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AN INTEGRATED THEORY OF COMPLEMENT CONTROL

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This paper presents an integrated theory of the syntax and semantics of complement control that treats unexpressed subjects in verbal and nominal constructions uniformly, in terms of semantic control constraints that are shown to apply across discourse as well. Our account includes an explanation of the long-standing problem of be allowed to ... exceptions to Visser’s Generalization (that subject-control verbs do not passivize). Moreover, semantic control constraints are shown to interact with a principle governing the binding of overt and covert anaphors in such a way as to deduce the correct predictions of both Visser’s Generalization and Manzini’s Generalization (that VP complements are controlled by an argument of the governing verb).*

INTRODUCTION

1. In this paper we present a theory of the syntactic and semantic representation of complements like those in 1 and 2, where the unexpressed subject of the embedded verb-phrase complement is subject to certain interpretational restrictions that have been discussed in the literature under such rubrics as Equi-NP Deletion and the binding of a hypothesized null anaphor (PRO).

(1) a. Kim wants to go.
   b. I prefer to do it myself.
   c. Lee is eager to serve on the committee.
   d. Pat tried to pass the test.
   e. Lee promised (Sandy) to behave.

(2) a. Dana persuaded/forced Lou to attend the meeting.
   b. She signaled (to the swat team) to close in on the house.
   c. Rene appealed to Jean to vote for the amendment.

Our analysis of these controlled complements involves neither a deletion transformation nor a phonetically unrealized constituent. Rather, we will argue that a principled explanation for the grammar of English controlled complements can be derived from the interaction of semantically based principles of controller assignment and the principles that determine the distribution of anaphors and pronouns (binding theory).

It was Jackendoff (1972:214ff.) who first suggested that controller assignment is determined by semantic (or THEMATIC) roles, rather than by purely syntactic

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factors (e.g. structural configurations or grammatical relations), as has been frequently assumed (Lakoff 1965, Rosenbaum 1967, Williams 1980, Chomsky 1980, Bresnan 1982, Larson 1988). Jackendoff observed, for instance, that controller choice in the following examples can be predicted in a uniform manner.

(3) a. Joe got furious at Henry.
    b. John promised to leave.
    c. Frank got Joe furious at Henry.
    d. John promised Bill to leave.

Jackendoff’s treatment involves role-based constraints to the effect that the controller of the unexpressed subject of the complement of *get* is always the individual playing the role of *theme*, whereas in the case of *promise* (Jackendoff 1974:503) it is the *agent* (or *source*) that must be the controller. These constraints remain constant across different subcategorizations of the ‘same’ verb, as illustrated.

Our analysis will build on Jackendoff’s insight, extending his semantic view of control constraints to a range of data broader than that standardly considered in such discussions. Our semantic constraints eliminate the need for any stipulations associated with specific lexical items (e.g. the verb *promise* or the noun *appeal*) and provide a unified account of sets of data such as the following:

(4) a. Sandy promised Tracy to leave the party early.
    b. Sandy’s promise to Tracy to leave the party early caused quite an uproar.
    c. The promise by Sandy to leave the party early caused quite an uproar.
    d. The promise that Sandy made, to leave the party early, caused quite an uproar.
    e. Sandy made Tracy a promise. It was to leave the party early.

(5) a. Sandy appealed to Tracy to leave the party early.
    b. Sandy’s appeal to Tracy to leave the party early was untimely.
    c. The appeal that Sandy made to Tracy, to leave the party early, was untimely.
    d. Sandy made an appeal to Tracy. It was to leave the party early.

(6) a. Dana wished to leave the party early.
    b. The wish that Dana made, to leave the party early, was fulfilled.
    c. Dana made a wish. It was to leave the party early.

Further, our semantically based principles of controller assignment, taken together with our binding theory—which we develop in terms of the framework of head-driven phrase structure grammar—allow us to explain the apparent shifts of control in examples like 7, first noted in Hust & Brame 1976.

(7) a. Lee promised Pat to be allowed to leave.
    b. Pat was promised to be allowed to leave.

As noted by Jackendoff (1987:370), such examples have not been adequately explained by previous theories of control, which we will survey. On our account, these examples involve no control shift at all. Rather, the semantic content of the infinitival complement, a (nonintentional) state, has been
‘coerced’ to an action in order to achieve semantic compatibility with promising (the semantics of promise to crucially involves a commitment to act, not a commitment to truth). On our analysis, 7a, for example, is treated roughly on a par with Lee promised Pat to cause him (Pat) to be allowed to leave. The interpolated causer in the complement’s semantics is thus identified with the appropriate matrix argument by the same semantic principles that determine controller assignment quite generally.

Finally, we will offer some speculative remarks on the consequences of our account with respect to the question of controller realization, with particular attention to a 1983 proposal of Manzini’s (roughly, that the unexpressed subject of a VP complement must be controlled within the minimal clause containing it), and to the phenomenon that Bresnan (1982) has dubbed Visser’s Generalization, i.e. the general incompatibility of subject control and passivizability, as illustrated in 8 and 9.

(8) a. Lee persuaded Pat to leave.
   b. Pat was persuaded to leave (by Lee).

(9) a. Lee promised Pat to leave.
   b. *Pat was promised to leave (by Lee).

The semantic nature of controller assignment

2. The principles of controller assignment are nonarbitrary. Radford (1981:381) offers the following critical observation:

Firstly, arbitrary lists of properties associated with predicates have no predictive or explanatory value: ask the question ‘How do you know this is a verb of subject control?’ and you get the answer ‘Because it’s listed as a verb of subject control in the lexicon.’ Secondly, treating control ... as a lexically governed phenomenon implies that control properties are entirely arbitrary, and hence will vary in random fashion from dialect to dialect, or language to language: this would lead us to expect that the counterpart of Fred persuaded Mary to give him title to her estate in some other dialect or language would have subject control rather than non-subject control ... But as far as we know, this is not the case.

The point here is that many widely accepted analyses of control phenomena stipulate precisely what is to be explained. namely that, in a clear, uniform, and consistent manner, verbs of a certain semantic type take ‘subject control’, while those of a different semantic type take ‘object control’. To illustrate this point, made also in Comrie 1984, consider the following classes of verbs, which exhibit uniform control constraints.

(10) ORDER/PERMIT type [object control]:
    order, persuade, bid, charge, command, direct, enjoin, instruct, advise, authorize,
    mandate, convince, impel, induce, influence, inspire, motivate, move, pressure,
    prompt, sway, stir, talk (into), compel, press, propel, push, spur, encourage, exhort,
    goad, incite, prod, urge, bring, lead, signal, ask, empower, appeal (to), dare, defy,
    beg, prevent (from), forbid, allow, permit, enable, cause, force

(11) PROMISE type [subject control]:
    promise, swear, agree, contract, pledge, vow, try, intend, refuse, choose, decline,
    decide, demand, endeavor, attempt, threaten, undertake, propose, offer, aim

(12) WANT/EXPECT type [subject control]:
    want, desire, fancy, wish, ache, hanker, itch, long, need, hope, thirst, yearn, hate,
    aspire, expect
Verbs of the *order/permit* type all submit to a semantic analysis involving *states of affairs (soa)* where a certain participant (the referent of the object) is influenced by another participant (the referent of the subject) to perform an action (characterized in terms of the soa denoted by the VP complement). The influencing participant may be an agent (as in *Kim persuaded Sandy to leave*) or a nonagent (as in *Ignorance of thermodynamics compelled Pat to enroll in a poetry class*). The semantics of all verbs in this class thus involves a soa whose relation is of the *influence* type. With respect to such soas, we may identify three semantic roles, which we will refer to as *influence* (the possibly agentive influencer), *influenced* (the typically animate participant influenced by the influence) and *soa-arg* (the action that the influenced participant is influenced to perform or, in the case of verbs like *prevent* and *forbid*, *not* to perform).\(^1\) We treat verbs like *allow*, *permit*, *cause*, and *force* as ambiguous, involving either an influence-type relation (in which case an influenced participant is present) or a different sort of dyadic relation for which the influencer role is inappropriate; in the latter case these verbs exhibit behavior characteristic of raising verbs (e.g. *The police permitted there to be a demonstration in the park*).\(^2\) In addition, in relations of this class the soa-arg argument need not be an action, as examples like *His pituitary condition caused him to be nine feet tall*.

The *promise*-type verbs also exhibit semantic uniformity. The semantic analysis of these verbs involves soas which contain a relation of a type that we may refer to (perhaps somewhat inaccurately) as *commitment*. Commitments involve a typically animate participant which we may identify as *committer*, and a soa-arg, in this case the action the committer commits to performing (or *not* performing, in the case of verbs like *refuse* or *decline*). Some commitment-type relations also allow a third role, which we may refer to as *commisseree*, the individual to whom the commitment is made.

Similarly, the *want/expect*-type verbs all involve desire, expectation, or similar mental orientation toward a given soa. We will refer to these as *orientation* relations, and will characterize their associated roles as *experiencer* (the participant who experiences the appropriate orientation) and soa-arg (here the soa towards which the experiencer is oriented).

Doubtless further refinement of this classification is possible. Nonetheless, as it stands it is sufficient to reduce the semantic generalizations that underlie controller assignment to three in the informal statement given in 13.

\[(13)\] Given a nonfinite VP or predicative complement C, whose semantic content C' is the soa-arg of a soa s whose relation is R, the unexpressed subject of C is linked to:
A. the influenced participant of s, if R is of influence type,
B. the committer participant of s, if R is of commitment type
C. The experiencer participant of s, if R is of orientation type.

\(^1\) For a different characterization of our notion of ‘action’ in terms of Castañeda’s 1975 notion of ‘practition’, see the HPSG control theory developed in Clements & Wetengel 1989.

\(^2\) For some discussion, see Schmerling 1979.
The role-based generalizations in 13 are adapted from Jackendoff 1972, 1974, and the characterization of the relevant classes of relations is adapted in part from Foley & Van Valin 1984. Our notion of influence-type relation (and, by extension, influence-type soa) is intended to be more general than Foley & Van Valin’s notion of directive, and our category of commitment extends their category of commissive to include, for example, attempts as well as promises. We distinguish orientation-type relations from commitments on the grounds that the latter do not involve agents and actions, but rather experiencers and soa arguments that may be either actions or states. In §4 we will make this informal statement of the controller assignment principles more precise.\(^3\)

Infinitival VPs also occur as dependents of nominal expressions, as illustrated in 14.

