Stevens, A. M. (1977) "On Local Ordering in Sundanese," *Linguistic Inquiry* 8, 155–162.
Williams, E. (1980) "Predication," *Linguistic Inquiry* 11, 203–238.
Williams, E. (1981) "On the Notions 'Lexically Related' and 'Head of a Word'," *Linguistic Inquiry* 12, 245–274.

Department of Linguistics
University of Pennsylvania
Philadelphia, Pennsylvania 19104–6305

Binding Problems with Experiencer Verbs

David Pesetsky

1. Binding Facts

This article discusses two well-known problems with the c-command condition on anaphoric binding: problems with certain *Experiencer* verbs (Postal (1970; 1971) and especially Giorgi (1984)), and *Connectivity* phenomena (called "Syntactic Connectedness" by Akmajian (1970) and Higgins (1973)).

Although Connectivity still presents many puzzles, the general outline of the phenomenon seems clear. The Experiencer problem, however, seems much more resistant to explanation. The purpose of this article is to reduce the Experiencer problem to the more tractable problem of Connectivity by relying on independently known facts about Experiencer verbs. This reduction, in turn, may shed some light on other problems connected with this class of verbs, which I consider in section 5.

Connectivity rears its head in examples like (1a–d):

(1) a. Pictures of *himself* I know *John* likes *e*.
b. Which pictures of *herself* did you say *Mary* bought *e*?
c. What *the men* really fight about *e* are *each other's* friends.
d. The stories about *himself* that *John* objects to *e* are the ones in which he looks foolish.

In the examples of (1) the italicized anaphor is not c-commanded by its italicized antecedent at S-Structure. C-command is satisfied, however, if we allow the phrase containing the anaphor to act *as if* it were in the indicated gap position. The examples of (2) support this view of the facts. In (2a–d) even this kind of procedure does not establish c-command, and (2a–d) are ungrammatical:

(2) a. *Pictures of *himself* I know *John's* friends like *e*.

I am grateful to Al Huettner, Kyle Johnson, Janis Melvold, Bożena Rozwadowska, Barry Schein, and Edwin Williams for useful discussion and comments, and to F. R. Higgins, Tom Roeper, and an LI reviewer for valuable written comments on an earlier draft.

Linguistic Inquiry, Volume 18, Number 1, Winter 1987
126–140

b. *Which pictures of *herself* did you say the company that employs *Mary* bought *e*?
c. *What *the men's* trainer really fights about *e* are *each other's* friends.
d. *The stories about *himself* that *John's mother* objects to *e* are the ones in which he looks foolish.

Some cases of Connectivity (like (1a–b)) invite an account in terms of "reconstruction" undoing movement (or NP-Structure binding, as in Van Riemsdijk and Williams (1981)). As noted by Higgins (1973), others (like (1c–d)) are more problematic, since the phrase containing the anaphor might never have occupied the position of the gap. I will not try to explore these problems here (besides Akmajian (1970) and Higgins (1973), see Jacobson (1982), Weisler (1983), Hellan (1984), Roberts (1984), and Barss (1984), among others). Instead, I will simply assume the Connectivity effect as a given.

Relevant to the discussion is the fact that constructions with *Tough* Movement also show Connectivity phenomena. I return later to the exact analysis of *Tough* Movement—in particular, whether the surface subject is moved from the position of the gap, or whether it is base-generated in subject position and linked to an empty operator binding the gap (following Chomsky (1977)):

(3) a. These pictures of *himself* will be difficult PRO to tell *Bill* about *e*.
b. Pictures of *each other* were not hard (for us) *PRO* to draw *e*.

The Experiencer problem arises in examples like (4a–d). Not all these examples are equally acceptable to all speakers, but they have a tendency to improve with familiarity:[1]

(4) a. Pictures of *each other* annoy *the politicians*.
b. Stories about *herself* generally please *Mary*.
c. *Each other's* health worried *the students*.
d. *Each other's* books amazed *the men*.

Giorgi (1984) has noted that the kind of command violation seen in (4) is possible only when the object is assigned the θ-role *Experiencer* by the verb that θ-marks the subject:

(5) a. *Pictures of *each other* convinced me that *the men* were lying.
b. **Each other's* parents invited *the students* to dinner.
c. **Each other's* friends murdered *the men*.

The Experiencer object in each sentence of (4) seems to act for binding purposes as if it c-commanded the subject. Examples like (6a–d), patterned after examples in Giorgi (1984), reinforce this interpretation of the data:

(6) a. *Pictures of *each other* annoy [the millionaire who funded *the politicians*].

[1] Conceivably, the subject NP in (4a) and similar examples itself contains a null antecedent for the anaphor: *PRO pictures of each other* (see Manzini (1983), Chomsky (1986), and others). Cases like (4c) and (4d) are then presumably the important ones.

b. *Stories about *herself* generally please [*Mary's* father].
c. **Each other's* health worried [*the students'* doctor].
d. **Each other's* books amazed [*the men's* teacher].

