Null Antecedents and Proper Government

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Variables bound by a well-defined class of null operators are subject to three special distributional restrictions that do not apply to variables bound by overt Wh operators. First, a null operator may not bind a variable in subject position, even if the subject is governed by a higher Exceptional Case Marking (ECM) verb. Second, a null operator may not bind a variable in an adjunct position. Third, a null operator may not bind a variable in an embedded tensed clause, even if the variable is in object position. None of these restrictions apply to variables bound by overt Wh operators.

The class of null operators subject to these restrictions includes the null operator in the Comp of an infinitival clause, as in infinitival relative clauses, purpose clauses, and infinitival complements to adjectival degree specifiers (too, enough, etc.) and adjectives of the tough class. Null operators in parasitic gap constructions are subject to the first two of these restrictions, in both finite and infinitival adjunct phrases. It seems, however, that none of these restrictions apply to null operators in finite relative clauses. Whatever the ultimate explanation of the aberrant behavior of finite relatives in this respect, for the purposes of this study I will make the simplifying assumption that the relevant restrictions apply to all null operators, and I infer from the absence of these effects in tensed relative clauses that the alternation between null and overt Wh in tensed relatives is due to a PF deletion rule of the type discussed by Chomsky and Lasnik (1977).

1. Restrictions on Null Operator Constructions

The three restrictions are illustrated in (1-4). (1) illustrates grammatical instances of Null Operator (Op) extraction from object position; (2) illustrates illicit extraction of Op from subject position; (3) involves illicit extraction of Op from adjunct position, and (4) involves illicit extraction from a tensed clause.

(1) a. This book is tough [Op_i[PRO to read $[e]_i$]]
    b. This car is easy [Op_i[PRO to believe
        [Betsy to have fixed $[e]_i$]]]
    c. This language is impossible [Op_i[PRO to expect
        [Scott to tell Greg
        [PRO to learn $[e]_i$]]]]

(2) a. **Betsy is easy [Op_i[PRO to expect
        [$[e]_i$fixed the car]]]
    b. *That language is impossible [Op_i[PRO to believe
        [$[e]_i$ to have discouraged Greg]]]

(3) a. *Today will be easy [Op_i[PRO to catch the bus $[e]_i$]]
    b. *This way is impossible [Op_i[PRO to
        learn the language $[e]_i$]]

(4) a. ??This car is hard [Op_i[PRO to claim
        [[Betsy fixed $[e]_i$]]]]
    b. ??That language is impossible [Op_i[PRO to say
        [[Greg will learn $[e]_i$]]]]

All of these examples involve Tough-movement, but the same restrictions apply uniformly to other structures involving null operators, with the exception of the Tensed-S effect in (4), which seems not to apply in parasitic gap constructions. I will discuss this exception very briefly in Section 2.

Since the restrictions illustrated in (2-4) do not apply to constructions involving movement of overt Wh-phrases in questions and relative clauses, it is reasonable to infer that an overt Wh operator plays some role in licensing a variable that it binds that a null operator is unable to fulfil. The first two restrictions follow straightforwardly from the assumption that Op cannot function as an antecedent proper governor in the sense of Chomsky (1981), Huang (1982), and Lasnik and Saito (1984). (For an interesting alternative approach to these two restrictions, see Cinque (1984).)

Consider first the familiar subject/object asymmetry exhibited by (2a) vs. (1a-c). Under standard formulations of the proper government relation (eg. Chomsky (1981)), an object trace is properly governed by the verb that θ-marks it, whereas a subject trace is dependent on its antecedent for proper government. If a subject trace lacks an antecedent governor, it violates the ECP. Consider the principle (5):

(5) A null category may not function as an antecedent governor.

Given (5), a variable in subject position whose only antecedent is a null category (as opposed to overt Wh) violates the ECP. Hence the status of (2a) vs. (1).

Principle (5) is too strong as stated, since it prevents a variable in subject position from being properly governed by the trace of an overt Wh-operator in the case of long extraction, as in (6):

(6) I wonder $[_{\bar{S}}$who$_i$ $[_S$John expects $[_{\bar{S}}[e]_i$ $[_S[e]_i$ fixed the car$]]$

The crucial distinction between a null operator and the trace of an overt operator is that a null operator heads its own A-bar chain, whereas the intermediate trace in (6) is incorporated into an A-bar chain that is headed by an overt Wh-phrase. This suggests that a subject trace can be identified by any A-bar position that belongs to an A-bar chain headed by an overt Wh-phrase. (5) should therefore be amended as in (7):

(7) A category α may antecedent govern a null category β iff α is a member of a chain headed by an non-null category.

