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COMPLEMENTIZERS AND THE EMPTY CATEGORY PRINCIPLE

TIM STOWELL

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1. Introduction

1.1 Chomsky (1981) introduces the Empty Category Principle (henceforth ECP), providing a unified account of a number of superficially disparate phenomena. The paradigm case is Chomsky and Lasnik's (1977) *that [e] filter, which Chomsky attributes to the ECP, accounting for the phenomenon exemplified in (1):

1. a) Who_i did you say [_S [e]_i [_S John saw [e]_i]]
- b) Who_i did you say [_S [e]_i [_S [e]_i saw John]]
- c) Who_i did you say [_S [e]_i that [_S John saw [e]_i]]
- d) Who_i did you say [_S [e]_i that [_S [e]_i saw John]]

Chomsky's account is as follows: in each case in (1), Wh-movement applies successive-cyclically, leaving a co-indexed trace in the embedded COMP, as well as in the original argument position. The contrast between (1c) and (1d) suggests that an asymmetry between subjects and objects with respect to extraction is imposed by some principle of grammar. Objects appear in VP, which is a projection of the category (V) which selects them, whereas subjects do not, so it is reasonable to attribute the subject/object asymmetry to this distinction. If a category C properly governs elements within Cⁱ, where Cⁱ is some X-bar projection of C, then the subject/object extraction asymmetry can be attributed to a condition on the output of movement:

TIM STOWELL

2. The Empty Category Principle:

[e] must be properly governed.

However, the grammaticality of (1b) suggests that the subject/object asymmetry imposed by the interaction of (2) with the structural distinction between subject and object positions can be overcome. In (1b), there is a trace in COMP which c-commands its co-indexed trace in subject position. (As Kayne (1980) observes, this is not so in (1d), where the presence of the complementizer creates a branching structure in COMP, blocking c-command.) Evidently, if the trace in subject position is properly governed in (1b), then a co-indexed c-commanding category may also count as a proper governor. We then have two cases of proper government:

3. Proper Government:

In the configuration $[_C \dots B \dots A \dots B \dots]$, A properly governs B if: (a) A c-commands B, and (b) where P is a maximal projection, if P dominates B then P also dominates A, and

(i) $A = C^0$, or

(ii) A is co-indexed with B

In all cases of (1), B represents the trace in the argument position. In (1a) and (1c), A is the verb see, which is a proper governor under (3i); in (1b) and (1d), A is trace in COMP, falling under (3ii).

1.2 It is reasonable to ask why the definition of proper government should involve the disjunction of properties (i) and (ii). Could these two cases not be reduced to a single property? It is unlikely that (ii) is a subcase of (i), since it is difficult to see how an NP-trace could be C^0 , where $C = \bar{S}$, especially given that the complementizer that apparently can not function as a proper governor.¹ Consider now the other alternative. Although it seems dubious that all constituents within VP are co-indexed with V, it is not in fact necessary for proper government by a lexical head (C^0) to have quite so wide a scope. Recall that verbs subcategorize for object complements (but not for subjects). Then (i) could be a subcase of (ii) if strict subcategorization entails co-indexing between the verb and its object, and if proper government by C^0 only holds for subcategorized complements. There are various ways in which this co-indexing might be achieved.² We will consider one possibility here. It is reasonable to limit subcategorization in such a way that a lexical head may only subcategorize for complements to which it assigns a thematic role. Such a restriction has the desirable property of ruling out a number of imaginable subcategorization frames which in fact never occur. A natural way to capture this restriction formally is to treat subcategorization for a complement B as an addendum to the thematic role assigned to B. Suppose that a lexical head (for instance, a transitive verb T) has a "thematic matrix" analogous to a phonological feature matrix. Each position in the matrix corresponds to a thematic role; in the case of T, there is a position for

COMP AND THE E.C.P.

the thematic object. Now suppose that strict subcategorization involves the association of a set of syntactic features ($[\pm N]$, $[\pm V]$, etc) with a position on the matrix. Then we could view thematic role assignment in the following way. Each thematic role which is associated with a set of subcategorization features is literally represented as a vacant position in the matrix of the lexical head. Rather than saying that a verb "assigns" a thematic role to its object in the same sense that it assigns case to the object, we could say that the subcategorized object assigns its referential index to the corresponding position within the verbal matrix. Then the verb (C^0 in (3i)) will share a referential index with its subcategorized object, and (3i) is subsumed under (3ii).³

1.3 As Kayne (1981a) observes, the ECP account of the grammatical extraction from subject position in (1b) raises interesting questions about the status of the trace in COMP. Are traces in non-argument positions such as COMP subject to ECP? If so, under what conditions is an empty category in COMP properly governed? Can a trace in COMP delete in order to escape the effects of ECP? We will assume that the answer to the first of these questions is in the affirmative, at least in the case of COMP. We will further assume that trace in COMP may freely delete prior to the application of ECP. (We accept, with Kayne (1981a) and Chomsky (1981) that ECP holds at the level of Logical Form (LF); hence the deletion must apply either at S-structure, or at LF, or in the mapping from S-structure to LF.⁴) Note, however, that in the case of extraction from subject position, a c-commanding trace in COMP cannot delete without creating an ECP violation on the part of the subject trace. Thus we predict that in those environments where the COMP of an embedded \bar{S} is not properly governed, there should be a subject/object asymmetry within the embedded sentence with respect to extraction. We return to this point below.