For Giorgi, these data motivate a partial replacement of c-command by a thematic hierarchy not unlike that proposed by Jackendoff (1972). In the Generative Semantics discussion of these verbs (see, for example, Postal (1970; 1971) and Lakoff (1971)) these data do not seem to have been noticed, but they might easily have been captured by an extrinsic ordering of anaphora rules with Psych Movement (Lakoff's "Flip"). In the next section I argue that the data can be explained without appeal to either a hierarchy or a process like Psych Movement.

2. Experiencer Verbs and *Tough* Movement

Verbs with Experiencer objects have another interesting property, perhaps unnoticed in the literature: they almost all license an infinitival clause with *Tough* Movement (henceforth *TM*), as seen in (7a–d). Furthermore, PRO in the infinitival clause is obligatorily controlled by the matrix Experiencer. Some of these examples also initially receive a mixed response from some informants. Nonetheless, like (4a–d), they improve with exposure:[2]

(7) a. These pictures$_i$ annoy me$_j$ [PRO$_j$ to have to look e_i].
b. Those stories$_i$ pleased me$_j$ [PRO$_j$ to listen to e_i].
c. John's health$_i$ worries me$_j$ [PRO$_j$ to talk about e_i].
d. War$_i$ frightens me$_j$ [PRO$_j$ to think about e_i].

Compare some ungrammatical abortive attempts at TM with non-Experiencer predicates:

(8) a. *Bill$_i$ kicked me$_j$ [PRO$_j$ to have to look at e_i].
b. *Those dogs$_i$ bit me$_j$ [PRO$_j$ to give water to e_i].
c. *Mary$_i$ sued Sue$_j$ [PRO$_j$ to prove a point to e_i].

I contend that the two properties of Experiencer verbs seen in (4) and (7) are related. Note first that all Experiencer *adjectives* seem to license TM, like the verbs, and that *Tough* adjectives also show the binding problem seen in (4):

(9) a. This picture$_i$ is difficult (for John$_j$) [PRO$_j$ to look at e_i].
b. Those ideas$_i$ were astonishing (to us$_j$) [PRO$_j$ to listen to e_i].
c. The books$_i$ have become easy (for Mary$_j$) [PRO$_j$ to read e_i].
d. The problems$_i$ are difficult (for the mathematicians$_j$) [PRO$_j$ to solve [e]$_i$.
(10) a. Pictures of *himself* are difficult for *John*.
b. *Each other's* ideas were astonishing to the *members of the group*.

[2] This is perhaps not a coincidence, given the theory I will propose. For some reason, these examples are often better if PRO of the embedded clause bears a θ-role denoting "bearer of an obligation," as in the subject of the phrase *to have to*.

c. Books about *herself* have become easy for *Mary*.
d. The mathematicians solved their own problems easily. *Each other's* problems, however, were hard for *them*.

Next reconsider examples like (3b), reproduced here with some indexing:

(11) Pictures of *each other*$_i$ were not hard for us$_i$ [PRO$_i$ to draw *e*].

I did not explain this example as a result of some special Experiencer effect, though I might have done so, since *us* is an Experiencer. Rather, I explained it as an instance of the more general Connectivity phenomenon. If this is correct, there is no need to suppose that the Experiencer in (11) acts in any peculiar way; it is not, in fact, the immediate antecedent of *each other*. Rather, by the Connectivity effect, the subject NP containing *each other* acts as if it were in the position of the trace *e*. In this position *each other* is c-commanded and bound by PRO, and PRO in turn is bound by *us*, yielding the desired interpretation.

Notice next that this explanation, but not any explanation directly involving properties of Experiencers, extends to (3a). In (3a) the antecedent for *himself* under Connectivity is *Bill*, and not PRO (or whatever controls PRO).

Note finally that the infinitival complement in both adjectival and verbal *Tough* constructions may be phonologically null:

(12) a. Mary thought that SPE would be difficult to make *e* into a movie, but the book was easy Ø.
b. Nuclear war terrifies Bill to talk about *e* but pleases Sue Ø.

It is probably irrelevant to our purposes whether we assume PF deletion, following the model of Chomsky and Lasnik (1977), or LF interpretation of an empty node, following Williams (1977); see also Pesetsky (1982, chap. 5).

Returning to the c-command problems in (4) and the parallel cases with adjectives in (10), consider all that we have observed. First, almost all Experiencer predicates license TM. Also, PRO in the embedded infinitive is always controlled by the Experiencer. Finally, the embedded infinitive may be deleted.

Consider also the meaning of a sentence like (4a). The pictures in question are not annoying in a situational vacuum. They are annoying in the context of some other relation that obtains between them and the politicians (see Lee (1971)): they are annoying *to look at* or *to hang on the wall* or *to have to discuss*.