Principle (7) draws the desired distinction between (6) and (2a), while still capturing the contrast between (2a) and (1). In particular, (7) prevents any member of a chain headed by a null operator from functioning as a proper governor, so the subject trace in (2a) violates the ECP.

But the status of (2b) poses a problem for our account thus far. According to Chomsky's (1981) definition of proper government in LGB, the subject trace in (2b) should behave like an object, since it is governed by a lexical category (the matrix ECM verb). We can explain the status of (2b) in terms of (7) only if we assume that the subject trace in the ECM construction is dependent on its antecedent for proper government. Therefore in order for our proposal to account for the full empirical domain of the subject/object asymmetry, we must assume that a matrix ECM verb does not properly govern the subject position of its infinitival complement. This will require either a different analysis of the ECM construction (perhaps along the lines explored by Kayne (1984)) or a different definition of proper government. I return to this problem in Section 2. The contrast between (2a) and (2b) will be discussed shortly.

The adjunct/object asymmetry exhibited in (3) vs. (1) follows from (7) in a parallel fashion. Huang (1982) has shown that an adjunct trace is also dependent on its antecedent for proper government. If neither the null operator nor any of its traces can function as a proper governor, it follows that null operator extraction from adjunct position in (3) inevitably incurs an ECP violation, regardless of whether Op moves successive cyclically. Thus (7) provides a unified explanation for the first two restrictions on null operator extraction.

The third restriction, illustrated in (4), is that a null operator may not bind a variable in a tensed clause. This Tensed-S effect appears in structures involving object extraction, so it cannot involve a pure ECP effect. Nevertheless it seems that the ECP plays an important role in inducing the Tensed-S effect in (4), by eliminating the possibility of successive cyclic movement of Op, thereby forcing a derivation involving one-step movement, in violation of Subjacency.

If Op undergoes iterative (successive cyclic) movement through the Comp of the most deeply embedded tensed clause in (4), the derivation will satisfy Subjacency. But this derivation will create an intermediate trace in Comp, to which the ECP may potentially apply. Suppose that this is correct. Lasnik and Saito (1984) have shown that a trace left in Comp by successive cyclic movement is dependent on its antecedent for proper government, just as a subject or adjunct trace is. Moreover, they have shown that this dependence on antecedent government holds even if the clause containing the trace is governed by a bridge verb. If the antecedent of the intermediate trace is a null operator, it follows from (7) that the trace violates the ECP. This rules out the possibility of successive cyclic movement in (4).

Before turning to the direct (one-step) movement derivation, I will address a possible objection to the claim that successive cyclic movement of Op always incurs an ECP violation on the part of the trace in Comp. This claim is based on the assumption that movement through Comp always leaves a trace that is subject to the ECP, even in the case of object extraction. This assumption has been disputed in Stowell (1981) and Lasnik and Saito (1984). These studies have suggested that trace may freely delete in the mapping to LF unless its presence is required by some principle applying at LF, such as the Projection Principle (PP), the ECP, or the Prohibition of Vacuous Quantification (PVQ). Neither the PP nor the PVQ apply to trace in Comp; hence if trace deletion is freely permitted, it should be free to delete prior to LF unless it is needed to properly govern another ec. This line of reasoning suggests that the intermediate trace should be free to delete in (4) and thereby vacuously satisfy the ECP, regardless of whether its antecedent is overt or null.

Obviously, our analysis of the Tensed S Effect in (4) compels us to reject this conclusion. There are two major empirical arguments in its favor. The first of these, discussed in Stowell (1981), concerns object extraction out of non-bridge complements; I will defer discussion of this to Section 2. The second argument is due to Lasnik and Saito (1984), who claim that syntactic extraction of a subject from an island yields a pure Subjacency effect in examples like (8a):

(8) a. *Who$_i$ did you meet a man who said [$_{\bar{S}}$[e]$_i$ [$_S$[e]$_i$ spoke to John]
    b. *Who$_i$ did you meet a man who said [$_{\bar{S}}$that [$_S$John spoke to [e]$_i$]

Whereas (8b) can be derived by direct movement, (8a) must involve iterative movement in order for the subject trace to satisfy the ECP. But Lasnik and Saito argue that the trace in Comp can properly govern the subject trace in (8a) at S-structure, and then delete prior to LF. (They assume that traces in Comp, unlike argument traces, need not themselves be properly governed at S-structure.) This argument depends crucially on the assumption that there is no significant contrast between (8a) and (8b). But this judgment seems highly questionable; most speakers that I have consulted find (8a) considerably less acceptable than (8b), suggesting that (8a) represents a true ECP violation. Hence the empirical basis for the free deletion of trace in Comp is not overwhelming. I will therefore continue to assume that successive cyclic movement of Op in (4) incurs an ECP violation on the part of the intermediate trace.