We turn now to the question of which environments allow for proper government of an element in COMP. Consider first the possibility of proper government of COMP by an element internal to \bar{S} . Suppose that the structure of \bar{S} is as represented in (4):

$$4. \quad [\bar{S} \text{ [COMP } \alpha \text{] } [S \text{ NP INFL VP }]]$$

No element within VP can properly govern COMP, since the intervening maximal projection (VP) blocks c-command. Thus the only possible candidates are VP itself, INFL, and the NP subject. VP will not be co-indexed with any element in COMP, so it too can be ruled out. This leaves the subject and INFL. The only case where either of these could be co-indexed with a trace in COMP is in the case of Wh-movement from subject position. Assuming that S is not a maximal projection, trace in COMP should always be properly governed by its trace in subject position, and also by INFL, if the latter contains an agreement element co-indexed with the subject.⁵ This is not a desirable result, however. Consider (5) vs. (6), noted by Kayne (1981a) in a similar context:

TIM STOWELL

5. a) Who did you say [\bar{S} [e]_i [S [e]_i saw John]]
 b) Who does it appear [\bar{S} [e]_i [S [e]_i likes John]]
6. a) *Who did you shout [\bar{S} [e]_i [S [e]_i saw John]]
 b) *Who does it surprise you [\bar{S} [e]_i [S [e]_i likes John]]

Clearly, mutual proper government must be blocked in (6a,b). Consider again the formulation of proper government in (3). Note that if condition (3i) (that $A = C^0$) were retained, we would obtain the desired result. Suppose then that both conditions (3i) and (3ii) must be met in order for proper government to hold. How then could trace in COMP properly govern subject position? This can be achieved if the complementizer position is taken to be the X-bar head of \bar{S} . The complementizer that will only properly govern subject position if it is co-indexed with it, as it is in relative clauses in some cases. (See Pesetsky (to appear).) In (5a,b) Wh-trace occupies the complementizer head position in place of the absent that, and subject position is properly governed. The embedded \bar{S} complements are identical in (5) and (6). But (6a,b) are ungrammatical, suggesting that the trace in COMP is not properly governed in these cases. This in turn suggests that the trace in COMP in (5a,b) is properly governed by some element in the matrix. Since these \bar{S} complements are within VP (a maximal projection) the governing elements must be the matrix verbs say and appear. Hence these verbs must be co-indexed with the traces in COMP. Recall, however, that co-indexing with a lexical head such as a verb is only possible if there is a vacant subcategorization feature, and subcategorization is in turn dependent upon thematic role assignment. Clearly, the verbs in (5) do not assign any thematic roles to the traces in COMP. The solution to this paradox again lies in viewing COMP as the head of \bar{S} . Note that both say and appear assign a thematic role to their clausal complements. This means that they can strictly subcategorize for these complements and properly govern them. Suppose now that when a phrasal constituent C^n is properly governed, its head position C^0 is automatically properly governed, by convention. Viewed another way, we might say that it is the referential index of the head C^0 which is entered in the subcategorization matrix of the governing verb.⁶ We can now attribute the ungrammatical status of (6a,b) to the fact that neither shout nor surprise strictly subcategorizes for an \bar{S} complement, despite the apparent fact that they assign a thematic role to these complements:

- 7 a) Mary shouted that Bill saw John
 b) Does it surprise you that Bill likes John?

Evidently, although strict subcategorization implies thematic role assignment, the reverse is not necessarily true.

Suppose that the conclusions reached thus far are essentially correct. Then the task of determining environments in which COMP is properly governed reduces to isolating those cases in which \bar{S} is subcategorized for by a lexical head. We turn to this in Section 2. In 2.1, we survey a number of environments in which \bar{S} appears, many of which are discussed by Kayne (1981a,b). Our discussion here will be

COMP AND THE E.C.P.

rather sketchy, serving mainly to develop a principled correlation between deletability of the that complementizer and the possibility of extraction from subject position through COMP. In 2.2 we concentrate on the distinction between bridge and non-bridge verbs (in the sense of Erteschik (1973)). In 2.3 we discuss the distinction between nouns and verbs with respect to subcategorization for \bar{S} complements. Finally, in Section 3, we draw some general conclusions on the relationship between ECP and the Subjacency principle of Chomsky (1973, 1977).

2. Environments of Subcategorization for \bar{S}

2.1 As noted above, the bridge/nonbridge distinction serves as a paradigm case distinguishing environments in which \bar{S} is strictly subcategorized for from those in which it is not:

- 8. a) Who did John say likes Mary?
- b) Who do you expect has come?
- 9. a)*Who did she whisper likes Mary?
- b)*Who are you whining has come?