Of course, as an LI reviewer has noted, nothing takes place in a total situational vacuum: if John kissed Mary, he did it in a particular place at a particular time, and perhaps for a particular reason. Nonetheless, in order to evaluate the truth of the sentence *John kissed Mary*, we merely need to know whether John kissed Mary, and not all the other circumstances surrounding the event. This is not true of *The article angered John*. We need to know what transaction between John and the article is supposed to have angered him. It might be the case, for example, that John thinks the article is wonderful,

but that something the article says causes him to become very angry at the government, or vice versa. The sentence *The article angered John* is thus, as the reviewer puts it, "expressively incomplete" in a way that *John kissed Mary* is not. This "expressive incompleteness" may yield a clue to the proper analysis of examples like (4a–d) and (10a–d). I return to this issue in section 4.

I therefore propose that examples like (4a–d) and (10a–d) actually involve a deleted infinitival clause that has undergone TM. The exact clause deleted depends on discourse factors.[3] Thus, at the level at which the binding theory is checked, sentences like (4a–d) actually have representations like those in (13):

(13) a. [Pictures of *each other*$_i$]$_j$ annoy *the politicians*$_i$ [PRO$_i$ to look at [*e*]$_j$].
b. [Stories about *herself*$_i$]$_j$ generally pleased *Mary*$_i$ [PRO$_i$ to hear [*e*]$_j$].
c. [*Each other's*$_i$ health]$_j$ worried *the students*$_i$ [PRO$_i$ to think about [*e*]$_j$].
d. [*Each other's*$_i$ books]$_j$ amazed *the men*$_i$ [PRO$_i$ to read [*e*]$_j$].

The apparent binding of a lexical anaphor inside a subject by a non-c-commanding Experiencer object arises from the interaction of a few independently true facts:

(i) Predicates with Experiencer objects select an infinitival clause that undergoes TM.
(ii) This infinitival can be deleted.
(iii) The Experiencer controls PRO in the *Tough* infinitival.
(iv) PRO c-commands *e* in the infinitival.
(v) TM yields Connectivity effects, as seen in (3).
(vi) The NP subject containing the anaphor acts as if it were in the position of *e*, by the Connectivity effect, with the result that:
(vii) PRO is the immediate antecedent for the lexical anaphor.

3. Predictions

My proposal makes a number of predictions, which I will examine in this section.[4]

The cases considered in (6) follow immediately. A sentence like (6a), for example,

[3] To be sure, sentences like (4a–d) may be used in isolation, but this is not a problem. When there is no actual preceding discourse, a context may be "assumed" by a process of *accommodation*, motivated for novel occurrences of definite NPs by Heim (1982, 371 ff.; she adapts ideas by Lewis (1979)). In these circumstances some prototypical or contextually likely embedded infinitive is simply assumed and deleted.

[4] The analysis raises one obvious technical problem. If the Connectivity effect allows an NP to act for *all* purposes as if it were somewhere else, then the analysis incorrectly predicts the possibility of sentences like (i)–(ii) (compare (3a–b)):

(i) **Himself* is difficult PRO to tell *Bill* about *e*.
(ii) *I expect *each other* to be hard for us *PRO* to draw *e*.

These examples suggest that, despite Connectivity, an anaphor in an A-position may not c-command its antecedent at S-Structure (see Higginbotham (1983)). Compare *Himself I think Bill likes e*, where *himself* is in an Ā-position. I will not go any deeper into this question, except to note that this explanation will also do for (iii):

(iii) **Each other* annoy the *politicians*.

is impossible. Consider a full form of (6a) under the proposed theory, before deletion of the infinitival, which might look like (14):

(14) *[Pictures of *each other*] annoy [the millionaire who funded *the politicians*]$_i$ [PRO$_i$ to look at *e*].

Connectivity permits the subject NP to behave as if it is in the position of *e*. But this possibility does not provide an antecedent for *each other* here. The only possible antecedent is PRO, but PRO is bound by the whole Experiencer NP and not by its subconstituent *the politicians*. Therefore, even under Connectivity this and similar examples are excluded.

If an Experiencer predicate resists TM, it should also resist the binding possibilities in (4) and (9). If one deems the object of *help* and its synonyms to be an Experiencer, this prediction is correct. Thus, the impossibility of (15a) correlates with the impossibility of (15b):

(15) a. *Each other's ideas helped the linguists.
b. *These ideas helped me to think about *e*.

