are licensed by subcategorization; hence, they presumably must be present at every level, including S-structure, by the Projection Principle. Extraction of subcategorized adjuncts from an island is not possible, as pointed out by Koopman and Sportiche (1988) and Rizzi (1990):

(b) *How do you wonder whether John dressed t?
(c) *How do you wonder who the job paid t t?

Antecedent government of the adjunct traces is not available in this case. These examples show that they ar enot lexically governed, either, even though they are subcategorized. Thus, in (a) the subcategorized adjunct must be antecedent-governed.

The only thing that would prevent traces of subcategorized adjuncts from being ECP-checked at S-structure like subject-argument traces is the following statement by Lasnik and Saito (1984):

(17) Only an argument receives a γ-feature at S-structure

Given that (17) is needed to handle the lack of that-trace effects with subcategorized adjuncts, the question is whether traces of nonsubcategorized adjuncts are allowed to be present at S-structure. For Lasnik and Saito, while traces of subcategorized adjuncts are licensed, those of nonsubcategorized adjuncts are not. However, this poses a problem in accounting for the absence of superiority effects, as in (13). There is another sense of licensing. According to Grimshaw (1988) and Larson (1988), every adjunct receives an "adjunct" θ-role such as *manner, cause,* and so on. As a receiver of such a θ-role, every adjunct trace is licensed, hence, allowed to be present at every level, including S-structure.

Therefore, contrary to Lasnik and Saito's argument, every adjunct trace, including those of nonsubcaterozied adjuncts, is licensed, hence, present at S-structure. Under this proposal, the absence or presence of superiority effects with adjuncts can be accounted for.

2. Superiority and WH-Expression Interpretations

2.1 Functional Interpretation of WH-expression

Superiority effects extend to cover quantifier/WH scope interaction. Consider the sentence in (18) again.

(18)   a. Who bought what
        b. *What did who buy

(18a) has a pair-list reading. In fact, all multiple question constructions obligatorily receive pair-list readings. For the pair-list reading to emerge, we need a functionally interpreted WH with a bound pronoun. Take the WH-in-situ as the functionally interpreted expression. (19) is the LF structure of the multiple interrogative of (18a); the LF structure of (18b), in which the WH in Spec CP is the quantifier and the WH-in-situ is interpreted functionally, is shown in (20).

(19) [Who$_i$ [t$_i$ bought [pro$_i$ N]]]

(20) [What$_i$ [[pro$_i$ N] bought t$_i$]]

The pro$_i$ in (20) is coindexed with a variable t_i on its right. This results in a weak crossover (WCO) violation. This accounts for the unacceptability of (18b).

This treatment of superiority effects also extends to the Hendrick-Rochemont cases mentioned above.

(21)   a. ˙What did you expect who to buy

b. *What did you persuade who to buy

In both these examples a WCO violation arises, as the LFs in (22) make clear. Both phrase markers have *pro* coindexed with a variable to its right.

(22)   a. [What$_i$ [you expect [[pro$_i$ N] to buy t$_i$]]]

b. [What$_i$ [you persuade [pro$_i$ N]$_j$ [PRO$_j$ to buy t$_i$]]]

Other cases of superiority are accounted for as well. Indirect object constructions, in both the double object NP version and the PP version, display superiority effects. The LF structures of these sentences are provided in (25) and (26).

(23)   a. Who did you give what/which check
       b. *What/which check did you give who
(24)   a. What/which check did you send to who
       b. *Who(m) did you send what/which check to
(25)   a. [Who$_i$ [you give t$_i$ [pro$_i$ N]]]
       b. [What$_i$ [you give [pro$_i$ N] t$_i$]]
(26)   a. [What$_i$ [you sent t$_i$ to [pro$_i$ N]]]
       b. [Who$_i$ [you sent [pro$_i$ N] to t$_i$]]

Both (25a) and (26a) are well-formed phrase markers. In contrast, both (25b) and (26b) violate WCO as the *pro* is coindexed in each case with a variable on its right. The binding account of superiority elaborated here ties superiority effects together with WCO.

WH-expressions can be functionally interpreted. In particular, the present proposal treats WHs not in Spec CP at LF as functionally interpreted. These WHs are to be distinguished from those in Spec CP. The latter WHs form operator variable structures at LF.[5] Just as WCO limits the interpretation of bound pronouns and restricts pair-list interpretations in certain WH/quantifier configurations, so it underlies superiority effects.

2.2. Superiority Effects and Minimalism

Let us compare the sentence (27) and (28).

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5. According to N. Hornstein (1995), Chomsky (1993) discusses two different kinds of WH-structures. One has the syntactic format of unrestricted quantification and one the format of restricted qunatification. What is crucial is that functional readings require the WH itself to be in an A-position. Should the WH remain in Spec CP an operator-variable configuration obtains. For example, in the reconstruction cases that Chomsky (1993) discusses involving picture noun phrase *which* questions, the reconstruction of the restrictor does not imply that the WH must be functionally interpreted.