We will return to the bridge/nonbridge distinction in 2.2.

Another distinction with respect to strict subcategorization for \bar{S} is that between the complements of raising verbs and adjectives such as "seem", "appear", "likely", etc. , and the complements which appear in structures of true extraposition:

- 10. a) Who does it appear has left?
- b) Who is it likely wants to come?
- 11. a)*Who does it surprise you likes John?
- b)*Who did it come as a relief was safe?

In (10), the subject position is not a position which is assigned a thematic role (a θ -position, in the terminology of Chomsky (1981)). Hence, raising from an infinitival subject to this position is possible (as noted by Borer (1980)). This is not the case in (11):

- 12. a) John appears [t to have left]
- b) *Bill surprises me [t to like John]

Similarly, lexical NP may be base-generated in subject position in (11), but not in (10):

- 13. a) This situation surprises me.
- b) His arrival came as a relief.
- 14. a) *This situation appears
- b)?*These facts are likely

These facts suggest a traditional extraposition analysis for the cases in (11), with the extraposed \bar{S} receiving its θ -role from subject position. The complements to the raising verbs, however, are true subcategorized objects, and they assign no θ -role to subject position. Hence only in (10) is the COMP of \bar{S} properly governed, allowing trace to satisfy the ECP in this position, and derivatively allowing proper

TIM STOWELL

government of wh-trace in subject position.⁷

As noted by Erteschik (1973) and Kayne (1981a), the possibility of deleting the that complementizer correlates strongly with the possibility of extraction. Thus the bridge verbs and the raising verbs allow that-deletion in their complements, but that-deletion is impossible in the complement of a nonbridge verb and in true extraposition constructions:

15. a) Bill says Mary likes John
 b) *Bill whined Mary likes John
16. a) It appears Bill has left
 b) *It came as a relief Bill had left

This correlation strongly suggests an ECP account. In order for this to go through, however, it is necessary to interpret absence of the that complementizer to indicate the presence of an empty category, as opposed to non-generation of COMP in the base. This cannot be attributed to obligatoriness in the base, however, since infinitival \bar{S} is free to occur without a complementizer in an ungoverned position:

17. a) Bill shouted to leave
 b) It came as a relief to see John again.

Thus if tensed and infinitival clauses share the same base rules, the necessary presence of the empty category in COMP in (15) and (16) must be attributed to some other principle of grammar. One possibility is Kayne's suggestion to adopt den Besten's (1978) analysis, according to which Tense originates in COMP, and leaves an empty category there when it moves to VP. Another possibility is to adopt one version of an idea presented in Safir (1981), according to which the agreement element in INFL functions as an empty category which must be properly governed. It is immaterial to our present concerns which of these solutions is correct.⁸ What is crucial is the principled correlation between absence of a complementizer and ECP, since there are cases where Wh-extraction through COMP is blocked independently by other principles of grammar, and the possibility of an empty complementizer will serve as another diagnostic for proper government of COMP, and by extension, for strict subcategorization.

Before we turn to other cases, note that the possibility of deleting trace in COMP predicts that it should be possible to extract from object position within an ungoverned \bar{S} . Extraction from object position in true extraposition cases is fully well-formed:

18. a) Who does it surprise you [\bar{S} that [S John likes t]]
 b) What did it come as a relief [\bar{S} that [S Bill bought t]]

Since subject position does not need to be properly governed, and the object trace is properly governed by the subcategorization feature in the verb with which it is co-indexed, trace is free to delete in COMP. Similarly, extraction from object position within the complement of a nonbridge verb is far better than extraction from subject position:

COMP AND THE E.C.P.

19. a) What_i did John just whisper to you that he ate [e]_i
 b) Who_j are you whining that you don't like [e]_j

Although many speakers find examples such as (19) only minimally acceptable, these sentences are uniformly judged to be better than those involving extraction from subject position, as in (9). Nevertheless, the questionable status of these sentences suggests that speakers' judgments are additionally affected by some functional principle relating to assertive force, or "dominance", as suggested by Erteschik (1973). This is the sort of factor which we would expect to be susceptible to considerable variability from one context to another, as is correct. Thus we conclude that (19a,b) are in fact grammatical (although varying in acceptability), whereas the ungrammatical cases in (9) involve a genuine ECP violation.