(14) a. Sandy’s promise/attempt to leave the party caused quite an uproar.
   b. Chris’s desire/wish to leave the party bothered Pat.
   c. Rene’s signal/appeal to Jean to leave the room was noticed by everyone.

There is no apparent difference between the semantic function of these infinitival phrases within nominal constituents and their semantic function within VPs. The infinitival VPs in 14a and 4a, for example, both designate the content of a promise made by an individual named Sandy. There is one important syntactic difference, however: within NPs these infinitival phrases are always optional.

It is evident that the unexpressed subjects of infinitival phrases within the NP are governed by the very same semantic principles that determine controller assignment for verbs.\(^4\) In 14a it is Sandy, the agent of the promise, who controls the missing subject; in 14b the controller is Chris, the experiencer of the desire or wish; and in 14c it is Jean, the influenced participant in the influence-type situation, who serves as controller. These observations show beyond any reasonable doubt that semantic control constraints function identically within nominal and verbal constituents. Within nominal constituents, however, the location of the semantically relevant NP cannot be specified in syntactic terms, as the examples in 15 show:

(15) a. Sandy’s promise to Tracy to leave the party early caused quite an uproar.

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\(^3\) Here and throughout, the reader will notice that we have made cautious use of generalized semantic (or thematic) roles. That is, contrary to assumptions often made on the basis of the work of Fillmore 1967 and Gruber 1965, we are skeptical about any claim that a small inventory of semantically meaningful roles can be established for the entirety of the vocabulary of English (or any other natural language). Our use of the notions of influence, committor, experiencer, and the like implies a commitment only to the idea that there are semantic regularities that hold over the particular types of relations and soas that we consider, i.e. over soas whose relation is of influence, commitment, and orientation type. For a critical discussion of thematic roles that we are in sympathy with, see Ladusaw & Dowty 1988.

\(^4\) The observation that verbal and nominal constructions obey identical control constraints was made in Higgins 1973 and in Jackendoff 1972, 1974. See also Williams 1985.
b. The promise by Sandy to leave the party early caused quite an uproar.
c. The promise that Sandy made, to leave the party early, caused quite an uproar.
d. The promise to leave the party early, which Kim knew would be immediately forthcoming from Sandy, was going to cause quite an uproar.

In all of these examples the content of the promise, speaking informally, is that Sandy, the committer of the promise, leave the party early. In 15a the controller is realized as a possessor; in 15b it is realized as the object of a by-phrase; in 15c–d the committer of the promise is not realized as any dependent of the noun promise. Rather, in 15c–d, it is only through integration of the content of the relative clause that the identity of the implicit committer argument is determined.

Of course the semantically determined controller need not be expressed within the NP at all:5

(16) The whole room was focussed on Sandy. A promise now to endow the center would ensure the success of the funding drive.

In this context, Sandy is the most likely choice for controller of the unexpressed subject of the infinitival phrase in the second sentence. Yet, even if prior context clearly establishes someone other than Sandy (say someone whose promise would have immediate and observable impact on Sandy), it remains true that that individual will be taken as the agent of the promising as well as the controller of the unexpressed subject of the infinitival phrase. The two argument positions are inextricably linked.

In fact, this link between unexpressed subject and the committer of a promise can be observed even in the absence of a discourse referent, as in the examples in 17.

(17) a. A promise to endow the center would indicate a desire to help the campaign.
b. A promise to endow the center would mean a commitment to success.

It is never possible to construct a context where the committer of the promise is dissociated from the controlled subject of the infinitival phrase. Thus examples like 18 are systematically ill-formed (cf. Zribi-Hertz 1989; the analysis of anaphors presented in Pollard & Sag 1991a describes a variety of English that is at odds with the one represented in some of Zribi-Hertz’s examples).

(18) a. *Mary knew that a promise by John to get herself arrested would be extremely unfortunate.
b. *John was quite upset. A promise by Mary to get himself arrested would be extremely unfortunate.

It is straightforward to demonstrate analogous application of control con-

5 Such examples are also noted in Williams 1985.
strains within nominal constituents whose semantics involves orientation-type or influence-type relations:

(19) a. The wish/desire on Dana’s part to leave the party early had no sensible basis.
    b. The wish that Dana made, to leave the party early, was fulfilled.
    c. Dana’s wish/desire/preference to leave the party early had gone unnoticed.
    d. A wish to leave the party early would make perfect sense.

(20) a. Sandy’s appeal/instruction/signal to Tracy to leave the party early was untimely.
    b. The appeal that Sandy made to Tracy, to leave the party early, was untimely.
    c. The appeal/signal/instruction to leave the party early went unnoticed.

In 19a–c, the content of the wish/desire being described is that Dana leave a certain party early; the content of the wish in 19d is that whoever is the experiencer of the wish leave the party early. Similarly, in 20a–b the content of the appeal/signal/instruction being described is that Tracy leave the party early. In 20c, the implicit influenced argument (which could have been realized as the object of a *to*-phrase, as in 21) is unambiguously the controller of the unexpressed subject of the infinitival phrase.

(21) The appeal/signal/instruction to the kids to leave the party early went unnoticed.

Note in fact that, once the influenced argument is expressed, no other choice of controller is possible in examples like 22.

(22) Mary realized that the appeal/signal/instruction to the kids to get her/*herself to leave the party early went unnoticed.

In sum, the semantically-based principles of controller assignment posited for the various verb classes also function within nominal constituents.

Higgins (1973:80, 89) observed that control constraints hold across the copula in examples like 23 and across clause boundaries in examples like 24.

(23) His promise was to reform himself.

(24) a. I don’t quite remember what John’s plan was, but I think it was to leave himself at least two hours to get there.
    b. If there’s one vice she will admit to, it is that of dosing herself too liberally with laudanum.
    c. If I remember his aims correctly, they were to proclaim himself emperor and to march on Moscow.

And the ‘connectivity’ of control constraints discussed by Higgins is even more extensive than these examples would suggest. The phenomenon extends across sentence boundaries in discourse, as the data in 25–26 show:6

(25) a. Sandy made Tracy a promise. It was to leave the party early.

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6 Examples like 25a were first pointed out to us by Janet Fodor (personal communication, 1985).
b. Tracy made an appeal to Sandy. It was to leave the party early.
c. Sandy wanted/desired/wished for something. It was to leave the party early.

(26) A: Sandy promised Tracy something.
B: What was it?
A: I think it was to leave the party early.

Here we observe exactly the same interpretational restrictions that are characteristic of complement control. The unexpressed subject of the VP to leave the party early is interpreted as referring to Sandy. Following Dowty 1989, we may refer to this discourse control phenomenon as ‘remote control’.

Our analysis of remote control proceeds roughly as follows. It, like other third-person pronouns, may refer to some object made salient in the context of an utterance. In the case of 26, the salient object is the promised action (about which little has yet been specified) of a certain promising event introduced into the discourse by the previous utterance. The copula conveys simple identity between this promised action and the semantic object designated by to leave the party early. Combining all relevant information in this discourse yields a promising soa wherein the promised action is the semantic content of the infinitival VP. The semantic control constraint applies to this soa just like any other. Since promises are commitments, the committer of the promise must control the unexpressed subject; hence the interpretational properties of remote control examples like (26) are correctly predicted.7

Further evidence for the semantic nature of controller assignment comes from the peculiar How’s about construction.8 Unlike How about, which allows a much wider range of interpretations in context, How’s about can only be used to make a request.

7 There remains, of course (as noted in Dowty 1989), the independent question of when a given utterance evokes a salient object that may be referenced by subsequent anaphoric elements. Thus Dowty points out contrasts such as the following (1989:102–3):

(i) John made an agreement with Mary yesterday.
   It was to perjure themselves.
(ii) John agreed with Mary yesterday.
   *It was to perjure themselves.

Evidently, use of the verb agreed is insufficient to render salient the soa that was agreed to. This could well be because this sort of use of agreed conventionally implicates that what was agreed to is understood from context; if this is right, then the badness of (ii) would be analogous to the badness of (iii), where similarly the identity of the job applied for must already be established:

(iii) John finally decided to apply yesterday.
   *It was the computational ichthyology position.

In any case, it is not true that remote control arises only with nominalizations of control verbs, as Dowty hints, but rather that discourse saliency is intimately tied to the difference between nominal and verbal expression. That remote control cannot be explained solely in terms of nominalizations of control verbs is demonstrated by examples like (iv), where it is the NP argument of the verb promise that gives rise to remote control.

(iv) Kim promised Sandy something.
   It was to support the resolution.

8 The relevance of this construction was pointed out to us by Bill Eilfort and Jerry Sadock (personal communication, 1988).
(27) A: How can Johnnie get the teacher to like him?
    B: How about behaving himself, for once.
    B': *How's about behaving himself, for once.
(28) a. How's about a beer.
    b. How's about handing me the pliers.

When *How's about* takes a gerund complement, the unexpressed subject of that gerund must be controlled by the addressee, as in 29.

(29) a. How's about taking *myself/yourself/*ourselves off the list right now!
    b. How's about booking yourself/*you/*myself/me on the 12:30 flight.

Since *How's about* sentences can be used only to perform a request, and request is a relation of influence type, the unexpressed subject of the gerund complement must be controlled by the influenced participant in the influence-type soa, namely the addressee. This is exactly as predicted by the semantic control constraint formulated above.

In sum, the regularities that underlie controller assignment apply not only to the complements of verbs, but also to nominal control constructions, remote control, and interpretationally restricted constructions. Controller assignment principles are tied to the soas described by linguistic expressions rather than to linguistic expressions themselves. This has the important consequence that the lexical entries for verbs and nouns whose complements have controlled subjects should not stipulate controller assignment. Once role assignment is correctly guaranteed for a lexical entry, controller assignment will follow from the semantic properties of the lexical entry. Thus subject control for a verb like *promise* is derived from the interaction of two things: (1) whatever principles ensure that the subject of (the active forms of) *promise* is assigned the committor role, and (2) the principles of controller assignment sketched in 13 above. Only by formulating the principles of controller assignment in essentially semantic terms can we provide a sufficiently explanatory, unified account of control relations.