Now consider the alternate derivation of (4) involving direct (one-step) movement of Op from its θ-marked object position to the [+Wh] Comp of the infinitival clause. On this derivation, the only trace is in the θ-marked object position and is properly governed by V, so the ECP is satisfied. But the derivation violates the Subjacency condition on movement, under the assumption that S is a bounding node, since direct movement minimally crosses the tensed S boundary and the S-boundary governed by the [+Wh] Comp, adjacent to the landing site of Op.

Note that Op may undergo long movement in (1b,c), where no finite S-boundaries are crossed. If successive-cyclic movement of Op always results in an ECP violation, the grammatical derivation of these structures must involve direct movement of Op. This involves crossing two or more infinitival S-nodes -- a potential Subjacency violation if all the S-nodes count as bounding. But Rizzi (1982) has shown that in Italian, infinitival clause boundaries do not count as bounding nodes for Subjacency, except in the case of a [+Wh] infinitive or an infinitive with an auxiliary verb in Comp. Rizzi's explanation of this pattern of bounding node status was based on the assumption that S' (CP) is the relevant bounding node. In order to transpose the analysis to the case at hand, we must assume that Rizzi's descriptive generalization is correct but that it applies to the bounding status of S (IP) rather than S' (CP). (Cf. Adams (1985).) Space limitations preclude a thorough discussion of the principles determining bounding node status here; for an interesting theory of this, see Chomsky (1985). I will assume, however, that bounding theory should have the effect of deriving the descriptive statements in (9):

(9) NP is bounding.
IP (S) is bounding iff (i) IP is finite, or
(ii) IP is governed by a [+Wh] Comp, or
(iii) IP is ungoverned.

Note that (9iii) is essentially a special case of a more general CED-type requirement proposed by Chomsky (1985); cf. Marantz (1979). Perhaps (9ii) reduces to a special case of (9iii), if IP in [+Wh] CP (S') is ungoverned.

In (1), (2b), and (3), Op crosses only one bounding node, i.e. the S-node governed by the [+Wh] Comp to which Op moves. In (4), the finite S-node constitutes a second bounding node, incurring a Subjacency violation on the direct movement derivation. Note that this implies that direct movement across an arbitrary number of governed infinitival IP nodes is permitted.

It seems to be well established that violations of the Subjacency Condition yield somewhat weaker effects on acceptability judgments than do ECP violations. Therefore from the perspective of acceptability, the direct movement derivation of (4), which incurs a pure Subjacency violation, has a preferred status over the successive cyclic movement derivation, which violates the ECP. This explains the gradation in strength of the acceptability judgments in (2,3) vs. (4). In (2,3) the D-structure position of Op is not properly governed, so (7) makes an ECP violation inevitable, regardless of whether movement applies in one step or successive-cyclically. But in (4) the preferred (direct movement) derivation avoids an ECP violation, with an acceptability status commensurate with a pure Subjacency violation.

Note that there is a difference in the level of acceptability between (2a) and (2b). So far we have accorded these sentences an equal status in terms of our theory, treating them both as ECP violations. It would be desirable to account for the more severe level of unacceptability in (2a) in terms analogous to our treatment of (4) vs. (1). This would follow if (2a), like (2b), must involve direct movement; in addition to the ECP violation arising in both structures, the movement of Op would violate Subjacency in (2a) but not in (2b).

Op cannot move successive cyclically in (2b) because no Comp position is available in an ECM construction; cf. Stowell (1982). But if Op can move successive cyclically through Comp in (2a), no Subjacency violation should arise; this derivation, like the direct movement derivation of (2b), should result in a pure ECP violation. Therefore in order to fully explain the preferred status of (2b), either we must assume that successive cyclic movement is ruled out by some independent principle in these structures or we must establish an additional violation in the successive cyclic derivation of (2a) to distinguish it from the direct movement derivation of (2b). If Op moves successive cyclically in (2a), an additional trace is left in Comp. Continuing to assume that trace in Comp is subject to ECP, we can attribute the contrast between (2a) and (2b) to the fact that (2b) incurs just one ECP violation, whereas in (2a) the ECP is violated twice, by the subject trace and the trace in Comp. Thus regardless of whether Op moves successive-cyclically, (2a) incurs an additional violation over the (direct-movement) derivation of (2b).