Another prediction concerns the use of Experiencer predicates as Agent-Patient predicates. As documented by Ruwet (1972), Experiencer predicates almost always have an alternative use as Agent-Patient predicates. In this incarnation, as Ruwet demonstrates, they have somewhat different properties. Examples (16a–c) show one such difference: the Agent-Patient usage excludes TM. Examples (17a–c) show that the binding peculiarities of (4a–d) are impossible with this usage, exactly as predicted:[5]

(16) a. Bill deliberately annoyed me (*to talk to).
b. The actor deliberately frightens the children (*to look at).
c. John deliberately embarrassed the censors (*to talk about).
(17) a. *Each other's friends deliberately annoyed the party-goers by blowing smoke in their faces.
b. *Each other's parents deliberately frighten the children to teach them a lesson.
c. *Each other's bosses deliberately embarrassed the censors.

More generally, the impossibility of TM in non-Experiencer sentences like (8a–c) explains the absence of "peculiar" binding phenomena seen in (5a–c).

[5] The impossibility of TM when an Experiencer verb ascribes agentivity to its subject contrasts with the behavior of *Tough* adjectives (see Lasnik and Fiengo (1974); also Jackendoff (1972, 151)):

(i) John is deliberately being easy to please.

This contrast supports the suggestion of Partee (1977) (see also Williams (1984)) that it is the main verb *be* in sentences like these (the second occurrence of *be* in (i)), not the adjective, that allows the subject to be agentive. We thus conclude that a *Tough* predicate may not assign the role of Agent. The subject of a *Tough* predicate may bear this role if some other element assigns it. In the terminology of Zubizarreta (1982), we might say that *be* assigns Agent as an *adjunct θ-role* to the subject of a *Tough* construction. The verbal *Tough* constructions lack this copula; hence, the subject of a verbal *Tough* construction cannot bear the Agent role.

4. The Argument Structure of Experiencer Verbs

4.1. TM in All Examples?

The binding facts taken by themselves support a fairly weak claim: that Experiencer predicates contain a deleted TM infinitival whenever binding is found as in (4). They do not in themselves argue for a stronger and possibly more interesting claim: that *all* Experiencer predicates take such an infinitival argument. Nonetheless, this stronger view may be defensible for the class of predicates we have been considering, in which the Experiencer is an S-Structure object. Recall in this context the observations in section 2 concerning the meaning of Experiencer constructions: if books annoy John, they annoy John because of some other relation John has to them. This type of datum does potentially argue for the stronger position.

4.2. Nominalizations

There may in fact be some pieces of evidence for the stronger position. If sentences like *Books annoy John* always involve TM, then the impossibility of nominalizations of such sentences, noted by Chomsky (1970) and discussed most recently by Rozwadowska (1985), follows from the well-known impossibility of TM in nominalizations:

(18) a. *the book's annoyance of John
b. *the book's amusement of the children
c. *the book's embarrassment of the censors
(19) *the book's difficulty to read

If the Agent-Patient versions of these predicates do *not* contain an infinitival clause, then we correctly predict that nominalizations of these usages should be possible. As Rozwadowska observes, this is also correct:

(20) a. Mary's (deliberate) annoyance of John
b. Mary's (deliberate) amusement of the children
c. Mary's (deliberate) embarrassment of the censors

4.3. Crossover

Also, if the data in Postal (1970; 1971) are accurate (also see Jackendoff (1972, 146)), the hypothesis of an obligatory *Tough* infinitival correctly excludes examples with reflexives like (21a). Suppose that (21a) must contain a deleted infinitive along the lines of (21b). If *e* in the infinitive has the properties of a variable (see Chomsky's (1977) analysis in terms of *Wh* Movement), then it will violate the binding theory, being bound by PRO by transitivity of indexing:

(21) a. ?I disgusted myself.
b. ?I_i disgusted myself$_i$ [PRO$_i$ to think about e_i].

Many speakers find (21a) at worst only slightly odd, even with the relevant nonagentive reading of the verb. This argument must therefore be taken with a grain of salt for now. It does seem to follow correctly that (21a) is completely grammatical if *disgust* is construed as an Agent-Patient verb (as noted for French by Ruwet (1972, 217–220), with a counterexample that I do not explain), since there is no *Tough* infinitival in this case.[6]

5. How Many Arguments Do Experiencer Verbs Have?

Two potential problems for this treatment actually turn out to support the present analysis, if we make a few claims more specific. If all sentences like *The article angered John* involve a deleted infinitival clause and TM, it is natural to ask about the argument structure of verbs like *amuse* and *annoy*. Two obvious hypotheses are available:

(I) The surface subject is an argument of the verb. The verb has three arguments: an external NP, an Experiencer, and an infinitival clause.

(II) The surface subject is not an argument of the verb. The verb has two arguments: an Experiencer and an infinitival clause. The surface subject receives its θ-role because it is the head of a chain that is assigned its θ-role inside the infinitival clause, much as in Raising structures.