The fact that subject position is not properly governed by any element internal to S predicts that the COMP of a sentential subject should also not be properly governed. With respect to the possibility of replacing the lexical complementizer that with [e], this prediction is borne out:

20. a) That John is a fool is obvious
 b) * [e] John is a fool is obvious

Infinitival sentences, which do not require a COMP, are free to occur in subject position without a lexical complementizer, as expected:

21. To commit aggression is wrong

The fact that COMP is ungoverned in these structures also predicts that the familiar subject/object extraction asymmetry ought to reappear. Thus we would expect that (22a), but not (22b), should involve an ECP violation:

22. a) Who_i is [_S [e]_i (that) [_S [e]_i likes food]] surprising
 b) What_j is [_S that [_S John likes [e]_j]] surprising
 cf. c) That John likes food is surprising

Although (22a) may be marginally worse, both of these are clearly ungrammatical. Since there is no ECP violation in (22), some other factor must be involved. Two possible explanations come to mind. First, it may be that the category S is universally characterized by the formula in (4), which requires that the subject of S be NP. Then a sentential subject would be dominated by NP, and any extraction to the COMP of the matrix would involve a subjacency violation, crossing \bar{S} , NP, and S.⁹ A second possible explanation would be to accept Koster's (1978) analysis of sentential subjects, according to which the sentential "subject" is actually in Topic position.¹⁰ Then the impossibility of extraction in these cases reduces to the general island status of topicalized structures:

23. a) That John likes Mary Sally already knows [e]
 b) Who_i [that John likes [e]_i]_k does Sally already know [e]_k

TIM STOWELL

Whichever explanation turns out to be correct, we can still account for the ungrammatical status of the object extraction in (22b) without invoking the ECP. Notice that in this case, where the subject/object asymmetry superficially breaks down, the necessity of having a lexical complementizer functions as a reliable diagnostic of an ungoverned COMP, as expected.

The same is true of the constructions in (24), which involve nominalized verbs with \bar{S} complements:

24. a) [_{NP} the claim [\bar{S} that Bill had left the party]]
 b) [_{NP} John's belief [\bar{S} that he would win the race]]

As observed by Ross (1967), these constructions are islands. This is true, regardless of whether the extraction is from subject position or object position within the \bar{S} complement:

25. a) *Who_i did you hear [_{NP} the claim [\bar{S} [e]_i (that)
 [_S [e]_i had left the party]]]
 b) *What_j did you hear [_{NP} the claim [\bar{S} that
 [_S Bill had left [e]_j]]]

The fact that both subject- and object-extractions are ungrammatical suggests that subadjacency is again at work, ruling out the application of single-step movement across \bar{S} , NP, and S. Thus the extraction evidence appears to have nothing to say about whether the COMP of the \bar{S} complements is properly governed. Nevertheless the that complementizer is again obligatory, suggesting that COMP is ungoverned:

26. a) *[_{NP} the claim [\bar{S} [e] [Bill had left the party]]]
 b) *[_{NP} John's belief [\bar{S} [e] [he would win the race]]]

We return to a discussion of these cases in Section 2.3.

2.2 We have suggested that there is a principled relationship between proper government and strict subcategorization. Specifically, we have claimed that COMP of \bar{S} is normally properly governed only if \bar{S} is itself properly governed,¹¹ and that \bar{S} is properly governed by a lexical head only if its referential index is attached to a subcategorization feature by means of thematic role assignment. To be more precise, we have suggested that the presence of the subcategorization feature makes a referential index which is assigned to a thematic position in the verbal matrix "accessible" or "visible" in the sense relevant to proper government.

We will now consider the distinction between bridge verbs and nonbridge verbs in more detail. Our purpose here is to strengthen both steps in the previous argument: first, to support the correlation between proper government of COMP and proper government of \bar{S} , and second, to support the link between proper government and subcategorization.

Consider first our claim that the \bar{S} complements of nonbridge verbs are not properly governed. This predicts straightforwardly

COMP AND THE E.C.P.

that extraction of the entire \bar{S} complement should be just as impossible as extraction from subject position within the complement. In fact this is correct. As Zwicky (1971) observed, these constructions have no passive counterparts:

27. a) *That the sky was cloudy was whined t (by John)
 b) *That the president should resign was shouted t by the hostile audience

This contrasts with bridge verbs, which do allow for passivization:

28. a) That the sky was cloudy was known t by all of us
 b) That Nixon was a crook was believed t by everyone

The obvious explanation for this contrast in the present framework is that only the bridge verbs properly govern their complements, allowing the trace in (28) to be properly governed. The same contrast holds for the trace of Wh-movement, as observed by Safir (1979):

29. a) That Harvey should hang, which Alice believed t, was not the general opinion
 b) *That Harvey should hang, which Alice exulted t, ...

... true for topicalized constructions, which have properties directly analogous to Wh-constructions, as discussed by Chomsky (1977):

30. a) That Bill is a fool Jane already knows t
 b) *That Bill is a fool Jane has quipped t several times

Hence it seems reasonable to conclude that the failure of nonbridge verbs to properly govern the COMP position of their \bar{S} complements can be attributed directly to their failure to properly govern the entire \bar{S} complements, as our theory of government requires.

Now consider the claim that the failure to properly govern the \bar{S} complement is due to a lack of strict subcategorization. It must be noted that these \bar{S} complements are still assigned a thematic role, as required by Chomsky's (1981) θ -criterion (if propositional \bar{S} s are considered to be referring expressions, as seems reasonable). Hence it must be possible for thematic role assignment to operate independently of strict subcategorization features, per se. It is worth considering how exactly thematic role assignment applies in these cases. It may be that bridge verbs and nonbridge verbs operate identically in this respect. Thus in both cases, the verb would have a position in its thematic matrix reserved for an object clausal complement, and in each case thematic role assignment would occur by virtue of the referential index of the \bar{S} complement being entered in this position. According to this account, even nonbridge verbs would have a thematic position co-indexed with the \bar{S} complement; but only bridge verbs would have subcategorization features associated with this position, making the index visible for the purpose of proper government.