Given the typology of bounding nodes in (9), this explanation of the Tensed-S Effect in terms of Subjacency predicts that Op cannot be extracted from an infinitival clause governed by a [+Wh] Comp (i.e. from an infinitival Wh-island). This is correct; cf. Chomsky (1977):

(10) a. ??This car is easy [$_{\bar{S}}$ Op$_i$[$_S$ PRO to ask John [$_{\bar{S}}$when [$_S$ PRO to fix [e]$_i$]]]]
b. ??Swedish is hard [$_{\bar{S}}$ Op$_i$[PRO to wonder [$_{\bar{S}}$ whether [$_S$ PRO to learn [e]$_i$]]]]

The contrast between (10) and (1) follows from the fact that the lowest infinitival S-node is governed by a [+Wh] Comp in (10) but not in (1). Hence direct movement crosses a second bounding node in (10) in addition to the S-node governed by the [+Wh] landing site of Op. The level of acceptability of (10) is roughly comparable to that of (4), as is expected if each example incurs a pure Subjacency violation.

To summarize the analysis thus far, I have proposed that all three of the special restrictions on null operator constructions can be traced to the effects of the principle (7), which prevents the null operator from functioning as an antecedent governor. This results in an ECP violation in subject and adjunct position in (2) and (3), and in Comp on the successive cyclic derivation in (2a) and (4). The ECP violation can be avoided by moving in one step in (4), but this results in a Subjacency violation.

This account is by and large compatible with current assumptions concerning antecedent government, as discussed for instance in Lasnik and Saito (1984). But some of these assumptions raise nontrivial problems concerning the status of traces in subject position, adjunct position, and Comp with respect to the relationship between lexical government and antecedent government. These are addressed in Section 2 in the context of a revised theory of proper government.

2. Splitting the ECP

In the preceding section, I suggested that the ECP was responsible, directly or indirectly, for the special restrictions on null operator constructions. But this theory depends on certain assumptions about the proper government relation that have been disputed in the literature. Specifically, it requires a formulation of proper government that permits a verb to properly govern only those categories that it directly θ-marks.

To see this, consider first the object/adjunct asymmetry illustrated by (1) vs. (3) above. Standard constituency tests indicate that manner and place adjuncts may occur within VP, presumably within the verb's domain of government. But Huang (1982) has shown that an adjunct trace, unlike an object trace, must be antecedent governed, on the basis of examples like (11):

(11) *How/When$_i$ did you ask Greg [$_{\bar{S}}$why [$_S$Betsy fixed the car [e]$_i$]]

The contrast between (1) and (3) points to the same conclusion, given (7). Since verbs θ-mark their objects but do not θ-mark VP-internal adjuncts, the contrast suggests that proper government by V entails θ-marking by V.

An analogous contrast distinguishes between object extraction and extraction of a subject from an ECM complement. Although the subject trace in (2b) and the object trace in (1) are both governed and Case-marked by V, only the object is θ-marked by V. This correlates with our conclusion that the ECM subject trace in (2b), unlike an object trace, is dependent on antecedent government. Finally, the contrast between an object trace and a trace in Comp illustrates the same distinction. The trace in Comp in (4), although arguably governed and Case-marked by the matrix bridge verb, is not θ-marked by the bridge verb (or by any other category). This correlates with the fact that the trace in Comp must be antecedent governed.

The notion that a verb must θ-mark a category in order to properly govern it requires a more restrictive definition of proper government than Chomsky's original (1981) formulation in <u>LGB</u>. The <u>LGB</u> definition recognized two distinct subcases of proper government: government by a lexical category, and government by a coindexed category. Since the adjunct trace in

(3), the subject trace in (2b), and the trace in Comp in (4) are all governed by the lexical category V, the disjunctive definition of proper government in LGB allows for all of these traces to be properly governed by V, predicting that they should locally satisfy the ECP, with or without antecedent government. To eliminate this possiblity, it is necessary to revise the LGB definition.