Although controller assignment is semantically determined, as we have seen, it would appear to be an inescapable fact that the *controlled element* (the element identified with the controller) must be identified in syntactic terms. Consider the following examples.

(30) a. Lee persuaded Tracy to examine Kim.
    b. Lee persuaded Tracy to be examined by Kim.

The infinitival VPs in both these examples describe soas whose relation is the relation of examining. The controlled element in 30a is the agent in this soa, while the controlled element in 30b is the PATIENT. And in the following example, the controlled element is the GOAL in the soa corresponding to the complement.

(31) Dominique wanted to receive an award.

For the moment, we will accept the traditional wisdom that the controlled
element is to be identified as the subject of the controlled complement. In §4.2 below, however, we will consider an alternative.

**HPSG: A brief synopsis**

3. In head-driven phrase structure grammar (HPSG), verbs and other lexical items that head phrases bear a lexical specification for a feature `subcat`. This feature takes as its value a list of specifications corresponding to the various complements (broadly construed to include subjects, including possessive phrases within NPs) that the word in question combines with in order to form a grammatically complete (or saturated) phrasal projection. The order of elements on the `subcat` list does not necessarily correspond to surface order, but rather to the order of relative obliqueness, with more oblique elements appearing later than (i.e. to the right of) less oblique elements. Following long-standing tradition, PP (or VP or S) complements are treated as more oblique than NP objects when both occur, and objects in turn are more oblique than subjects. Thus the `subcat` list for an intransitive verb contains exactly one NP, corresponding to the verb’s subject; and the `subcat` list for a (strict) transitive verb contains exactly two NPs, the first corresponding to the verb’s subject and the second to its (primary) object, as illustrated in (32).

(32) a. **died**
    subcat ⟨NP⟩

b. **chased**
    subcat ⟨NP,NP⟩

The satisfaction of `subcat` specifications replaces X-bar theory as the fundamental principle underlying the construction of headed phrases. More precisely, the Subcategorization Principle (one of the handful of universal principles in HPSG theory) requires that heads combine with complements in such a way that the `subcat` value of a given phrase is obtained by cancelling one member from the end of the head daughter’s `subcat` list for each complement that actually appears in the phrase. Thus the Subcategorization Principle ensures that a simple sentence like *Felix chased Fido* has a structure like (33).

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9 HPSG is a framework that has been developed as a conscious attempt to synthesize ideas and insights from a variety of frameworks, including GPSG (Gazdar et al. 1985), Categorial Grammar (Dowty 1982a,b), Lexical-Functional Grammar (Bresnan, ed., 1982), Government-Binding (Chomsky 1981, 1986), and Situation Semantics (Barwise & Perry 1983, Gawron & Peters 1990). For further details, the reader is referred to Pollard & Sag (1987, 1988, 1991a, 1991b) and Sag & Pollard 1989.

10 In the case of English double-object verbs, we take the immediately postverbal NP to be less oblique, thus eschewing the traditional terms ‘direct object’ and ‘indirect object’, which we take to reflect a thematic distinction (i.e. one based upon semantic role), not one of relative obliqueness.

11 This statement is something of a simplification, as `subcat` specifications serve only to relate heads to complements. As described in Pollard & Sag 1991b, other features are employed to mediate dependencies which obtain between noncomplements (e.g. adjuncts and markers) and the heads they depend on.
As in traditional tree diagrams, each nonterminal node represents a constituent of the phrase in question, with preterminals corresponding to lexical constituents. However, terminal nodes (connected by dotted lines) serve only to indicate the phonology of the associated preterminal, so that there is no notion of lexical insertion in the usual sense. The boxed numerals in 33 are tags (in the sense of Shieber 1986) indicating pieces of linguistic structure that are required by some linguistic constraint—in the present instances, the Subcategorization Principle—to be token-identical (‘structure-shared’). Thus individual lexical items may impose conditions of various sorts on their subcategorized complements (including their subject), and these conditions will be enforced by the Subcategorization Principle.

But in fact the information subcategorized for in HPSG is not limited to syntactic category in the usual sense. Each constituent in an HPSG structure has in addition to its syntactic category another component called its (semantic) CONTENT, which contains linguistic information that is relevant to the determination of the phrase’s semantic interpretation. Being somewhat more precise, then, each node label in 33 would be represented by a feature structure of the form 34.

Thus the category includes both subcategorization information and the head features of the constituent in question (part of speech, case of nouns, inflected form of verbs, etc.). It is crucially important that both category and content information can be subcategorized for. In light of these considerations, the structure of the tree given in 33 is actually represented more precisely in the form 35, although we will continue to employ simplified tree diagrams for expository purposes.

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12 Thus the content of a phrase can be viewed as a rough analog of GB’s LF.
Here the lexical head *chased* is lexically specified as in 36, where ‘NP:*x*’ abbreviates the structure shown in 37.

As with other verbs (and other predicative categories), the content specification is a predicate-argument structure (corresponding to a soa), similar to a logical formula except that argument positions are indicated by labelling their semantic roles rather than positionally; universal grammatical principles (the Semantics Principle and the Head Feature Principle—Pollard & Sag 1991b) ensure identity of content and head specifications between a lexical head and
its phrasal projections. Role assignment is effected by requiring that the contents of the subcategorized NPs (or other complements) be identical to (structure-shared with) the fillers of the corresponding roles in the content of the verb. The contents of the NPs themselves, called parameters, are analogous to logical variables, and are indicated here by lower-case letters from the end of the alphabet. Unlike logical variables, however, parameters have further internal structure, as we shall discuss directly below.

This theory of subcategorization thus has two immediate effects: (1) it draws a clean distinction between category selection and semantic selection, as urged in Grimshaw 1979, and (2) it ensures that the domain of role assignment is identical to the domain of category selection (subcategorization in the traditional sense). Among the predictions entailed by (2) are (a) that no verb will assign a semantic role to its complement’s object (since the verb has access only to the complement’s content, not to that of the complement’s object), and (b) that no verb will select for the category of a phrase within a complement. Thus, because the subcat feature is the vehicle for both role assignment and category selection, it follows immediately that both role assignment and category selection are local.

We turn now to the parameters that constitute the contents of NPs. For present purposes, there are two important points to note about parameters: first, parameters bear indices, which play much the same role as the NP indices widely employed in syntactic theory; and second, there are different sorts of parameters, corresponding to different kinds of NPs with differing referential properties. We consider these points in turn.

As shown in (38), the index of a parameter itself has internal structure, namely the features person, number, and gender (informally, agreement features).

\[
\begin{align*}
\text{INDEX} \quad \begin{bmatrix}
\text{PER} \\
\text{NUM} \\
\text{GEND}
\end{bmatrix}
\end{align*}
\]

It is identity (structure sharing) of indices that corresponds in our theory to the standard notion of coindexing for NPs, which figures centrally in binding theory and control theory. The semantic interpretation of indices is simply this: if an NP is referential, then any NP coindexed with it must have the same reference. Since the agreement features belong to the internal structure of

---

13 The Semantics Principle in fact must be more complex than this, in order to allow for adjuncts.

14 For simplicity we ignore quantification here.

15 It also follows, from the Head Feature Principle and the fact that in HPSG case is treated as a head specification, that case assignment obeys exactly the same locality condition as role assignment and category selection. For further discussion, see Sag & Pollard 1989 and Pollard & Sag 1991b.

16 We ignore here restrictions on parameters, in virtue of which heads impose semantic selectional restrictions on their complements.

17 Here and throughout, we indicate the sort of a linguistic object via left subscript.

18 Equivalently, in terms of parameters: if a parameter is anchored to some entity, then any other parameter coindexed with it is anchored to the same entity. In the terminology of situation semantics (Barwise & Perry 1983), the referent of an NP coincides with the anchor of the NP’s parameter.
indices, it follows immediately that coindexed NPs (such as an anaphor and its antecedent) necessarily bear identical specifications for person, number, and gender.\textsuperscript{19} By contrast, since \textit{case} is treated as part of the category, not part of the index, it also follows that case concord is not required by coindexing—a valid crosslinguistic prediction.

Second, we consider the classification of parameters into sorts on the basis of the referential properties of the NPs which bear them. At the top level of the classification, we posit a distinction between parameters which are \textit{referential (ref)} and those which are merely \textit{expletive (expl)}. In English, expletive parameters are classified as either \textit{it} or \textit{there}, while referential parameters fall into the two subsorts \textit{nonpronominal (nonpro)} and \textit{pronominal (pron)}, with the latter further classified as either \textit{anaphor (ana)} or \textit{personal-pronominal (ppro}, i.e. pronouns which are not anaphors). For overt nominals, the three sorts of referential parameter \textit{nonpro}, \textit{ana}, and \textit{ppro} correspond to Chomsky’s three-way classification of NPs as R-expressions, anaphors, or pronominals.\textsuperscript{20} Finally, anaphors are distinguished as either \textit{reflexive (refl)} or \textit{reciprocal (repc)}. The classification of NP parameters is summarized in 39.

(39) Sortal hierarchy of parameters:

```
parameter
  / \          /
 ref  expl     pron  npro  it   there
  /   \     /   \        /     \     /
 ana  ppro refl recp
```

By way of illustration, the parameters of representative NPs are given in 40.

(40) a. \textit{she:}

\[
\begin{array}{c}
\text{INDEX} \\
\text{PER} \\
\text{NUM} \\
\text{GEND} \\
\text{sing} \\
fem
\end{array}
\]

b. \textit{himself:}

\[
\begin{array}{c}
\text{INDEX} \\
\text{PER} \\
\text{NUM} \\
\text{GEND} \\
\text{sing} \\
masc
\end{array}
\]

c. \textit{Kim:}

\[
\begin{array}{c}
\text{INDEX} \\
\text{PER} \\
\text{NUM} \\
\text{sing}
\end{array}
\]

Let us now summarize the ideas just presented. An NP has a parameter as

\textsuperscript{19} The idea that agreement features are not syntactic features, but rather features associated with NP indices, has been proposed independently in various forms in, inter alia, Lapointe 1980, Hoeksema 1983, Chierchia 1987, and Wunderlich 1988. Some syntactic, semantic, and pragmatic consequences of this hypothesis are discussed in Pollard & Sag 1991b.