Although this account of thematic role assignment by nonbridge verbs seems reasonably natural, it may be that another explanation is closer to the truth. It is a striking fact that most of the nonbridge verbs are manner-of-speaking verbs, such as quip, whistle, shout, whisper, gurgle, laugh, exult, scream, etc. Although this correlation may

TIM STOWELL

simply be due to some discourse-related functional principle such as Erteschik's notion of "dominance", one wonders whether some principle of core grammar might be involved.¹² Notice that these verbs all intrinsically identify some aspect of the physical nature of their thematic objects. Thus "whisper" means "to utter a whisper-like sound", "shout" means "to utter a loud noise", etc. Suppose now that this property of identifying the nature of the thematic object within the lexical specification of the verb has the effect of absorbing the thematic object position, making it unavailable in principle for strict subcategorization. This would imply that the clausal complements of nonbridge verbs are not actually assigned a thematic role in the conventional sense, but rather are interpreted as adjuncts to the entire VP. Thus "John shouted to leave" would actually be interpreted as "John uttered a shout, conveying the message to leave"; "Bill whined that he was sick" would mean "John uttered a whine, to the effect that he was sick".

This distinction between bridge verbs and nonbridge verbs with respect to thematic role assignment receives some support from the properties of nouns which are lexically related to the verbs in question. Most English verbs of speech have nominal counterparts which refer not to the action denoted by the verb, but rather to the verb's thematic object. Thus "John's claim" refers to the thing which John claimed, rather than to his act of claiming something; "John's whine" refers to the thing that John whined. Significantly, however, the nominals corresponding to bridge verbs refer to the propositional content of what was uttered, whereas the nominals corresponding to nonbridge verbs refer only to the physical utterance itself. Thus one can equate a bridge-based nominal with a propositional \bar{S} , but not so for nouns based on nonbridges:

31. a) John's claim was that we should leave
 b) Bill's belief was that he would win
32. a) Jim's whine was very loud
 b) *Jim's whine was that we should leave
 c) *Tom's whisper was that he liked Sally

This contrast suggests that the propositional \bar{S} complements to nonbridge verbs are not directly linked with any thematic object position in these verbs' θ -matrices, but rather are more loosely linked with the verb, along the lines of the absorption analysis described above. (We return to a more detailed discussion of these derived nominals in Section 2.3.)

It is important to note that whichever of these two accounts of nonbridge thematic role assignment is correct, both accounts require that there is a principled correlation between lack of proper government and lack of strict subcategorization. The "visibility" account directly links the lack of proper government to the lack of subcategorization features; the absorption analysis links both of these independently to the lack of thematic role assignment. The theories differ in that only the absorption analysis provides a principled

COMP AND THE E.C.P.

attempt to account for the failure of the nonbridge verbs to have strict subcategorization features associated with the thematic object.

There is another property distinguishing bridge verbs from nonbridge verbs which is of relevance to the issue of subcategorization. It is remarkable that almost all of the verbs which strictly subcategorize for an \bar{S} complement also allow an NP complement instead:

33. a) John remembered (that) he was sick
 John remembered his illness
 b) Bill pointed out (that) John had lied
 Bill pointed out John's dishonesty
 c) Jane explained how she had discovered the molecule
 Jane explained her discovery
 d) Susan knows (that) her boss was unfair
 Susan knows her boss's unfairness

In contrast, most nonbridge verbs do not allow NP complements as substitutes for propositional \bar{S} :

34. a) John whined that Sally had left
 *John whined Sally's departure
 b) Frank whispered that John had lied
 *Frank whispered John's dishonesty
 c) Phil screamed that his boss was unfair
 *Phil screamed his boss's unfairness

The correlation is not absolute, but it is significant enough to justify an account in terms of a theory of markedness. Suppose, for instance, that it is significantly less costly to associate the subcategorization features for NP with a given thematic position if the position is already associated with the subcategorization features for \bar{S} . This would make sense if there was a certain cost assigned to the attachment of a subcategorization frame to a thematic role, since it would be less costly to amend an existing subcategorization frame than to create a new one. It is perhaps worth noting that in those cases where a nonbridge verb does allow an NP object, it is not a true substitute for the \bar{S} complement, in that it cannot denote the propositional reference of the utterance, but only the utterance itself:

35. a) John whispered a few words
 *John whispered his dislike of Sally
 b) Bill shouted an objection
 *Bill shouted the danger of nuclear holocaust

This contrast recalls the semantic distinction between the nominals derived from bridge verbs and those derived from the nonbridge verbs. In fact, it is exactly what we would expect, given the absorption analysis of nonbridge verbs' thematic role assignment. Clearly, if there is no true thematic position for a propositional object with these verbs, we would expect that it ought to be impossible to associate any subcategorization features with a propositional object role. Instead, where an NP object is possible with a nonbridge verb, it must be associated with the lexically specified (nonpropositional) object

TIM STOWELL

role. The class of NPs which can correspond to such intrinsically specified thematic object positions is typically very limited, as with the "quasi-objects" of other intransitives:

36. a) Sally danced a beautiful polka
 b) John laughed a hearty laugh
 c) Jim jumped an impressive jump

Thus it seems reasonable to conclude that the nonbridge verbs do not assign a thematic role to a subcategorized object complement, and that it is this fact, due possibly to absorption, which causes the complements of these verbs not to be properly governed.