Note that the appropriate revision must be sensitive to a distinction between θ-marking and Case-marking, since V does not properly govern all categories that it Case-marks. This is evident from the status of ECM subject traces and traces in Comp. The Case-marking relation between an ECM verb and the subject of its infinitival complement is relatively uncontroversial (but cf. Kayne (1984).) Although the Case-marking relation between a bridge verb and a trace in Comp has been disputed, eg. by Chomsky (1981), Kayne (1984) has provided considerable evidence in support of such a relation, which is corroborated by other evidence discussed in Stowell (1981), and in work on Hungarian by Julia Horvath. For these reasons, Chomsky's (1985) notion of an "l-marking" relation is too broad to restrict the verb's capacity to act as a proper governor in the desired way.

In Stowell (1981) I proposed a revision of the formal definition of government so as to permit government only by a lexical head (X^o), combined with a revision of the proper government relation so as to allow a category α to properly govern a category β iff β is governed by and coindexed with α. The revised definition was based on a formalization of (direct) thematic role assignment to internal arguments in terms of a theory of thematic grids (θ-grids). The θ-grid of a verb is a formal representation of its (internal) argument structure, consisting of a set of unordered slots, each corresponding to one of the verb's internal arguments. θ-role assignment to a complement involves assignment of the complement's referential index to the appropriate slot in the verb's θ-grid. As a consequence, V is coindexed with (and hence properly governs) each of the categories that it θ-marks. Given this reformulation, the contrast between (1) and (2-4) follows from the fact that the θ-marking relation between a verb and its object exempts an object trace from dependence on its antecedent for proper government. Note that V does not properly govern categories that it Case-marks but fails to θ-mark in (2) and (4), since Case-marking does not entail coindexing; see (20) below.

But this solution faces important empirical problems; there is other evidence suggesting that adjunct traces, ECM subject traces, and traces in Comp are all properly governed by V. I will confine the present discussion to the status of ECM subject traces and traces in Comp; on adjunct traces, see Stowell (1985). Consider first (12) and (13):

(12) a. *Who$_i$ did you say $[_{\bar{S}}\ [e]_i$ that $[_S\ [e]_i$ will fix the car]]
b. Who$_i$ did you say $[_{\bar{S}}\ [e]_i$ $[_S\ [e]_i$ will fix the car]]

(13) Who$_i$ do you believe $[_S\ [e]_i$ to have fixed the car]

According to the <u>LGB</u> analysis, the subject trace in (12a) violates the ECP, since the presence of the complementizer prevents antecedent government from Comp. But if ECM constructions involve a simple S (IP) node complement, the contrast between (12a) and (13) suggests that the ECM verb may properly govern the subject NP that it Case-marks, even though it does not θ-mark it. Now consider (14) vs. (15):

(14) a. Who$_i$ did you say [$[e]_i$ (*that) [$[e]_i$ fixed the car]]
b. How/When$_i$ did you say [$[e]_i$ (that)
[Betsy fixed the car $[e]_i$]]

(15) a. *Who$_i$ did you whisper [$[e]_i$ (that) [$[e]_i$ fixed the car]]
b. *How/When$_i$ did you whisper [$[e]_i$ (that)
[Betsy fixed the car $[e]_i$]]

The pattern of extraction from the bridge verb complements in (14) vs. the non-bridge verb complements in (15) can be explained if it is assumed that a matrix bridge verb may properly govern a trace in Comp. Suppose that a trace in subject or adjunct position must be antecedent governed by a category in the Comp of its clause that satisfies the condition (7). Suppose further that a trace in Comp must be properly governed by a matrix verb. We may then conclude that the contrast between (14) and (15) follows from the fact that a bridge verb has the ability to properly govern a trace in the Comp of its S' (CP) complement, whereas a non-bridge verb does not. (The reason for this difference will be discussed shortly.)

We thus face a situation where the available evidence seems to lead to two contradictory conclusions. (2-4) suggests that traces in adjunct positions, in subject position, and in Comp are all dependent on antecedent government. But (12-15) suggests that these traces are all dependent on proper government by verbs which do not θ-mark them.

These contradictory conclusions arise from the implicit assumption that proper government by a lexical head and proper government by a coindexed category are mutually substitutable. But if a trace must be properly governed both by a lexical head and by a coindexed category, the conflict is resolved. In other words, if we assume that the ECP actually involves two distinct requirements, we may infer that government by a verb satisfies the ECP requirements is violated.