\textsuperscript{20} The HPSG classification of empty categories differs in a number of respects from that assumed in GB theory. See Pollard & Sag 1991b for discussion.
its content. The lexical head of a phrase (the verb in a simple sentence) identifies the parameters of its complements with argument positions in its own content. The Semantics Principle ensures that (in the absence of adjuncts) the verb's content is identified with that of the sentence it heads. Hence, the content of the sentence *I love them* is as indicated in 41.

\[
\begin{align*}
\text{(41)} & & \raisebox{2em}{
\begin{array}{c}
\text{RELATION} \\
\text{LOVER} \\
\text{LOVED}
\end{array}
\begin{array}{l}
\text{INDEX} \\
\text{INDEX}
\end{array}
\begin{array}{l}
\text{PER 1st} \\
\text{PER 3rd}
\end{array}
\begin{array}{l}
\text{NUM sing} \\
\text{NUM plu}
\end{array}
\text{love}
\end{align*}
\]

A control verb or adjective associates the content of a VP or predicative complement with an argument position in its own content, as illustrated in 42 and 43.\(^{21}\)

\[
\begin{align*}
\text{(42) } & & \text{try:} & & \text{SUBCAT } \langle \text{NP:[1], VP[inf]:[2]} \rangle \\
\text{CONTENT} & & \text{RELATION try} \\
& & \text{COMMITTOR [1]} \\
& & \text{SOA-ARG [2]}
\end{align*}
\]

\[
\begin{align*}
\text{(43) } & & \text{persuade:} & & \text{SUBCAT } \langle \text{NP:[1], NP:[2], VP[inf]:[3]} \rangle \\
\text{CONTENT} & & \text{RELATION persuade} \\
& & \text{INFLUENCE [1]} \\
& & \text{INFLUENCED [2]} \\
& & \text{SOA-ARG [3]}
\end{align*}
\]

Because of lexical entries like 43, a sentence like *They persuaded me to leave* will have the structure illustrated in 44, whose content is given in 45.

\[
\begin{align*}
\text{(44)} & & \text{S:[4]} \\
& & \langle \text{NP:[1]} \rangle \\
& & \langle \text{NP:[2]} \rangle \\
& & \langle \text{NP:[5]} \rangle \\
\text{they} & & \text{V:[4]} & & \text{V:[4]} & & \text{V:[4]}
\end{align*}
\]

\[
\begin{align*}
\text{persuaded} & & \text{me} & & \text{to leave}
\end{align*}
\]

\[
\begin{align*}
\text{(45) } & & \text{RELATION persuade} \\
& & \text{INFLUENCE [1]} \\
& & \text{INFLUENCED [2]} \\
& & \text{SOA-ARG [3]}
\end{align*}
\]

\[
\begin{align*}
\text{RELATION leave} \\
\text{LEAVER [5]}
\end{align*}
\]

\(^{21}\) Here and throughout, 'A:B' abbreviates a category A whose semantic content is B. VP[INF] designates a VP whose head value includes the specification [VFORM inf]. Because VFORM is a head feature, a VP so specified will be headed by an infinitival form, i.e. by the defective auxiliary *to.*
The key points to see here are the following. First, the content of the VP in 44 fills the soa-arg role in 45, as required by the lexical entry for persuade in 43. Second, because the verb leave assigns its subject’s parameter to the leaver role, the parameter of the complement VP’s subcat value in 44 is the very same parameter that fills the leaver role in 45. Third, nothing we have said so far guarantees the correct assignment of controller in 45.

One more comment about relations is in order. Relations are grouped hierarchically in much the same way as parameters. Thus the classification of types of relations we appealed to informally in §2 is in fact the hierarchy of sorts given in simplified form in 46.

(46) Sortal hierarchy of relations:

This hierarchy of relations, which could be refined to include intermediate subsorts, or even a cross-cutting positive/negative classification of subsorts (corresponding to such distinctions as force versus prevent and love versus hate), is the basis for the determination of which relations take which roles. In addition, it plays a crucial role in the following formulation of control theory, which replaces the informal characterization given in §2.

(47) HPSG Control Theory (preliminary version):

Given a phrase X[SUBCAT (NP:[INDEX [6]]):[3]],

and a soa [4]
\[
\text{RELN } R \\
\text{SOA-ARG [3]} 
\]

A. if \( R \) is of sort influence, then [4][INFLUENCED [INDEX [6]]]
B. if \( R \) is of sort commitment, then [4][COMMITTER [INDEX [6]]]
C. if \( R \) is of sort orientation, then [4][EXPERIENCER [INDEX [6]]]

The following characteristics of 47 are noteworthy. First, the controlled element is identified as the content (parameter) of the subcat value of a given phrase, which is the HPSG embodiment of the notion ‘unexpressed subject’. Second, the control relation is treated as coindexing of parameters, rather than as parameter identity (the reason for this will become clear in the next section). And third, 47 is quite general. It applies not only to verbal complements, but whenever the content of a VP or predicative phrase is assigned a role in a soa whose relation engenders obligatory control. As we saw in §2, control theory must be formulated so that this consequence will emerge.

In virtue of 47, the content of the sentence They persuaded me to leave will
contain more information than was indicated in 45, namely the sharing of indices added in 48.

(48) \[
\begin{array}{c}
\text{RELATION} \ persuade \\
\text{INFLUENCE} \ [1] \\
\text{INFLUENCED} \ [2][\text{INDEX} \ [6]] \\
\end{array}
\]

\[
\begin{array}{c}
\text{SOA-ARG} \ [3] \\
\text{RELATION} \ leave \\
\text{LEAVER} \ [5][\text{INDEX} \ [6]] \\
\end{array}
\]

Note that, because agreement features are features of indices, it follows immediately from this analysis that a controller must agree with the unexpressed subject of a controlled complement, and also with anything that is coindexed with the latter. In addition, the coindexing guaranteed by our control theory interacts with the HPSG binding theory to explain contrasts like those in 49.

(49) a. They persuaded me to perjure myself/*ourselves/*himself.
b. He promised them to behave himself/*myself/*herself.
c. Do you want to absent yourself/*themselves/*himself?

By way of clarifying this point, we summarize briefly relevant aspects of the binding theory set forth in Pollard & Sag 1991a,b, where we argue that the c-command relation is not directly relevant for the correct formulation of Principle A (or for binding theory as a whole). To replace it, we introduce the relation we call \text{LOCAL O(BLIQUENESS)-COMMAND}, which figures directly in our version of Principle A. This relation, and the closely related local o-binding relation, are defined as in 50.\(^{22}\)

(50) **Definitions of Local O-command and Local O-Binding** (from Pollard & Sag 1991a):

A **locally o-commands** B just in case the content of A is a referential parameter and there is a \text{SUBCAT} list on which A precedes (i.e. is less oblique than) B.

A **locally o-binds** B just in case A and B are coindexed and A locally o-commands B. If B is not locally o-bound, then it is said to be **locally o-free**.

It is important to note that local o-commanders, and thus o-binders, must be referential (i.e. have referential parameters as their content). This matter is discussed in detail in Pollard & Sag 1991a, where Principle A is formulated as in 51.

(51) **Principle A:**

A locally o-commanded anaphor must be locally o-bound.

This principle guarantees that, whenever an anaphor is more oblique than one or more referential elements on a \text{SUBCAT} list, it must be coindexed with

\(^{22}\) Local o-command and local o-binding are special cases of more general relations called simply o-command and o-binding. Local o-command and local o-binding figure in the HPSG formulations of Principles A and B, while o-command and o-binding are involved in the formulation of Principle C.
one of them. But it imposes no stronger requirement on the coindexing of anaphors. Thus anaphors which lack a local o-commander are exempt from Principle A, though they are subject to other processing-based or discourse-based constraints.

Thus stated, Principle A has a number of important consequences. Most obviously, if the object of a simple transitive verb like hates is an anaphor, it must be coindexed with the subject, as in 52.23

(52) a. [\textsc{subcat}\ (NP:\ npro$_i$, \textsc{np:ana}$_i$)]
   b. Mary$_i$ hates herself$_i$.
   c. *Mary$_i$ thinks John$_i$ hates herself$_i$.

Similarly, since nonpredicative PPs have the same content as the prepositional object, the PP complement of a verb like depend must also be coindexed with the subject if the prepositional object is an anaphor:

(53) a. [\textsc{subcat}\ (NP:\ npro$_i$, \textsc{pp:ana}$_i$)]
   b. [Kim and Sandy]$_i$ depend [on each other]$_i$.
   c. *[Kim and Sandy]$_i$ think John$_i$ depends [on each other]$_i$.

And if a verb subcategorizes for both a primary object NP and a more oblique referential complement (either a secondary NP object or nonpredicative PP) and the latter is an anaphor—i.e. its content is an anaphoric parameter—then the anaphor must be coindexed with either the subject or the primary object, as shown in 54 and 55.

(54) a. [\textsc{subcat}\ (NP$_i$, \textsc{np}$_i$, \textsc{pp:ana}$_{ij}$)]
   b. Mary$_i$ explained Bill$_j$ to himself$_j$.
   c. Mary$_i$ explained Bill$_j$ to herself$_j$.
   d. *John$_k$ forgot that Mary$_i$ had explained Susan$_j$ to himself$_k$.

(55) a. [\textsc{subcat}\ (NP$_i$, \textsc{np}$_j$, \textsc{np:ana}$_{ij}$)]
   b. He$_i$ sold the slave$_j$ himself$_j$.
   c. He$_i$ sold the slave$_j$ himself$_j$.

The formulation of Principle A given in 51 is weaker than standardly assumed alternatives formulated in terms of c-command. This is by design; 51 correctly allows for all of the examples in 56, where the anaphors are exempt from Principle A.

(56) a. The agreement that [Iran and Iraq]$_i$ reached guaranteed each other$_i$‘s trading rights in the disputed waters until the year 2010.
   b. A fear of himself$_i$ is John$_i$‘s greatest problem. [Higgins 1973]
   c. The picture of himself$_i$ in the museum bothered John$_i$.
   d. The picture of herself$_i$ on the front page of the Times made Mary$_i$‘s claims seem somewhat ridiculous.
   e. The pictures of each other$_i$, with Ness made [Capone and Nitty]$_i$, somewhat nervous.
   f. The picture of herself$_i$ on the front page of the Times confirmed the allegations Mary$_i$ had been making over the years.