2.3 We now turn to a consideration of the status of the \bar{S} complements of derived nominal constructions. As noted above, most bridge verbs have derived nominal counterparts which optionally take \bar{S} complements:

37. a) John stated that he would leave
 [John's statement that he would leave]
 b) Bill claimed that he would win
 [Bill's claim that he would win]
 c) Andrea knew that Susan would help her
 [Andrea's knowledge that Susan would help her]

As noted above, these constructions are islands for Wh-extraction, but this can be attributed to the subjacency condition. Nevertheless the fact that the complementizer that is obligatory in these complements suggests that they are not properly governed. Kayne (1981a) provides an impressive array of evidence supporting this conclusion. He recalls Chomsky's (1970) observation that there are no derived nominal counterparts to the raising and passive constructions in (38):

38. a) John_i appears [_S [e]_i to have arrived]
 b) Kathy_j is known [_S [e]_j to like chili]
 c) Fred_k is expected [_S [e]_k to leave]
39. a) * [_{NP} John's_i appearance [[e]_i to have arrived]]
 b) * [_{NP} Kathy's_j knowledge [[e]_j to like chili]]
 c) * [_{NP} Fred's_k expectation [[e]_k to leave]]

(Note that (39c) is grammatical on a control reading, where Fred is the subject of expect, but not on the relevant passive derivation.)

Kayne relates these facts to the ungrammaticality of derived nominals corresponding to tough-movement constructions, a fact also noted by Chomsky (1970):

40. a) Jimmy_i is tough [\bar{S} [e]_i [_S PRO to please [e]_i]]
 * [_{NP} Jimmy's_i toughness [\bar{S} [e]_i [_S PRO to please [e]_i]]]
 b) Frank_j is great [\bar{S} [e]_j [\bar{S} [e]_j [_S PRO to dance with [e]_j]]]
 * [_{NP} Frank's_j greatness [\bar{S} [e]_j [_S PRO to dance with [e]_j]]]

COMP AND THE E.C.P.

Kayne accepts Chomsky's (1977) analysis of the tough-constructions, according to which Wh-movement applies internal to the \bar{S} complement, and further assumes that the output of Wh-movement leaves an empty category in COMP which is subject to the ECP. He then attributes the ungrammaticality of the derived nominal constructions corresponding to the raising, passive, and tough-movement constructions to the fact that all of these involve \bar{S} complements containing an empty category which is not properly governed. More specifically, Kayne attributes this lack of proper government to the inability of nouns to govern across \bar{S} , which he in turn attributes to their inability to assign a superscript index to \bar{S} , thus preventing the transmission of government.

Given our account of proper government of COMP via proper government and strict subcategorization for \bar{S} , this explanation is unavailable. If the derived nominals in (40) subcategorize for an \bar{S} complement, there is no reason why the referential index of that complement should not be associated with the subcategorization frame, thus allowing proper government of the empty NP in COMP. Moreover, if we accept the essence of Jaeggli's (1980) account of proper government in raising constructions, according to which the trace in subject position is interpreted as the "head" of the S-complement for the purposes of proper government, the same should hold true for the derived nominals corresponding to the raising and passive constructions in (39). It is important to emphasize that in general, nouns are eligible to govern the NP-trace of passive constructions, provided that it is not contained in a sentential complement:

41. a) [_{NP} the destruction of the city]
 [_{NP} the city's_i destruction [e]_i]
 b) [_{NP} the organization of the rally]
 [_{NP} the rally's_j organization [e]_j]

Thus in our terms there can be only one explanation of the failure of these nominals to govern the empty NPs in the head positions of their \bar{S} complements: it must be the case that the derived nominals do not subcategorize for these complements. This would follow if it were in general true that nouns may not contain strict subcategorization features for \bar{S} . Suppose that this is true. Then it follows automatically that the head position of the \bar{S} complements of these derived nominals can never be properly governed, since there is no subcategorization frame in the verb available with which to associate its referential index.