These hypotheses are familiar from previous discussion of TM, particularly Lasnik and Fiengo (1974), and, most recently, Chomsky (1981, 308–314). In favor of hypothesis (I) is the questionable status of TM with idiom chunks and, internal to the Extended Standard Theory, the well-known similarities between *Tough* constructions and *wh* constructions. In favor of hypothesis (II) is evidence of the classic sort supporting the view that the subject is a $\bar{\theta}$-position. Note in particular that verbs like *amuse* in examples like (22a) take an infinitive as an argument independent of TM:

(22) a. It amuses Mary to read this book.
b. This book amuses Mary to read *e*.
c. *This book amuses Mary to read *War and Peace*.

(23) a. It seems that book has been read.
b. That book seems to have been read.
c. *That book seems that *War and Peace* has been read.

[6] J. Higginbotham (personal communication) asks whether the subject of the deleted infinitival must be PRO. If the subject need not be PRO, then (21a) should be grammatical on a reading where the subject of the deleted infinitive is lexical. Apparently, however, the subject of the clause must be PRO:

(i) This book is easy for children to understand.
(ii) ?*Books like this annoy me for children to read.

These data tend to support Chomsky's (1973) contention that the subject of the embedded clause in (i) is PRO as well, with the *for*-phrase a matrix Experiencer. Example (ii) then violates the θ-Criterion, since both *me* and *for children* bear the same Experiencer role. Note also that if (ii) were grammatical, sentences like (iii) would also be predicted to be acceptable, because of reconstruction into a clause like that in (ii):

(iii) *Each other's books annoy me.

The subject position may be filled by an expletive. It is filled by a nonexpletive NP only if that NP is linked to a gap in the infinitival clause. Let us suppose that hypothesis (II) is correct, and that the theory may be modified to explain the *wh*-like properties of TM in another way. We thus assume that verbs like *amuse* and *annoy* take two arguments and not three. The θ-roles assigned to these arguments are Experiencer and Cause.[7] The surface subject in the sentences we have considered is thus "deceptive"—it is a derived subject, receiving its θ-role at S-Structure through a chain extending into an often deleted infinitival. We can now consider the apparent problems.

5.1. Passive

A first problem is raised by Passive. For many speakers, sentences superficially like the ones we have been considering may be passivized. This is surprising if our sentences involve TM and a derived subject. Yet certain subtle differences exist among various passive sentences:

(24) a. ??Bill was delighted by Fred. (Fred ≠ Agent)
b. Bill was delighted by Fred's visit.
(25) a. ??Mary was amazed by my shoes. (unless *shoes* is some kind of Agent)
b. (?)Mary was amazed by my choice of shoes.

If the active counterparts of both the (a) and the (b) sentences of (24)–(25) involve TM, and if the possibility of a non-Experiencer NP in the sentence rests on the possibility of TM, then the availability of Passive in any of these examples is quite surprising. (I take the *by*-phrases to indicate that these are cases of verbal, not adjectival, passive.) TM is, of course, impossible in the passive sentences, since the object of *by* does not c-command the gap:

(26) *Mary was angered by my (choice of) shoes to look at.

Interestingly, however, not all the passive examples are equally acceptable. Comparison of the (a) with the (b) examples shows that passive sentences are somewhat better with a nominalization in the *by*-phrase than with a concrete noun. To check the judgments, it is useful to compare (24)–(25) with parallel examples that contain adjectival passives, using prepositions other than *by*—for example, *delighted with* and *amazed at*. (I discuss these adjectival examples below.) The (a) sentences of (24)–(25) become considerably better in this adjectival guise, whereas the (b) sentences of (24)–(25) are already fairly acceptable and do not noticeably improve when made adjectival. I believe that the differences between the (a) and the (b) sentences of (24)–(25) hold the key to understanding why verbal passive is possible at all.

If the (b) examples, but not the (a) examples, can be derived *without* TM, we can

[7] As noted above and by Ruwet (1972), the Cause role may systematically be replaced by Agent. This is a general process, which is also found elsewhere: compare *The sun melted the ice* to *Bill deliberately melted the ice*. (See footnote 11.)

explain what is going on, since no c-command problems will arise in the passive construction. In fact, we can make just this claim if we refine our hypothesis slightly by considering the selectional properties of our Experiencer verbs. If verbs like *amaze* take two arguments, it is natural (and consistent with some recent views of selection, namely, those of Grimshaw (1981), Pesetsky (1982), and Chomsky (1986)) to say simply that the Cause argument can be any syntactic category that can denote an event or an action. A shoe is not an event or an action, in contrast to what a nominalization or a clause may denote. Thus, although *shoe* as subject of a verb like *amaze* cannot really be a θ-marked argument of that verb, a nominalization like *choice of shoes* can be.[8] As a consequence, the (b) sentences of (24)–(25) and their active counterparts do not have to involve TM.[9]