23 We use \textsc{xp:s}, as an abbreviation for an XP whose parameter is of sort $s$ and bears the index $i$. 
g. John's campaign requires that pictures of himself be placed all over town. [Lebeaux 1984:358, ex. 55b]

h. John's intentionally misleading testimony was sufficient to ensure that there would be pictures of himself all over the morning papers.

i. [Kim and Sandy], knew that Computational Ichthyology had rejected each other's papers.

j. They made sure that nothing would prevent each other's pictures from being put on sale. [Kuno 1987:95]

We can now see how binding theory and control theory interact to derive the agreement properties of English controlled complements. In an example like They persuaded me to behave myself, Principle A requires that the object reflexive on the SUBCAT list of behave be coindexed with (and hence agree with) the unexpressed subject (the initial SUBCAT member) of behave. The auxiliary to identifies its unexpressed subject with that of behave (it functions essentially as a raising verb). And control theory requires that the unexpressed subject of the to-phrase be coindexed with the INFLUENCED parameter (the parameter of me). Since coindexing entails agreement in our theory, it follows, essentially from the transitivity of equality, that the object reflexive agrees with the controller me. This mode of explanation, which makes no appeal to such stipulations as the Control Agreement Principle (Gazdar et al. 1985), extends to the full range of agreement phenomena in control constructions.

We now propose to modify the definition of local o-command as in 57. (The definitions of local o-binding and Principle A remain unchanged.)

(57) Definition of Local o-Command (revised):

A locally o-commands B just in case the content of A is a referential parameter and either

a. A precedes B on a SUBCAT list, or

b. A locally o-commands some C that subcategorizes for B.

This should be compared with the earlier definition given in 50. The difference is that now an unexpressed subject (the SUBCAT element) of a given nonsubject complement is by definition o-commanded by any other complement (subject or object) which is less oblique than the one in question and whose complement is a referential parameter. And by Principle A, if that unexpressed subject is an anaphor, then necessarily the unexpressed subject must be coindexed with—and therefore controlled by—some such o-commander, provided such exists.

In the sections that follow, we will illustrate how this minor modification of the definition of local o-command plays a role in our treatment of shifts of controller and Visser's Generalization.

Shifts of Controller?

4.1. Complement coercion. A long-standing problem in the analysis of control phenomena has been what appears to be a shift in controller assignment with certain sorts of embedded complements. The best-known examples of this phenomenon are to be allowed to complements of the sort illustrated in 58.
(58) a. Kim promised Sandy to be allowed to attend the party.
b. Dana asked Pat to be allowed to attend the party.

In 58a it is Sandy, the **commissary** of the promise, who is the controller of the unexpressed subject of the VP complement; in 58b the controller is Dana, the **influence** of the asking. These shifts in controller choice appear to violate the semantically based principles of controller assignment discussed in the previous sections.

It is sometimes thought\(^{24}\) that such controller shifts occur only when the VP complement is passivized. However, passivization is neither a necessary nor a sufficient condition for controller shift, as the following examples show.

(59) a. Kim promised Sandy to be hassled by the police.
b. Dana asked Pat to be hassled by the police.

(60) a. Grandma promised the children to be able to stay up for the late show.
b. Montana was promised (by the doctor) to be healthy by game time on Sunday.
c. Dana asked Pat to be able to attend the party.

In 59, the preferred controller of the unexpressed subject of the (infinitival) passive complement is the individual picked out by our semantic constraint on **commitment**-sort and **influence**-sort relations (even though the readings in question are pragmatically odd): the **committor** in 59a, the **influenced** in 59b. But in 60, we see the same shifts in controller assignment that we saw with the **be allowed to** examples. Thus the **commissary** is the controller in 60a,b (the **children** in 60a; **Montana** in 60b), even though **promise** is a relation of **commitment** sort. And **Dana** is the controller in 60c, though **ask** involves an **influence**-sort relation.

For many speakers, controller shift from subject to object is more acceptable when the matrix verb is passivized, as in 61.

(61) Sandy was promised to be allowed to attend the party.

But even examples like 58 and 60b are interpretable for such speakers, and judgments improve with proper contextualization (as noted in Farkas 1988). Hence, we will take it as our goal to provide an account of controller shift that applies equally well to active and passive matrix structures.

Controller shift is thus closely tied to the interpretation of the controlled complement, rather than to any syntactic property it may possess.\(^{25}\) Roughly speaking, controller shift takes place when the complement's content does not (quite) satisfy the semantic demands of the relation it is an argument of. In 61, for example, the relation of promising selects an action-type soa as its **soa-arg**, and the content of VPs like **to be allowed to X**, **to be able to X**, and so forth is a state, rather than an action. Controller shift involves a kind of 'accommodation' of interpretation, or **coercion**.\(^{26}\)

---

\(^{24}\) See, for example, the remarks made in passing in Jackendoff 1987.

\(^{25}\) This point is emphasized by both Růžička 1983 and Farkas 1988.

\(^{26}\) There is much research one can point to as identifying the need for some notion of coercion in the semantic analysis of natural languages. Partee’s recent work on polymorphic types (1987)
On our view, the shift of controller in these examples is only an apparent violation of the semantically based principles of controller assignment we have put forth. The interpretation of to be allowed to leave is coerced into roughly the interpretation 'to cause X to be allowed to leave', and it is the 'interpolated' causer that is identified with the appropriate participant of the embedding soa in accordance with our semantically based principles. Under this proposal, which bears a certain similarity to the analysis of try put forth in Perlmutter 1968, if Jones promises Smith to be allowed to go, the action that Jones promises to perform is an action that causes Smith to be allowed to go, and it is Jones himself who must perform this action. As Farkas (1988) points out (see also Perlmutter 1968, 1971, Kuno 1970, and Lasnik & Fieno 1974), a similar kind of coercion affects the interpretation of imperatives. If the VP of an imperative sentence is not sufficiently agentive, we make every effort to make it so. Thus in examples like 62 the interpretation is crudely characterizable as 'make yourself Φ', where Φ is the state expressed by the imperative VP.

(62) a. Be optimistic!
   b. Be careful!
   c. ?Be allowed to go!
   d. ???Be tall!

As such examples show, VPs are graded as to how easily they allow such causative coercion.

Like the imperative construction, commitment-sort relations select for complements that denote actions intentionally performed by an agent—to promise

may be viewed as an attempt to construct a theory of certain types of coercion, though these are somewhat different from the cases that are relevant in the present context. In addition, the interpretation of 'concealed' questions (Baker 1968, Grimshaw 1977, 1979) involves coercion of NP interpretations to interrogative interpretations, as in I asked his phone number. Equally systematic is the coercion found in the interpretation of the objects of locative prepositions (Herskovitz 1986), e.g. The nail is in the bowl. The situation described by this sentence might be a nail resting in the interior of a bowl, or a nail hammered into the side of a bowl. In the first case, the space that the bowl designates corresponds to the concavity bounded by the interior of the bowl; in the second situation, it is the region occupied by the bowl. Here again, we can view the problem in terms of adjusting the interpretation of bowl (posing mappings from physical objects to three-dimensional spaces that are contextually associated with them) or in terms of manipulating the interpretation of the preposition (e.g. letting the interpretation of in 'float' among a family of contextually determined containment relations). Other prepositions have similar effects, as much research work has revealed (see Brugmann 1981, Lindner 1981, and Lakoff 1987). These studies, in fact, suggest that interpretation is far more fluid than our discussion would imply. If this body of research is on the right track, then argument coercion of the sort employed here is just the limiting case of a highly fluid interpretation process that involves metaphors and 'radial' categories connecting core concepts in diverse and potentially complex ways. Such a conclusion would not alter in fundamental ways the nature of our proposal for complement coercion. For our present purposes, it is sufficient to establish the existence of semantic coercion, which will play a central role in our analysis of controller shifts.

27 The notion of action that we appeal to is admittedly a slippery one, and may ultimately be explicated in terms of the notion 'degree of agency', 'self-controllability', or 'responsibility'. See Fillmore 1967, Fodor 1974, Steele et al. 1981, Comrie 1984, and Farkas 1988 for some relevant discussion.
to \( \Phi \) is to commit to doing \( \Phi \). Many VP complements denote actions, but others, e.g. to be tall, to resemble Kim, and to be allowed to go, do not. When such semantically mismatched VPs appear as the complements of verbs whose relation is of commitment or influence sort, they are also made to fit semantically through causative coercion, as illustrated in 63.

(63) a. They promised us to be on time.
b. We promised to have the right change.
c. ?He promised to be allowed to attend the party.

The complements in 63, taken in isolation, describe nonintentional states—states where no intentional action is implied. But in contexts like 63, these complements must be interpreted as actions. A promise by X to \( \Phi \), where \( \Phi \) would otherwise describe a (nonintentional) state, is a promise by X to act in such a way as to cause \( \Phi \) to hold of X.

Interpolated causation is familiar in many languages as a common way of establishing cohesion of a discourse, as in The evidence was revealed (and) Jones resigned \((S_1 \text{ caused } S_2)\) and Jones resigned; the evidence was revealed. \((S_2 \text{ caused } S_1)\). Of course some things are difficult to cause, given the way the world is. Hence the causative coercion analysis provides a natural account of the difficulty people have in interpreting examples like the following.

(64) a. ?Sandy promised Kim to be tall.
b. ?Pat promised them to resemble Kim.

The difficulty one experiences in interpreting examples like these is precisely the difficulty of imagining circumstances wherein one can cause someone's height to change or someone's appearance to be altered in controllable ways. Speakers differ a great deal in how easily they can imagine such circumstances or with regard to which particular circumstances they instantiate to relate the state and the causal action.\(^{28}\) Ex. 64a might be interpreted as a promise to stand erect so as to appear tall or to eat certain foods believed to stimulate growth. The promise in 64b might be taken to involve undergoing plastic surgery or applying makeup to alter one's appearance. These are some of the more plausible scenarios that would count as ways of causing the state in question to come about. The assumption of causative coercion is a useful step, though admittedly just a first step, in making sense of interpretational observations such as these.