The idea that the ECP involves two distinct government requirements was proposed by Jaeggli (1982), who suggested that proper government is composed of both "c-government" (by a lexical category) and "identification" (by a coindexed category). Jaeggli's theory has recently been adopted in various forms by several studies, including Jaeggli (1985), Stowell (1985), and Wahl (1985). I will refer to the two distinct requirements of the ECP as follows:

(16) The Head Government Requirement (HGR) :
[e] must be governed (by an X^o category).

(17) The Identification Condition (IC) :
[e] must be locally bound (by a coindexed category).

A formal definition of the government relation referred to in (16) is provided in (18) below. The relation of local binding referred to in (17) corresponds roughly to the standard definitions. I assume that "binding" implies both c-command and coindexation, and that "local binding" involves an additional locality relation corresponding roughly to Subjacency, as in Lasnik and Saito (1984). A more precise formulation of the relevant locality relation is provided in Stowell (1985); this differs from the definition of Subjacency solely with respect to the definition of bounding categories, with consequences that are not relevant to the present discussion. In referring to this binding relation, I will adopt Jaeggli's term identification.

The two halves of the "split" ECP interact so as to account precisely for the contrasts discussed above. Consider first the status of a trace in object position. Since an object trace is coindexed with the θ-grid of the verb that governs it, it can locally satisfy both ECP requirements; it is governed both by a lexical head (the verb) and is identified (locally bound) by a coindexed category (again, the verb).

Next, consider the status of a VP-internal adjunct trace. This trace is governed by V, satisfying the (lexical) head government requirement (HGR). But it is not coindexed with V, so it must be identified by its antecedent in order to satisfy the Identification Condition (IC). The same is true of a sentence-level adjunct trace: it is governed by Infl, thus satisfying the HGR. But Infl does not θ-mark an adjunct, so the adjunct trace must be identified by its antecedent. The null operator fails to identify the adjunct traces in (3), due to (7). In (11), the adjunct trace has an overt antecedent, but it is not subjacent to its antecedent, and so proper government is blocked by the locality condition on identification discussed above; the Wh-phrase in the lower Comp precludes successive-cyclic movement in this case.

Next consider the status of a trace in Comp. If the trace appears in the Comp of a bridge verb complement, as in (14), it is governed by V, satisfying the HGR; otherwise, it lacks a head-governor and violates the HGR, as in (15). But the trace in Comp is never θ-marked by the bridge verb, and is therefore not coindexed with it, so it is dependent on its antecedent in order to satisfy the IC. This results in an ECP (i.e. IC) violation on the successive-cyclic derivation of (2a) and (4), where the antecedent is a null operator, but no violation results in (14), where the antecedent is in a chain headed by overt Wh.

Finally, consider the status of traces in subject position. Here we must distinguish between subjects that are Case-marked by ECM verbs and subjects that are assigned Nominative Case by Agr. (Small clause subjects have rather different properties from either of these; see Stowell (1985) for discussion.) With respect to the IC, these traces have an equivalent status: they can only be identified by their antecedents. This is indicated by (2b) vs. (13) and by (2a) vs. (12b). For an ECM subject trace, this follows from the fact that it is not coindexed with the ECM verb (which does not θ-mark it.) For a Nominative trace, (2a) shows that Agr, although coindexed with the subject, does not identify it. This follows from (7), if Agr is treated as a null category for the purpose of identification.

Next consider the status of a subject trace with respect to the HGR. An ECM subject trace is governed by the ECM verb in (13), so it satisfies the HGR. A Nominative subject trace is presumably not governed by the matrix verb. The contrast between (12a) and (13) suggests that a Nominative subject trace satisfies the HGR iff a lexical complementizer is absent from Comp. In other words, the <u>that</u>-trace effect is a symptom of a failure of head government of the subject trace. Why should this be so?

To answer this question, we must refer to the formal definition of the government relation, given in (18).

(18) α governs β iff (i) $\alpha = X^o$; and
(ii) a. α precedes β [English], or
b. β precedes α [Japanese]; and
(iii) For any phrasal category δ,
if δ is not coindexed with α,
then if δ dominates either α or β,
δ must dominate both α and β.

The definition of government in (18) incorporates three nonstandard features. First, (18i) restricts the class of desirable effects for the split ECP theory, as we shall see. Note that (18i) does not include a disjunctive definition of the class of governors; in particular, it excludes coindexed phrasal categories from the class of (head) governors.