On the other hand, if sentences like (24b) and (25b) need not be derived by TM, a problem immediately arises with our explanation for (18a–c) (for instance, **the book's annoyance of John*). Our explanation for the ungrammaticality of such examples rested crucially on TM, and on the independent fact that TM cannot apply within NP. But now consider (27), which by the argument in this section need not involve TM:

(27) a. *Fred's visit's delight of Bill
b. *my choice of shoes's annoyance of Mary

All things being equal, these examples should be acceptable, yet they seem as bad as (18a–c). Interestingly, however, a nominalization is generally impossible as the subject of another nominalization, and for mysterious reasons:

(28) a. the king of England's dependence on cunning
b. *the oxidation of iron's dependence on moisture
(29) a. John's older brother's relation to Mary
b. *Bill's abrupt departure's relation to Mary's mood

This at least provides an independent account of (27). Speculating, I might suggest that the constraint seen in (28)–(29) and in (18) may reduce to the same effect, but I will not explore the subject here.[10] See Rozwadowska (1985) for discussion of clearly related phenomena.

[8] We might be able to distinguish the Agent-Patient incarnations of the predicates discussed here from their Experiencer incarnations as a by-product of alternating selection for an event or an action versus selection for something animate. The absence of selection for an event or an action in the agentive case would explain the absence of TM in the agentive case, and thus the relative acceptability of the nominalizations in (20). See Johnson (1985) for discussion of this alternation.

[9] Though the active counterparts might involve TM in sentences like *Each other's choice of shoes amazed the men (to think about)*. Note that *The men were amazed by each other's choice of shoes* raises no c-command problems that require us to postulate TM.

[10] This is related to the question of whether the Cause argument is underlyingly external or internal. Webelhuth (1985) and Belletti and Rizzi (1985) (in orally presented work) assume—as I do not—that the visible subject of an *annoy*-type verb is a real argument of the verb, but argue—as I do—that the subject NP has moved from a position dominated by the VP. In particular, these authors claim that the verbs in question are "unaccusative" (alias "ergative"), the Cause argument being assigned internally. A number of their points (arguing, for example, for movement into subject position) follow from my theory as well, but further discussion would require a deeper analysis of TM and its relation to θ-theory than I can provide here.

5.2. Objects vs. Causes of Emotion

The next problem is somewhat different. Consider the adjectival constructions in (30) on the view that the object of *at* corresponds to the subject of the active verbs we have been examining:

(30) a. Bill is angry at the article.
b. Mary is quite amused at the results.
c. The men are completely amazed at the book.

As in the passive case just considered, an analysis in terms of TM is unlikely:

(31) a. *Bill is angry at the article to read *e*.
b. *Mary is quite amused at the results to contemplate *e*.
c. *The men are completely amazed at the book to look at *e*.

Unlike what we find in the passive case, however, there is no tendency here to prefer nominalizations as arguments, nor is there any problem with NPs like (30a–c) (see Anderson (1977), Rozwadowska (1985)):

(32) a. Bill's anger at the article
b. Mary's amusement at the results
c. the men's amazement at the book

Evidently, no TM is involved in the derivation of these examples. Yet given the Lexicalist Hypothesis, one expects the selectional and thematic properties of the adjective and nominalization to be the same as those of the related verb. If the verb takes two arguments, an Experiencer and a Cause, and if the Cause must be an event or an action, then (30)–(32) seem to present serious problems. The subject in (30) and (32) is clearly an Experiencer, the other visible argument is neither an event nor an action, and a TM solution is tough to motivate here.

Closer examination of (30) and (32), however, suggests that the selectional and thematic properties of these nominal and adjectival examples are indeed different from the properties of our verbal examples. Pertinent observations are made by Kenny (1963, esp. 70–75), developing an observation by Wittgenstein. Kenny considers the logical structure of verbs of emotion and takes pains to distinguish the *Cause* of an emotion from the *Object* of the emotion. We can see this distinction by comparing (33a) and (33b):

(33) a. Bill was very angry at the article in the *Times*.
b. The article in the *Times* angered Bill greatly.

For (33a) to be true, Bill's anger is directed at some intrinsic property of the article. In short, he finds the article objectionable in some respect; he does *not* think the article is good. Example (33b) is rather different. Bill *might* be directing his rage at the article in (33b) as well—the meaning of (33b) is not inconsistent with (33a)—but (33b) is appropriate even if Bill thinks the article is splendid. Example (33b) can be true if Bill's

favorite columnist has written, in Bill's opinion, a great article revealing hitherto unknown examples of government corruption. Though the article *causes* Bill to be angry, his anger is not directed at the article, but somewhere else.

This difference in meaning generally distinguishes verbal examples like those considered in previous sections from the adjectival and nominal examples considered here. Thus, *The article worried Mary* may be true if the article caused Mary to think about nuclear war, whereas *Mary was worried about the article* requires that the article itself be the object of Mary's concern; for example, Mary might be afraid that her editor will cut the first paragraph.