Causative coercion is also required in the case of verbs whose relation is of influence-sort, but not for orientation-sort relations.

(65) a. We persuaded Sandy to be on time.
b. We persuaded Sandy to be tall.

(66) a. Sandy wanted to be tall.
b. Sandy's desire to be tall

In 65 we see the same causative coercion as with promise. Persuade to involves persuading to act, and if the complement describes a state, a causation of that state is interpolated, with more or less difficulty and a certain amount of varia-

\(^{28}\) See the discussion in Fodor (1974:103).
tion across speakers. Ex. 65b, for example, can only be interpreted in terms of Sandy being persuaded to act in such a way as to cause it to come about that (s)he be, or appear, tall. Wanting (and similarly for other volitionals, e.g. hating), however, does not require its embedded property to be an action, and no adjustment of interpretation is observed in examples like 66.

Causative coercion is particularly robust in the case of to be allowed to complements of promise, as in 67.

(67) a. Jim promised Mary to be allowed to attend the reception.
b. ?Jim promised Mary to be allowed to defend himself.

In 67a, the complement undergoes causative coercion; its interpretation is roughly paraphrasable as ‘to cause X to be allowed to attend the reception’. This is, in effect, the only way of reconciling the interpretation of the non-agentive VP complement with the demands of promising. And the parameter of the interpolated causal agent must be Jim, the comitter of the promise, by what appears to be our familiar semantic control constraint. The preferred ‘causee’ (i.e. the individual who is caused to be allowed to attend the reception) is Mary. However, it is also possible to interpret ex. 67a in terms of a situation where Jim promises Mary that he (Jim) will cause it to come about that he (Jim) be allowed to attend the party. Such circumstances, where X promises to cause Y to allow X to do something, are hard to imagine, precisely because they simultaneously involve X having power over Y (in order for X to cause Y to do anything) and Y having power over X (in order for Y to allow X to do anything). The complexity of such circumstances makes 67b, where this is the only option available, more difficult to assign any interpretation to at all. Nonetheless, it seems prudent to conclude that the parameter of the unexpressed subject of be allowed to Φ may in principle be associated with either the committer or the comissée of the promise.

The claim that the be allowed to complements of promise are causative in nature perhaps requires some justification. It has been claimed (by Bresnan 1982, for example) that, when promise takes such complements, it takes its promise, that sense, i.e. the sense of promise that occurs with that clauses, whose semantics is propositional in nature. The promise, that sense does not convey a commitment to act, but rather merely a prediction about future events, as in I promise you that it will rain.

If this observation were true, it would of course itself require explanation, for the promise, to → promise, that coercion (unlike the causative coercion we have illustrated in other contexts) lacks independent justification. But, in fact, there is evidence against the promise, that analysis of the be allowed to type of complement. The two senses of promise are difficult to tease apart, largely because, when one promises that Φ, one in general suggests that one will in fact do something to cause Φ to come about, as in 68.

(68) I promise that you will get the job.

But this example only suggests that the speaker will act so as to enable the addressee to get the job in question. This cannot be part of the linguistic meaning of promise, for the promise, that relation can perfectly well be predicated of an inanimate argument that is incapable of performing actions, as in 69.
(69) The fortune cookie promised Montana that he would play in the Super Bowl.

If the be allowed to type of complement required the promise that sense of promise, then we would expect that an example like 70 would make sense, the same sense that 69 makes.

(70) #The fortune cookie promised Montana to be allowed to play in the Super Bowl.

Ex. 70, however, is nonsensical. If an interpretation is forced, it could only be one where the fortune cookie somehow caused itself or Montana to be allowed to play in the Super Bowl. Observations such as these argue that the causative coercion analysis we have proposed is superior to an analysis that involves an ad-hoc promise to → promise that coercion.

Finally, we observe that similar coercion affects the be allowed to complements of verbs whose relation is of influence sort:

(71) Susie persuaded the teacher to be allowed to leave early.

(72) a. Jim asked Mary to be allowed to get himself a new dog.
    b. Jim asked Mary to be allowed to get herself a new dog.

Ex. 72a is interpreted roughly as Jim asked Mary to cause him (Jim) to be allowed to get himself a new dog. And the complement in 72b (which is considerably harder to interpret) is coerced to roughly Jim asked Mary to cause herself (Mary) to be allowed to get herself a new dog. In both cases, it is the interpolated causer that is identified with the influenced argument of the embedding soa, in keeping with our semantic constraint. In the more natural 72a, the influence of the asking soa (Jim) is identified with the unexpressed subject of be allowed. In the less natural 72b, the unexpressed subject is identified with the goal of the asking soa (Mary). The preferred interpretation for sentences whose semantics is of commitment or influence sort appears to involve identifying the parameter of the unexpressed subject of the be allowed to complement with the participant of the matrix soa that is not the controller of the interpolated causer.

In sum, the semantic control constraints discussed in previous sections are still at work with be allowed to complements, but they identify the interpolated causer with the semantically determined controller. This raises a paradox vis-à-vis our theory of control. How can the interpolated causer be the controlled element if it is not the parameter of the subject of the be allowed to complement? This question arises precisely because the control constraints we have stated identify the controlled element as the parameter associated with the unexpressed subject (subcat value) of the complement. Exxs. 73–74 illustrate the problem at hand.29

Given that the parameter [1] is the parameter of the complement VP’s unexpressed subject, our controller assignment principles, as stated, incorrectly

29 We assume here that the interpolated cause relation (notated ‘i-cause’) is of influence sort. That is, perhaps unlike the English verb cause, this relation is always specified for the attribute influenced.
require that the parameters [1] and [5] should be coindexed. The correct result should be that the parameter of the i-causer ([6]) is coindexed with the parameter of the promisor ([5]).

Suppose now that coercion were to function in such a way that the interpolated i-causer became the parameter of the VP's subject, apparently providing a solution to this problem. The question that would then arise is why the original subject of be allowed to X (the parameter assigned the influenced role of the allow relation) must be coindexed with either the subject or the object in examples like 67 and 73. This problem also manifests itself in the the ungrammaticality of examples like 75.

(75) *Betsy\textsubscript{i} knew that John\textsubscript{j} was promised to be allowed to speak for herself.

The resolution of this paradox, we will suggest, lies in revising our controller assignment principles so that they make reference not to the notion 'subject', but to an ancillary notion that (in English) identifies the subject argument quite generally. In the next section, we discuss crosslinguistic evidence for such a notion.

4.2. Subject and external argument. Crosslinguistically, the matter of how the controlled element is identified is quite interesting. First, in many languages the controlled element may be an overt pronominal. This is true at least for Serbo-Croatian (Zec 1987), Japanese (Kuno 1976, Iida 1991), and Halkomelem Salish (Gerdt, personal communication, 1988).\textsuperscript{30} Thus the notion 'unexpressed subject' is inadequate as a universal characterization of the controlled element in control constructions.

Second, the controlled element in Philippine languages cannot be identified

---

\textsuperscript{30} For discussion of control into subjunctive clauses, see also Farkas 1984, 1985 (Romanian), Suñer 1984 (Spanish), and Hashemipour 1988 (Persian).
in terms of the notion ‘subject’. These languages exhibit a rich system of ‘voice’, in consequence of which the verb registers the semantic role of the absolutive argument, as illustrated in the following Tagalog examples (adapted from Foley & Van Valin 1984:135 and Kroeger 1990).\(^{31}\)

(76) a. \(B\text{-um-ili} \ ang = \text{larake} \ ng = \text{isda} \ sa = \text{tindahan}.\)
\(\text{AV-buy} \ \text{ABS} = \text{man} \ \text{GEN} = \text{fish} \ \text{DAT} = \text{store}\)
‘The man bought fish at the store.’

b. \(B\text{-in-ili-Ø} \ \text{ng} = \text{larake} \ ang = \text{isda} \ sa = \text{tindahan}.\)
\(\text{PERF-buy-OV} \ \text{GEN} = \text{man} \ \text{ABS} = \text{fish} \ \text{DAT} = \text{store}\)
‘The man bought the fish at the store.’

c. \(B\text{-in-ilh-an} \ \text{ng} = \text{larake} \ \text{ng} = \text{isda} \ \text{ang} = \text{tindahan}.\)
\(\text{PERF-buy-LV} \ \text{GEN} = \text{man} \ \text{GEN} = \text{fish} \ \text{ABS} = \text{store}\)
‘The man bought fish at the store.’

d. \(I\text{-p-in-an-bili} \ \text{ng} = \text{larake} \ \text{ng} = \text{isda} \ \text{ang} = \text{pera}.\)
\(\text{IV-PERF-buy} \ \text{GEN} = \text{man} \ \text{GEN} = \text{fish} \ \text{ABS} = \text{money}\)
‘The man bought fish with the money.’

e. \(I\text{-b-in-ili} \ \text{ng} = \text{larake} \ \text{ng} = \text{isda} \ \text{ang} = \text{bata}.\)
\(\text{BV-PERF-buy} \ \text{GEN} = \text{man} \ \text{GEN} = \text{fish} \ \text{ABS} = \text{child}\)
‘The man bought fish for the child.’

Although the entire issue of subjecthood in Philippine languages has been the subject of considerable controversy,\(^{32}\) Kroeger 1990 argues at length that the absolutive argument in Tagalog should be treated as a (surface) subject, rather than a topic, as has frequently been suggested. Kroeger establishes this point on the basis of such issues as ‘floated’ quantifiers, relativization, ‘raising’, and the (near) obligatory presence of an absolutive argument within a clause.

Philippine languages pose a dilemma for control theory. On the most natural and productive pattern, the controlled element is not the subject of the controlled complement, but rather the \textit{actor}. This is illustrated in 77 (see Schacher 1976, 1977) and 78 (see Dell 1981:17).