(18ii) only permits unidirectional government, the choice of direction being left to parametric variation. This condition is proposed by Horvath (1981) to derive head-complement order within X' without explicit reference to linear order in the parameters of X-bar theory; further arguments for this condition appear in Stowell (1983), based on the distribution of PRO.

(18iii) states that any category (regardless of whether it is a maximal projection) is a barrier to government unless it is coindexed with the governor. This is a simplification of a barrier condition that Kayne (1983) proposed to account for the fact that small clauses are transparent to government iff they are θ-marked by a governing verb; cf. Chomsky (1985). By referring to coindexation rather than θ-marking in the barrier condition, (18) predicts that a phrasal category will be transparent to government regardless of the means by which it is coindexed with the governing head. Coindexation arises as in (19):

(19) (a) Assign an index to every A-position. (Chomsky 1982)

(b) α and β are coindexed iff
(i) α is an A-position assigned the same index as β, or
(ii) the index of β is transferred to α.

(c) Transfer the index of β to α iff:
(i) A category γ moves from β to α, or
(ii) α is a θ-grid slot governing β, or
(iii) α is a phrase predicated of β, or
(iv) α is the (X-bar) head of β.

(d) If α is coindexed with β, and β is coindexed with γ, then α is coindexed with γ. (Transitivity of indexing)

Given (19), the definition of government in (18) accounts precisely for the distribution of HGR violations in the cases at hand. In English, government is oriented from left to right. An object trace is preceded and governed by its head (usually V). Adjuncts may also be preceded and governed by the head of the category in which they appear, regardless of their level of attachment, since every projection of the head is coindexed with it by (19 c iv) and is therefore transparent to government.

The subject position of S (IP) is not governed by the head of IP (Infl), since Infl can only govern categories appearing to its right. (Note that a postverbal subject has a different status in this respect; see Stowell (1985) and Adams (1986) for discussion.) A preverbal subject trace in IP must therefore be governed by an IP-external head preceding the trace. This must correspond either to the complementizer (C^o) position or to the matrix verb. Furthermore, the governing head must be coindexed with with the IP node dominating the trace, or else IP will function as a barrier to government. In (13), the IP node dominating the ECM subject trace is directly θ-marked by the governing ECM verb, assuming that Chomsky (1981) is correct in analyzing these structures in terms of S' (CP) Deletion. Hence (18iii) allows the verb to govern the trace, satisfying the HGR.

But S' Deletion does not apply in (12), so the matrix verb does not directly θ-mark the IP node dominating the Nominative trace; instead it θ-marks the CP node dominating IP. This makes IP a barrier to government by V. Therefore the only potential governor for the Nominative trace is the complementizer (C^o) position. C^o is not normally coindexed with IP by any of the procedures in (19), so IP should function as a barrier to government by C^o. Hence (12a) violates the HGR. Why, then, does (12b) satisfy the HGR? Suppose that Wh, although required to appear in [Spec, C'] at LF, is permitted to move through an empty C^o position, contrary to a restriction proposed by Chomsky (1985). After Wh moves from the subject position to C^o, these positions are coindexed by movement (19 c i). The subject position is also coindexed with the predicate phrase I' under predication by (19 c iii). (Coindexation under predication is intended to subsume coindexation by the rule of agreement.) Finally, I' is coindexed with IP by X-bar projection (19 c iv), so C^o is coindexed with IP by the transitivity of indexing (19 d). Thus if Wh may move through an empty complementizer position as an intermediate step in movement to [Spec, C'], it follows from (18) and (19) that C^o governs the subject of IP at S-structure in (12b), allowing a full reduction of the <u>that</u>-trace effect to the HGR. If movement through an empty C^o is disallowed, a rule coindexing [Spec, C'] with a null C^o is required, a possibility suggested by Osvaldo Jaeggli.

The idea that the subject trace is ungovered at S-structure is incompatible with the standard Case-theoretic assumption that Nominative Case is assigned to the subject of IP under government by Tense or Agreement at the level of S-structure. It also conflicts with the <u>LGB</u> account of why PRO is excluded from appearing in this position (i.e. because it is governed, and PRO is excluded from governed positions.) These conflicts can be resolved if it is assumed that Nominative Case assignment and the distribution of PRO are determined on the basis of government configurations at the level of Logical Form, where Tense/Agr moves from Infl to Comp; cf. Stowell (1981), Pesetsky (1982).) At LF, Comp (C^o) is coindexed with Infl (I^o) by movement, and with IP by the transitivity of indexing; hence the subject of IP is governed by C^o at LF, where Nominative Case is checked, and the principles determining the distribution of PRO apply. If this line of reasoning is correct, the HGR must apply at S-structure rather than at LF. (For detailed discussion, see Stowell (1985).)