Of course, as Kenny notes, in many cases "it is very natural to think of the object of an emotion as its cause," and this may lead to some confusion. Thus, in *Bill's behavior embarrassed Sue* (adapting one of Kenny's examples) Bill's behavior is naturally both the cause and the object of Sue's embarrassment. The same is true with *Sue was embarrassed at Bill's behavior*. Nonetheless, it is clear that the roles of Object of Emotion and Cause are distinguishable in principle, and that the non-Experiencer NP in (30) bears the Object of Emotion role and not the Cause role.

If a predicate assigns the role of Object of Emotion to a syntactic position, there is no reason to suppose that it selects an event or an action in that position. There is then no need to propose that the object of *at* in (30) and (32) (and similar NPs in other adjectival and nominal examples) is derived by means of TM. As a result, there is now no syntactic problem with (30) or (32).[11]

But what of the Lexicalist assumption that the verb *anger* should assign the same θ-roles as the adjective *angry* and the noun *anger*? For now, I will simply suggest that the adjective and the noun do not assign the Cause role because the related verb is a lexical causative from this adjective and noun. An even more interesting question is why the causative verb cannot assign the Object of Emotion role:

(34) a. *The article in the *Times* angered Bill at the government.
(cf. *The article made Bill angry at the government.*)
b. *The book worried Mary about nuclear war.

One might take this fact to argue that Cause and Object of Emotion are not distinct θ-roles after all, contrary to my suggestions. Since I cannot explain (34), this possibility cannot be altogether rejected. Note, however, that it is perfectly clear what (34a–b) mean; the sentences are simply not grammatical. This is not typical of cases in which the same θ-role has been assigned to two arguments, which normally are senseless:

(35) *Sue gave Bill five dollars to Mary.

I therefore optimistically leave the solution to (34) open.

[11] There are verbs with the θ-structure of the adjective *angry*. For example, compare *John feared the article* with *The article frightened John,* which differ in much the same way *angry* differs from *anger*. The discussion in the text implies that such pairs are not mere lexical variants, thus providing an additional argument against any analysis in the spirit of Psych Movement that proposes a common thematic structure.

6. Conclusions

I have argued that certain verbal constructions with Experiencers in object position actually involve TM, and that odd binding facts can be explained in this way. I then showed some consequences of the stronger hypothesis that *all* such constructions involve TM. This stronger hypothesis raises certain problems, but closer inspection of each problem produces evidence that in fact supports it: Experiencer constructions that independently disallow TM have other properties that distinguish them from constructions that do allow TM.

In my argumentation I have several times followed the well-known ploy of reducing one difficult problem to another. Why language shows Connectivity phenomena is still an open question. Equally open is why the *Tough* construction is associated with Experiencer predicates and how to explain the various properties of the *Tough* construction. Other general issues raised in section 5 remain open. Clearly, these issues need resolving. Further consideration of the properties of Experiencer predicates will very likely prove important in all of these domains.

Minimally, I hope to have demonstrated that the odd binding properties of Experiencer verbs follow from Connectivity effects and the availability of TM with these verbs. These binding properties thus do not motivate a rule like Psych Movement or an appeal to a thematic hierarchy replacing c-command. To be sure, other interesting arguments for such a hierarchy (such as those in other sections of Giorgi (1984) and in Nishigauchi (1984a,b)) remain untouched by the present discussion. Nonetheless, if my remarks are correct, the Experiencer problem, at least, does not motivate these devices. What is more, the solution that eschews both such a hierarchy and Psych Movement sheds a certain amount of new light on the properties of Experiencer predicates in general.

References

Akmajian, A. (1970) *Aspects of the Grammar of Focus in English,* Doctoral dissertation, MIT, Cambridge, Massachusetts.

Anderson, S. (1977) "Comments on the Paper by Wasow," in P. W. Culicover, T. Wasow, and A. Akmajian, eds., *Formal Syntax,* Academic Press, New York.

Barss, A. (1984) "Chain Binding," ms., MIT, Cambridge, Massachusetts.

Belletti, A. and L. Rizzi (1985) "Psych Verbs and θ-theory," handout, MIT, Cambridge, Massachusetts. (Also presented at the Conference on Formal Syntax, Princeton University, Princeton, New Jersey, March 1986.)

Chomsky, N. (1970) "Remarks on Nominalization," in R. Jacobs and P. Rosenbaum, eds., *Readings in English Transformational Grammar,* Ginn and Co., Waltham, Massachusetts.

Chomsky, N. (1973) "Conditions on Transformations," in S. Anderson and P. Kiparsky, eds., *A Festschrift for Morris Halle,* Holt, Rinehart and Winston, New York. (Reprinted in N. Chomsky, *Essays on Form and Interpretation,* Elsevier North-Holland, New York.)