(77) a. \(Nag\text{-atubili} \ \text{siya} = \text{ng} \ \text{hiram-in} \ \text{ang} = \text{pera} \ \text{sa} = \text{bangko}.\)
\(\text{AV-hesitate he = COMP borrow-OV} \ \text{ABS} = \text{money} \ \text{DAT} = \text{bank}\)
‘He hesitated to borrow the money from the/a bank.’

b. \(Nag\text{-atubili} \ \text{siya} = \text{ng} \ \text{hiram-an} \ \text{ng} = \text{pera} \ \text{ang} = \text{bangko}.\)
\(\text{AV-hesitate he = COMP borrow-LV} \ \text{GEN} = \text{money} \ \text{ABS} = \text{bank}\)
‘He hesitated to borrow money from the bank.’

c. \(Nag\text{-atubili} \ \text{siya} = \text{ng} \ \text{um-iram} \ \text{ng} = \text{pera} \ \text{sa} = \text{bangko}.\)
\(\text{AV-hesitate he = COMP AV-borrow} \ \text{GEN} = \text{money} \ \text{DAT} = \text{bank}\)
‘He hesitated to borrow money from the/a bank.’

\(^{31}\) The unusual abbreviations used here are: \textit{AV} for Active Voice (indicating that the actor is the absolutive argument), \textit{OV} for Objective Voice, \textit{LV} for Locative Voice, \textit{IV} for Instrumental Voice, and \textit{BV} for Benefactive Voice. Here and throughout, ‘\text{-Ø}’ designates a simple morpheme boundary, as opposed to ‘\text{=}’, which designates the boundary between a clitic and its host. Note that \text{\textit{-um}} and \text{\textit{-in-}} are infixes in Tagalog, glossed as ‘\textit{AV}’ and ‘\textit{PERF}’, respectively.

\(^{32}\) See Schacher 1976, 1977 for some discussion.
(78) a. um-iwas ako = ng t-um-ingen kay = Lorna.
   AV-avoid I(ABS) = COMP AV-look.at DAT = Lorna
b. um-iwas ako = ng tingi-an si = Lorna.
   AV-avoid I(ABS) = COMP look.at-LV ABS = Lorna
c. in-iwas-an ko = ng t-um-ingen kay = Lorna.
   PERF-avoid-LV I(GEN) = COMP AV-look.at DAT = Lorna

   ‘I avoided looking at Lorna.’

Note that in these examples the voice of the verb heading the complement is irrelevant to the choice of controlled element. The controlled element (the unexpressed dependent of the controlled complement) is always the ACTOR, whether that ACTOR happens to function as the complement’s subject (absolutive dependent) or not.

How then can we reconcile the apparent universality of semantically based controller assignment with the crosslinguistic variation in selection of the controlled element? To answer this question, we will adapt a construct introduced in Williams 1980: EXTERNAL ARGUMENT. The external argument in our theory is not an element that is external to some substructure of semantic content or ‘logical form’. Rather, we treat external argument (EXT-ARG) as a feature of content that picks out a particular role argument of a given soa as distinguished with respect to external relations such as control. Following Williams, we will assume that in English the EXT-ARG is in general identified with the subject, i.e. that a general principle applying to (at least nonfinite) verbs and predicative expressions guarantees the parameter sharing illustrated in 79.

(79) attend

\[
\text{SUBCAT (NP-[1], NP-[2])}
\]

\[
\text{CONTENT}
\]

\[
\text{RELATION} \text{ attend}
\]

\[
\text{EXT-ARG} \text{ [1]}
\]

\[
\text{ATTENDER} \text{ [1]}
\]

\[
\text{ATTENDEE} \text{ [2]}
\]

The controlled element can now be universally identified as the EXT-ARG of the complement’s content. Since the value of EXT-ARG in English is in general the subject’s parameter, the controlled element in English will in general be (modulo coercion, which we return to directly) the parameter of the complement’s subject. In Tagalog, however, the EXT-ARG value is not the subject’s parameter, but rather that of the ACTOR. Thus the differing control patterns in English and Tagalog are a consequence of differing constraints on the realization of external arguments.\(^33\)

\(^33\) It is tempting to think that the actor-based selection of the controlled element in Philippine languages has a purely semantic basis, dictated by the semantic nature of influence-sort and commitment-sort relations. However, essentially the same constraints hold for complements of verbs whose relations are of the orientation-sort, which impose no requirement that their arguments be actions or agentive soas (See Kroeger 1990, 1991 for further discussion). Thus in these languages (as well as in English) there is a certain conventionality to the determination of the controlled element that cannot be reduced to purely semantic factors.
One final assumption that remains to be introduced before we present our account of coerced complements can be regarded as our analog of the assumption within GB theory that the controlled element (viz., PRO) is an anaphor.\textsuperscript{34} We can express this as a condition of sortal appropriateness on the SOA-ARG of the relevant kinds of relations, as in 80.

(80) Principle of External Argument Reflexivity (PEAR):

The EXT-ARG within the SOA-ARG of a commitment, influence, or orientation-sort relation is of sort refl).

This constraint is particular to English and many other languages with similar control properties, but not, say, to those languages where the controlled element is an overt pronominal. Some possible motivation for PEAR that is independent of complement coercion will be considered in §5, where we take up the matter of controller realization.\textsuperscript{35}

4.3. Control theory and coerced complements. The proposals made in the previous section lead to the following revision of control theory for languages with English-like control:

(81) HPSG control theory (revised):

\[
\text{RELATION R} \\
\text{Given a soa: } \text{SOA-ARG [EXT-ARG refl[INDEX [1]]]} \\
\text{if R is of sort influence, commitment, or orientation, then the value of the INFLUENCED, COMMITTOR, or EXPERIENCER role respectively is [INDEX [1]].}
\]

This revised formulation ensures the correct coindexing of unexpressed subjects. As in our earlier formulation, such covert reflexives are subject to control theory no matter how they arise: within the complements of verbs or nouns, in remote control, or in semantically restricted constructions (e.g. How's about X).

The revised control theory in 81 also provides the basis for a solution to the dilemma raised at the end of §4.1 regarding the analysis of be allowed to complements. Coercion may be formulated as a lexical process that maps certain state-denoting expressions into causative expressions, as sketched in 82.\textsuperscript{36}

\textsuperscript{34} See also the earlier treatments by Helke 1971 and Fodor 1975, who treat equi constructions in terms of a rule deleting for self.

\textsuperscript{35} We assume further that a number of verbs are to be analyzed in terms of multiple relations. Thus want involves an orientation-sort relation (and hence is subject to 80) only when it co-occurs with a VP complement. Similarly, sentences like (i) and (ii) do not involve influence-sort relations.

(i) Jean forced there to be quiet in the room.
(ii) Sandy caused it to be silent in the room.

\textsuperscript{36} Note that the i-cause relation, unlike the majority of influence-sort relations, does not require its SOA-ARG to be an action. As formulated, this rule is not sufficiently restricted—clearly, not every state-denoting expression can be coerced freely into a causative interpretation. In addition, the analysis, as presented here, does not yet reflect the fact that causative coercion (in fact, coercion in general) occurs only when incompatibility of interpretation would result (e.g. Kim is happy obviously has no interpretation analogous to "Someone caused Kim to be happy"). It is beyond the scope of this paper to develop a refinement of our basic coercion analysis that takes all such restrictions into account.
(82) Coercion Lexical Rule:

\[
\begin{array}{c}
\text{CONTENT} \quad \text{state}[1] \rightarrow \\
\begin{array}{c}
\text{RELATION} \quad \text{i-cause} \\
\text{EXT-ARG} \quad [2] \\
\text{INFLUENCE} \quad [2] \\
\text{INFLUENCED} \quad [3] \\
\text{SOA-ARG} \quad [1]
\end{array}
\end{array}
\]

Since 82 (like all lexical rules in HPSG) preserves all properties of the input not mentioned in the rule, it will apply to a state-denoting passive form like allowed, as illustrated in 83–84.

(83) allowed

\[
\begin{array}{c}
\text{SUBCAT} \langle \text{NP}: [1], \text{VP} [\text{SUBCAT} \langle \text{NP} \rangle]: [3] (\text{PP} \langle \text{by} \rangle : [2]) \rangle \\
\begin{array}{c}
\text{RELATION} \quad \text{allow} \\
\text{EXT-ARG} \quad [1] \\
\text{INFLUENCE} \quad [2] \\
\text{INFLUENCED} \quad [3] \\
\text{SOA-ARG} \quad [3]
\end{array}
\end{array}
\]

(84) allowed (coerced)

\[
\begin{array}{c}
\text{SUBCAT} \langle \text{NP}: [1], \text{VP} [\text{SUBCAT} \langle \text{NP} \rangle]: [3] (\text{PP} \langle \text{by} \rangle : [2]) \rangle \\
\begin{array}{c}
\text{RELATION} \quad \text{i-cause} \\
\text{EXT-ARG} \quad [4] \\
\text{INFLUENCE} \quad [4] \\
\text{INFLUENCED} \quad [5][\text{INDEX} [6]]
\end{array}
\end{array}
\]

\[
\begin{array}{c}
\text{RELATION} \quad \text{allow} \\
\text{EXT-ARG} \quad \text{refl}[1][\text{INDEX} [6]] \\
\text{INFLUENCE} \quad [2] \\
\text{INFLUENCED} \quad [1] \\
\text{SOA-ARG} \quad [3]
\end{array}
\]

Notice that because i-cause itself is an influence-sort relation the EXT-ARG of its SOA-ARG argument has a reflexive parameter (as guaranteed by PEAR) that is coindexed with the INFLUENCED parameter (as guaranteed by control theory), as indicated in 84.

Now consider the result, shown in 85, of embedding the coerced interpretation of to be allowed to go\(^{37}\) as the VP complement of the passivized form of promise. Our revised control theory now correctly guarantees that the EXT-ARG of the SOA-ARG of promise ([4]) is coindexed with the COMMITTOR of promise, even though that external argument is not the parameter of any unexpressed subject. In addition, [1], which is the parameter of the unexpressed subject of the VP complement in 85 (required by PEAR to be reflexive), is now subject

\(^{37}\) This is identical to the coerced interpretation of allowed to go. For discussion, see Pollard & Sag (1991b:ch. 3).
(85) *promised to be allowed to go

\[
\text{SUBCAT} (\text{NP}:[7], \text{VP}[\text{SUBCAT} (\text{NP}:[1]):[3] (. \text{PP}[by]:[8]))}
\]

\[
\text{CONTENT}
\]

\[
\text{RELATION} \quad \text{promise}
\]

\[
\text{EXT-ARG} \quad [7]
\]

\[
\text{COMMITTOR} \quad [8][\text{INDEX} [9]]
\]

\[
\text{COMMISSER} \quad [7][\text{INDEX} [6]]
\]

\[
\text{RELATION} \quad \text{i-cause}
\]

\[
\text{EXT-ARG} \quad \text{refl}[4][\text{INDEX} [9]]
\]

\[
\text{INFLUENCE} \quad [4]
\]

\[
\text{INFLUENCED} \quad [5][\text{INDEX} [6]]
\]

\[
\text{SOA-ARG}
\]

\[
\text{RELATION} \quad \text{allow}
\]

\[
\text{EXT-ARG} \quad \text{refl}[1][\text{INDEX} [6]]
\]

\[
\text{INFLUENCE} \quad [2]
\]

\[
\text{INFLUENCED} \quad [1]
\]

\[
\text{SOA-ARG} \quad [3]
\]

to Principle A of the binding theory. But the only local o-commander of [1] is [7], the parameter of the subject of *promised. It thus follows from the interaction of control theory and binding theory that the parameters [7] and [1] are also coindexed, as indicated in 85.