(27) Who bought what

(28) Which man reviewed which book

What distinguishes the WHs in (27) from those in (28)? In a multiple interrogative, a simple WH like *who, what,* etc. must be in an A'-position, i.e. Spec CP, in order to be discourse-linked. Elements like *which N*, in contrast, are inherently d-linked. Consider what this means for superiority assuming the WCO analysis.

As the Minimalist assumption is that a moved element leaves a full copy behind, the structure of the phrase marker underlying (29a) right after SPELL OUT is (29b).

(29)   a. What did who buy

       b. [What$_i$ [who buy what$_i$]]

To get the correct interpretation we must find a pronoun. Assume that WHs interpreted as ranging over individuals bind syntactic variables. Full copies are interpreted functionally. If we read *who* functionally and treat *what* as the individual level quantifier we end up with the LF in (30). This phrase marker violates WCO

(30) [What$_i$ [[pro$_i$ N] buy t$_i$]]

Why can we not do the opposite in (29b): interpret *who* as the individual quantifier and the copy of *what* as the functional expression? In terms of economy, it is equally costly to interpret the *what* copy and delete the *what* in Spec CP as it is to retain the one in Spec CP and delete the copy. To give either *who* or *what* a discourse-linked interpretation, one of the two WHs must be in Spec CP. This means that in (29b), aside from deleting the *what* in Spec CP we must also raise *who* to Spec CP and then delete its copy in Spec IP so that *who* receives an individual level interpretation. In order words, we must go

through the following series of steps.

(31)   a. [What [who bought what]]
       b. [[who bought what]]
       c. [Who [who bought what]]
       d. [Who · [t bought what]]
       e. Who$_i$ [t$_i$ bought [pro$_i$ N]]]

This derivation is not permitted. There are two possible explanations.
First, the derivation in (31) is less economical than the one that
underlies (29b). The latter merely requires deletion of one of the two
WHs to yield a well-formed LF. The derivation in (31) involves deletion
of the lower WH, raising of the WH-in-situ and subsequent deletion of
the copy. This is a more involved derivation and given that economy,
rather than expressibility, derives grammaticality in a Minimalist theory,
the existence of a more economical derivation (29b) blocks the
alternative derivation (31). A second alternative to prevent (31c) is that
WH-movement is driven by morphological necessity[6]. That features
disappear when they are checked implies that there is no WH-raising to
Spec CP at LF. WH-features, being universally strong, must be checked
and eliminated by SPELL OUT. But this suffices to prevent step (31c).

Of these two explanations, the economy account of (29b) is clearly
preferable as it makes fewer ad hoc assumptions. Given the economy
approach, we need not theoretically distinguish A'-positions, only
permitting WHs in Spec CP to function as generators. From a
minimalist viewpoint, there is sufficient theoretical motivation to
dispense with ECP-style accounts of LF phenomena. The standard

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6. According to Chomsky (1993:32), certain features must be checked in the
domain of a head, or the derivation will crash. Therefore, raising of an operator
to [Spec, CP] must be driven by such a requirement. The natural assumption is
that C may have an operator feature...and that this feature is a morphological
property of such operators as *wh*.....If the operator feature of C is strong, the
movement must be overt....the *wh*-operator feature is universally strong.

ECP-style accounts only succeed when supplemented with considerable ancillary hypothesis and technical devices. Superiority effects comport with certain aspects of the minimalist program[7]. This has empirical appeal, given that conditions on movement do not fully hold for multiple questions.

3. Conclusion

I have so far explored that a full WH-in-situ can be functionally interpreted. A WH in Spec CP that is binding an empty category (i.e. what one gets after the copy is deleted) is interpreted as an individual level quantifier. In multiple WH-constructions, a simple WH like *who* and *what* is interpreted as discourse-linked. In fact, to be discourse-linked such a WH must be in this configuration. In contrast, *which N* WHs are inherently interpreted as discourse-linked. This means that for these explanations, moving to Spec CP is not required for them to act as generators for pair-list readings. Thus, these facts suffice to make (29a) unacceptable by reasons of economy. In terms of economy, I have shown that why we cannot allow the opposite in (29b), that is, interpret *who* as the individual quantifier and the copy of *what* as the functional expression. This is because it is costly to interpret the *what* copy and delete the *what* in Spec CP as it is to retain the one in Spec CP and delete the copy.

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7. Chomsky (1993:26) suggests that the properties of multiple question constructions should follow from their interpretations, saying "...the LF rule that associates the in-situ wh-phrase with the wh-phrase in [Spec, CP] need not be construed as an instance of move-α and that it "need satisfy none of the conditions on movement.

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