Chomsky, N. (1977) "On *Wh*-Movement," in P. W. Culicover, T. Wasow, and A. Akmajian, eds., *Formal Syntax,* Academic Press, New York.

Chomsky, N. (1981) *Lectures on Government and Binding,* Foris, Dordrecht.
Chomsky, N. (1986) *Knowledge of Language: Its Nature, Origin, and Use,* Praeger, New York.
Chomsky, N. and H. Lasnik (1977) "Filters and Control," *Linguistic Inquiry* 8, 425–504.
Giorgi, A. (1984) "Toward a Theory of Long Distance Anaphors: A GB Approach," *The Linguistic Review* 4, 307–362.
Grimshaw, J. (1981) "Form, Function and the Language Acquisition Device," in C. L. Baker and J. J. McCarthy, eds., *The Logical Problem of Language Acquisition,* MIT Press, Cambridge, Massachusetts.
Heim, I. (1982) *The Semantics of Definite and Indefinite Noun Phrases,* Doctoral dissertation, University of Massachusetts, Amherst.
Hellan, L. (1984) "The Loop Model," ms., University of Trondheim.
Higginbotham, J. (1983) "Logical Form, Binding, and Nominals," *Linguistic Inquiry* 14, 395–420.
Higgins, F. R. (1973) *The Pseudo-Cleft Construction in English,* Doctoral dissertation, MIT, Cambridge, Massachusetts. (Published 1979 by Garland, New York.)
Jackendoff, R. (1972) *Semantic Interpretation in Generative Grammar,* MIT Press, Cambridge, Massachusetts.
Jacobson, P. (1982) "Evidence for Gaps," in P. Jacobson and G. K. Pullum, eds., *The Nature of Syntactic Representation,* Reidel, Dordrecht.
Johnson, K. (1985) "Subjects and θ-Theory," ms., MIT, Cambridge, Massachusetts.
Kenny, A. (1963) *Action, Emotion and Will,* Routledge and Kegan Paul, London.
Lakoff, G. (1971) *Irregularity in Syntax,* Holt, Rinehart and Winston, New York.
Lasnik, H. and R. Fiengo (1974) "Complement Object Deletion," *Linguistic Inquiry* 5, 535–572.
Lee, G. (1971) "Notes in Defense of Case Grammar," in D. Adams et al., eds., *Papers from the Seventh Regional Meeting of the Chicago Linguistic Society,* University of Chicago, Chicago, Illinois.
Lewis, D. (1979) "Score-keeping in a Language Game," in R. Bäuerle, U. Egli, and A. von Stechow, eds., *Semantics from Different Points of View,* Berlin, Springer-Verlag.
Manzini, M. R. (1983) "On Control and Control Theory," *Linguistic Inquiry* 14, 421–446.
Nishigauchi, T. (1984a) "Thematic Superiority and Anaphoric Binding," *English Linguistics: Journal of the English Linguistic Society of Japan* 1, 22–44.
Nishigauchi, T. (1984b) "Control and the Thematic Domain," *Language* 60, 215–250.
Partee, B. (1977) "John Is Easy to Please," in A. Zampoli, ed., *Linguistic Structures Processing,* North-Holland, Amsterdam.
Pesetsky, D. (1982) *Paths and Categories,* Doctoral dissertation, MIT, Cambridge, Massachusetts.
Postal, P. (1970) "On the Surface Verb *Remind,*" *Linguistic Inquiry* 1, 37–120.
Postal, P. (1971) *Cross-Over Phenomena,* Holt, Rinehart and Winston, New York.
Riemsdijk, H. van and E. Williams (1981) "NP-Structure," *The Linguistic Review* 1, 171–217.
Roberts, C. (1984) "On the Assignment of Indices and Their Interpretation in Binding Theory," in *Proceedings of the Fifteenth Annual Meeting of NELS,* GLSA, University of Massachusetts, Amherst.
Rozwadowska, B. (1985) "Experiential Nominals," ms., University of Massachusetts, Amherst.
Ruwet, N. (1972) *Théorie syntaxique et syntaxe du français,* Editions du Seuil, Paris.
Webelhuth, G. (1985) untitled ms., University of Massachusetts, Amherst.
Weisler, S. (1983) "Generalized Binding," in T. Borowsky and D. Finer, eds., *University of Massachusetts Occasional Papers in Linguistics* 8, GLSA, University of Massachusetts, Amherst.
Williams, E. (1977) "Discourse and Logical Form," *Linguistic Inquiry* 8, 101–139.

Williams, E. (1984) "*There*-Insertion," *Linguistic Inquiry* 15, 131–154.
Zubizarreta, M. L. (1982) *On the Relationship of the Lexicon to Syntax,* Doctoral dissertation, MIT, Cambridge, Massachusetts.

Department of Linguistics
South College
University of Massachusetts
Amherst, Massachusetts 01003