In fact there is some evidence which supports the assumption that nouns may not strictly subcategorize for \bar{S} . Kayne (1981b) presents a long list of nouns which strictly subcategorize for NP objects, thus allowing passive trace to appear after the noun. (This list includes nouns such as betrayal, removal, revival, adoption, confiscation, invasion, bombardment, harassment, capture, and censure, among others.) It is striking that not a single derived nominal in Kayne's long list corresponds to a verb which strictly subcategorizes for \bar{S} ,

TIM STOWELL

including verbs which allow NP to substitute for propositional \bar{S} , in the sense described above.¹³ In fact there is, to our knowledge, not a single derived nominal allowing NP-trace which corresponds to a verb subcategorizing for \bar{S} . Thus alongside the ungrammatical (39b,c) we find that independently, simple NP trace is not properly governed:

42. a) *[the fact's_i knowledge [e]_i (by Kathy)]
 cf. [Kathy's knowledge of the fact]
 b) *[a party's expectation [e] (by Fred)]
 cf. [Fred's expectation of a party]

We now have an explanation for this mysterious gap, however, if we combine the assumption that nouns cannot subcategorize for \bar{S} with the markedness theory of subcategorization frames discussed in the previous section. Suppose that the markedness theory which assigns less cost to the association of NP subcategorization features if the verb already subcategorizes for \bar{S} actually has the effect of forcing the subcategorization features associated with a single thematic position to merge. Then even though verbs such as know and expect superficially appear to subcategorize for NP, it will actually be the case that they subcategorize for the entire class (NP, \bar{S}). Now suppose that all derived nominals acquire the subcategorization frames of their corresponding verbs. It then follows that if nouns cannot acquire subcategorization features for \bar{S} , the nouns in (42) will not be able to acquire the subcategorization frames of their corresponding verbs, and hence will not be able to function as proper governors of either NP or \bar{S} . Thus we have a principled account of the otherwise mysterious gap in the paradigm of passive structures in derived nominals, but only if nouns do not subcategorize for \bar{S} .¹⁴

This conclusion is supported by the fact that the derived nominals corresponding to verbs which take \bar{S} complements refer specifically to the thematic object of the verb, rather than to the action itself. This distinction corresponds to the one observed by Chomsky (MIT lectures, 1980) which can be found in other derived nominals:

43. a) [the enemy's destruction of the city]
 b) [the enemy's destruction]

Chomsky notes that (43a), in which the noun subcategorizes for an object, refers to the action of the enemy destroying the city, whereas (43b), where the noun is intransitive, must refer to the thematic object of the verb destroy, i.e. the results of the enemy's action. Now recall that all of the nominals corresponding to the bridge verbs which subcategorize for \bar{S} (or \bar{S} and NP) refer to the thematic object of the verb. This suggests that all of these verbs optionally allow for absorption of their thematic objects, as is obligatory in the nonbridge verbs. Something like this must be generally available to verbs in any case, since virtually any transitive verb may be used intransitively, given the appropriate aspectual context:

COMP AND THE E.C.P.

44. a) John kissed his friend
 b) ?? John kissed
 c) John likes to kiss
45. a) Armies tend to kill
 b) Bill always offers to help
 c) Rice appears to be unable to hit

Then we can account for the interpretations of these derived nominals by assuming that a noun may only refer to the action denoted by its corresponding verb when it acquires the subcategorization frame of that verb. Again, the fact that all the derived nominals which appear to take \bar{S} complements are interpreted as referring to the absorbed thematic object only makes sense if these nominals are syntactically intransitive, analogous to (43b), i.e. if they are blocked from acquiring the subcategorization features for \bar{S} (and NP/ \bar{S}).

3. Conclusions

We have argued that subject/object asymmetries with respect to extraction from embedded clauses may be traced to the fact that the complementizer position of these clauses is not properly governed, and that empty categories appearing in this position violate Chomsky's ECP. We have further claimed that in those cases where COMP is properly governed, this is by virtue of the fact that COMP, as the head of \bar{S} , supplies the referential index which is associated with the subcategorization frame of the governing verb, by means of thematic role assignment as we have redefined it. The island properties which block extraction of both subjects and objects we have attributed to other principles of grammar, primarily to Chomsky's subjacency condition on movement rules.

Kayne (1981a) takes a slightly different approach. He suggests that the island properties commonly associated with subjacency may in fact be attributable to a modified version of the ECP, incorporating an additional requirement that an empty category have an antecedent in a particular domain.¹⁵ However, it appears that there is some evidence for a subjacency condition on movement rules which is independent of the facts accounted for by Kayne's ECP. Specifically, the phenomena relating to Ross's (1967) Wh-island condition, and the effects of parametric variation of bounding nodes on this condition discussed by Rizzi (1978) appear to have no ready explanation in terms of ECP. Moreover, long-distance cases of NP movement also appear to be blocked by subjacency, as observed by Longobardi (personal communication):

46. *John_i seems [\bar{S} that [S it appears to him_i [S [e]_i to be smart]]]]

Thus unless some account of these facts can be attributed to principles independent of subjacency, it seems that it is preferable to maintain this as a principle of grammar.¹⁶ If this is correct, then notice that the principle allowing free deletion of trace in COMP is crucial in allowing cases of object-extraction from ungoverned \bar{S} complements, as described above, since subjacency forces successive-cyclic movement through the ungoverned COMP.