The definition of government in (18) also provides the basis for an account of the distinction between bridge verbs and non-bridge verbs in (14-15) concerning head government of traces in Comp. The intermediate trace in [Spec, C'] is not governed by C^o, which occurs to its right, so the trace must be governed by an external head that precedes it. A matrix verb V can govern the trace iff V is coindexed with the CP node dominating the trace. The matrix V and the intervening CP node can only be coindexed by θ-marking (22ii), since V and CP are not related by movement, predication, or X-bar projection. Therefore a matrix verb will only govern an intermediate trace in Comp if it θ-marks the CP category dominating the trace. In Stowell (1981) I argued that non-bridge verbs do not directly θ-mark their S' "complements", contrary to the pretheoretical intuition that the θ-marking properties of bridge verbs and nonbridge verbs are identical. The manner of speaking verbs do not truly select (i.e. s-select, in Pesetsky's (1982) terminology) a propositional argument; instead, they select a "speech signal" complement, referring to the actual utterance, rather than to the propositional content conveyed. (This distinction is reflected in the referential properties of object nominals formed by these verbs; object nominals of bridge verbs refer to the propositional content of the verb's object, whereas object nominals of manner of speaking verbs refer to the utterance iself. The clausal "complements" of the manner of speaking verbs must therefore be adjuncts predicated of the true thematic objects of these verbs. This explains the status of (15) vs. (14); the nonbridge verb does not θ-mark the S' (CP) category dominating the trace, so CP is a barrier to government by V, and the ungoverned trace violates the HGR.

If a trace in Comp can only be governed by a matrix bridge verb, then extraction from non-bridge "complements" ought to be prohibited entirely. Even in the case of object extraction, a Tensed S Effect similar to that in (4) should arise, since successive cyclic movement should create an HGR violation parallel to (15), and direct movement should violate Subjacency. Examples like (20) are often cited as ungrammatical:

(20) ?Which car_i did you whisper $[_{\bar{S}}$ that $[_S$ Betsy fixed $[e]_i$]]

As it stands, we expect (20) to be equivalent to (4), but the status of this example is not clear; to my ear (20) seems clearly preferable to (4) and quite possibly fully grammatical. In this respect, it resembles parasitic gap structures, which are immune to the Tensed-S Effect in the case of object extraction:

(21) ?Which paper$_i$ did you file $[e]_i$ without $[_{\bar{S}}Op_i[_S$PRO knowing that $[_S$you had read $[e]_i$]]

(21) should violate the IC if Op moves successive cyclically, given (7); otherwise if it moves in one step, it should violate Subjacency. Why do (20-21) differ from (4) in acceptability?

In (20-21) the object trace is bound by an overt Wh phrase (assuming that Wh and Op are coindexed in (21).) The resulting structure seems marginally acceptable, but it is not clear whether the direct movement derivation or the successive cyclic derivation is preferred. Suppose that the successive cyclic derivation of (20-21) is the preferred derivition. Then the trace in Comp must be exempt from the HGR in (20) and the IC in (21). This of course would follow if trace were free to delete as in Stowell (1981) and Lasnik and Saito (1984), but such deletion would have to restricted to structures of the type (20-21) where an overt Wh antecedent exists. Suppose instead that the direct movement derivation is preferred. Then Subjacency must be relaxed in the case where an object trace is bound by overt Wh, provided that no other Wh phrase intervenes between the object trace and its overt antecedent, as in the case of extraction from a relative clause or a Wh interrogative, where the effect of a Subjacency violation is much stronger. This would imply that Subjacency does not constrain movement directly, but functions instead as one factor contributing to the wellformedness of A-bar binding configurations at S-structure and LF. The effect of an intervening Wh operator is reminiscent of Rosenbaum's (1970) Principle of Minimal Distance, suggesting a possible parallel with control theory.

In any event, a trace whose only A-bar binder is a null category must obey Subjacency absolutely, as in (4). A trace in any other position is subject to the further distributional restrictions induced by the principle (7), which prohibits null operators and their traces from functioning as antecedent governors.

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