TIM STOWELL

The analysis presented here raises a number of questions about the exact nature of thematic role assignment, which we have touched on only briefly. In particular, it is worth considering just how much leeway is allowed for the non-core cases of θ -role assignment involving nonbridge complements and extraposed structures. The issue of θ -role assignment to subjects also merits careful consideration. Our claim that strict subcategorization is dependent upon θ -role assignment also raises questions about the status of special case-marking elements, such as the infinitival for complementizer.¹⁷ Another issue worthy of attention is the exact relationship between case assignment and strict subcategorization. The fact that nouns may not strictly subcategorize for \bar{S} seems to be related to the fact that they cannot assign case; a possible solution might involve some notion of case assignment to \bar{S} , perhaps in the form of a requirement that strict subcategorization for a complement require case assignment to that complement. Perhaps a more abstract notion of case, generalizing across syntactic categories, might lead to a better understanding of the formal status of subcategorization. It seems likely that such a theory will require a more fully-articulated theory of syntactic features than is currently available.¹⁸

FOOTNOTES

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1. There is one exception, namely when that is co-indexed with the trace in subject position. This is true in relative clauses involving short extraction from subject position, as suggested by Pesetsky (to appear).

2. For alternative accounts, see Aoun (1979), Rouveret and Vergnaud (1980), and Kayne (1981a). All of these invoke the notion of a superscript index. Although we accept, with Chomsky (1981), that some special system of indexing may be required to account for certain syntactic relationships involving subjects, we claim that the core cases of proper government by a lexical head involve co-indexing of referential indices, a property shared by syntactic movement.

3. We will actually conclude further below that the head requirement (3i) must also be maintained, in conjunction with (3ii).

4. The possibility of allowing trace in COMP to be omitted in the mapping from S-structure to LF is actually implied by the projection principle proposed by Chomsky (1981). Since no lexical category will

COMP AND THE E.C.P.

have the property of requiring trace in COMP, the projection principle will not require that it appear at LF. This is especially natural, given that only the original trace in the argument position will be required to function as the variable bound by the quantifier. Note also that the trace in COMP does not appear at D-structure. It may be that the projection principle will subsume the principle of recoverability of deletions. See Chomsky (1981) and Stowell (forthcoming) for discussion.

5. This possibility of government of COMP from subject position is implied by the definition of c-command developed by Reinhart (1976). Note that the agreement element will only function as a proper governor if it shares a referential index with COMP, a situation which could be eliminated by adopting superscript co-indexing in this case. (See also fn. 2, above.)
6. This is consistent with the conclusions reached by Kayne (1981a) and Belletti and Rizzi (1981), which require that the head position of NP be subject to ECP, even if the entire NP contains lexical material in complement phrases.
7. Jaeggli points out that an account of proper government similar to the one presented here requires that the trace of NP in subject position of the complement clause in raising constructions be interpreted as the head of S with respect to proper government. We accept his conclusions as essentially correct. (See Jaeggli (1980).)
8. Of possible relevance in distinguishing the two theories empirically are cases in Turkish and Portuguese, which dissociate tense and agreement. (See George and Kornfilt (1978) for discussion.)
9. Subjacency is thus violated regardless of whether S or \bar{S} is taken to be the bounding node. (See Rizzi (1978) for discussion.)
10. The Topic analysis of sentential subjects may actually be forced by the universal characterization of S represented in (4). (See Koster (1978) for discussion.)
11. The one exception is the case of relative clauses with empty categories substituting for relative pronouns. In this case, it is the necessary co-indexing between the head noun and the relative pronoun which allows proper government. (Recall that θ -role assignment is only a means to achieve co-indexing, at least with respect to proper government.)
12. For discussion, see Erteschik (1973).
13. There is one apparent exception, namely the theory's demonstration. We find this acceptable only with another sense of demonstrate, that of visual presentation (e.g. in a laboratory). This is especially clear if a by-phrase is appended: the theory's demonstration by John.

TIM STOWELL

14. If these derived nominals are blocked from subcategorizing for both NP and S, this raises questions about the status of the NPs containing objects introduced by of in (42), e.g. Kathy's knowledge of this fact. It may be that these are accepted by analogy with gerunds, which are sentential. Note that John's statement of the facts marginally allows an interpretation such that statement refers to his act of stating the fact. With this reading, assignment of a θ -role to a subject (either lexical or PRO) is obligatory; this is not usually the case with true NPs. (See Chomsky (1981) for an interesting discussion of this point.)

15. This domain is the "percolation projection" of the governing category. Our discussion of Kayne's reformulation of ECP has been necessarily brief, due to considerations of space. (See Stowell (forthcoming) for discussion.)

16. Aoun (to appear) presents another case where it appears that ECP is unable to subsume the effects of subjacency. Aoun's case involves long extraction from subject position, where ECP is satisfied by a clitic appearing on a complementizer, and ungrammaticality results from a subjacency violation.

17. This was pointed out to me by Hagit Borer.

18. For a discussion of syntactic features, see van Riemsdijk (1980), and Stowell (forthcoming).

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