This analysis of coerced complements thus exploits the separation of external argument and subject\(^{38}\) as well as the interaction of control theory and binding theory to derive not only the correct interpretations for these problematic examples, but also an explanation for why our earlier example of extra-clausal control is impossible:

(86) *Betsy\textsuperscript{i}, knew that John\textsuperscript{j} was promised to be allowed to speak for herself\textsuperscript{j}.

In 86, the unexpressed subject of the *be allowed to complement must be coindexed with *John, in accordance with Principle A. Similarly, we now have an account for the problem (raised in §4.1) of why there are in principle two interpretations for examples like 87.

(87) Jim promised Mary to be allowed to attend the reception.

The active form of *promise has a SUBCAT list containing two local o-commanders of the unexpressed subject of *be allowed to attend the reception. Hence, though control theory guarantees that this example will be grammatical only if the interpolated i-causer is coindexed with *Jim, Principle A guarantees that the unexpressed subject of the complement (the INFLUENCED argument of allow) will be coindexed with either *Jim or *Mary. As noted in §4.1, the latter interpretation will be preferred for purely pragmatic reasons.

\(^{38}\) Conversely, there is a second pattern of control in Tagalog that arises when the complement is in the ‘nonvolitional’ mood. This pattern of control, where the controlled element is the subject, rather than the actor, may be treated as a reassignment of external argument from actor to subject. For an analysis of these cases, as well as a third pattern of control best treated as ‘raising’, see Kroeger 1990, 1991.
5. The control theory formulated at the beginning of §4.3 correctly identifies in semantic terms the controller of the unexpressed subject of a VP (or other predicative) complement, but it imposes no constraint on how the controller is realized, or whether it must be realized at all. However, there is evidence that some further principle is at work. For example, there are no verbs in English that exhibit the behavior of foobar in the following example.

(88) Mary suspected that John would foobar Bill to behave herself. And only a handful of verbs, such as signal, say, and shout (see below), allow what appears to be control from higher clauses or from the prior discourse context:

(89) a. Mary realized that John had signaled to position herself near the door.
   b. Mary was on the alert. John had signaled to position herself behind the door.

In the vast majority of cases, when a verb allows a VP (or predicative) complement, the controller of the unexpressed subject of that complement is realized as one of the verb’s complements. 39 In this section we would like to consider the tenability of the following hypothesis concerning controller realization:

(90) In all cases of verbs whose semantics involves relations of commitment, influence, or orientation sort, the controller, if expressed, must be less oblique (in roughly the traditional sense of the term) than the controlled complement.

We will explore the possibility of deriving this hypothesis, to the extent that it is true, from the theory of binding.

The matter of controller realization is less clear with gerund complements. As the following examples illustrate, the controller of the unexpressed subject of a gerund complement need not be an overtly expressed less oblique dependent of the verb, as in 91a–b.

(91) a. Kim discussed perjuring themselves with Sandy.
   b. Mary thought John might be willing to discuss getting herself a new car.

39 We use this term to include the subject.

40 Gerund complements of verbs whose relations are of commitment sort sometimes appear to be subject to our principles of controller assignment, for example in cases like (i) and (ii):
   (i) Kim tried tying his shoes.
   (ii) I will now undertake juggling three balls with my hands tied.

However, counterexamples such as the following can be constructed:

(iii) Mary has been working regularly with that disabled boy to help him improve his motor skills. For the past few weeks she's had him playing catch with a beachball and putting his own pants on, and next week she's planning to try tying his shoes.
Cross-discourse control of unexpressed gerund subjects is also possible, though examples like the following vary somewhat in acceptability across speakers.

(92) Mary was in quite a quandary—should she get herself arrested, or not? John would find getting herself arrested quite objectionable, but Bill would think it was the only thing to do.

In fact verbal gerunds need not be controlled at all:

(93) Kim and Sandy consider stuffing oneself with nachos to be offensive. Though we assume that gerunds in examples like these are to be analyzed semantically in much the same way as infinitivals, the principles of controller assignment we have articulated do not affect relations like considering, discussing, or finding, and hence there is no obligatory control in these examples.40

In the discussion that follows, however, we will confine our attention to other types of VP and predicative complements.

5.1. Manzini’s Generalization. Various researchers have tried to understand the constraints on controller realization. Manzini (1983:423) offers the generalization in 94.

(94) Manzini’s Generalization:
‘Object’ VP complements with unexpressed subjects must have a controller within the minimal clause that contains that complement.

This conclusion is based on examples like those in 95, where in each case there is such a controller, and those in 96, where either there is no appropriate controller anywhere within the sentence, or else the appropriate controller is not in the minimal clause containing the complement.

(95) a. John asked Bill to shave himself.
b. John asked Bill to be allowed to shave himself.
c. John promised Bill to shave himself.
d. John promised Bill to be allowed to shave himself.

(96) a. *John asked Bill to shave oneself.
b. *John promised Bill to shave oneself.
c. *Mary said that John asked Bill to behave herself.
d. *Mary said that John promised Bill to behave herself.

In a similar vein, Bach (1979) has suggested that, when the direct object of a verb is a controller, the verb can never undergo detransitivization, as shown by the contrast between 97 and 98.

(97) a. Kim promised Sandy to leave.
b. Kim promised to leave.
(98) a. Kim persuaded Sandy to leave.
b. *Kim persuaded to leave.

Bach’s Generalization can thus be seen as a subcase of Manzini’s, as long as some other constraint prevents the subjects in 98 from being controllers.

We will now consider three potential problems facing Manzini’s Generalization. First, there is the verb help, which, as noted in Mohanan 1983 and Chierchia 1984 (see also Comrie 1984), appears to be a counterexample to Manzini’s Generalization (and also to Bach’s, if we assume that the help in
question is derived from object-controlled *help* via detransitivization):

(99) René helped (to) trim the sail.

Second, there are examples like 100b, which, as noted by Bresnan (1982:373), appear to contradict Bach’s Generalization.

(100) a. Pat signaled Lou to leave.
    b. Pat signaled to leave.

Here it is the unexpressed primary (direct) object (or perhaps an unexpressed *to*-phrase) that controls the unexpressed subject of the VP complement. The complement thus has no controller within the minimal clause that contains it, contra Manzini. And, if 100b involves an unexpressed object, detransitivization has applied to eliminate a controller, contra Bach.

A third class of cases to be considered concerns ‘extraposed’ VPs (based on examples by Manzini 1983:426):

(101) a. It would help Bill to behave himself in public.
    b. It would help Bill’s development to behave himself in public.
    c. Mary knows that it would help Bill to behave herself in public.
    d. It reflects well on the whole corps to conduct oneself honorably in public.

In these examples as well, the controller need not be expressed as a dependent of the verb. In fact, the controller of the unexpressed subject of an extraposed VP may also be an individual evoked by the prior discourse context, as in 102.

(102) Mary was in a quandary. It would suffice to find herself a new secretary, but the real solution was an entirely new office staff.

In order to save Manzini’s Generalization in the face of examples like 99, one might suggest (as Manzini does) that *help* allows a phonetically null pronominal object to function as controller. On such an account, 99 is analogous in structure to 103.41

(103) René helped them (to) trim the sail.

However, this explanation is empirically untenable, as the examples in 104 show.

(104) a. John helped the barbers (to) shave him.
    b. *John helped to shave him.
    c. John helped to shave them.

If Manzini’s account were right, then we should expect 104b to be grammatical by analogy with the well-formed 104a and 104c; but this expectation is not borne out.

A more plausible explanation for these facts, we think, is that the *help* of

41 The *help* in this example, which means roughly ‘to be a participant in’, has to be distinguished from the homophonous *help* of (i), which means ‘assist’:

(i) Professor Jones knew Sandy had helped *(him)* get tenure.

The *help* of assistance requires an overt object, and behaves in all respects like an ordinary object-controlled verb whose relation is of the *influence* sort; for instance, in (i) it is Professor Jones that gets tenure.
103 and 104a is the (transitive and object-controlled) help of assistance, a typical influence-sort verb, while the help of participation instantiated in 99 and 104c is simply intransitive and therefore not object-controlled. In fact, perhaps surprisingly, neither is the help of participation subject-controlled. For if it were, then we should expect 105a to be grammatical and 105b to have a reading where it is John that gets tenure:

(105) a. ??The barbers were grateful that John, had helped to shave himself.
    b. #John helped to get tenure.

But 105a is unexpectedly bad (for many, though not all, native speakers of English), and the intended interpretation of 105b is in fact unavailable; rather, if 105b has any interpretation at all, it is only the pragmatically bizarre one wherein John is a member of a collective entity which jointly gets tenure (cf. John helped to get the grant). We conclude therefore that participatory help does not involve an influence-sort relation, and is not subject to the control theory proposed in the previous section. Moreover, it constitutes a genuine counterexample to Manzini’s Generalization.

The control properties of verbs like signal are also interesting. When an object or to-phrase is present, as in 106, that phrase may function as controller.

(106) a. The captain signaled (to) Kim, to position herself, behind the door.
    b. Kim shouted to the captain, to free himself, from the ropes.

Here, signal and shout might appear at first blush to be functioning as verbs of influence sort, with controller assignment in accordance with the principles outlined earlier. This possibility is also preserved in examples like 107 where the verbs all seem to have an influence-sort interpretation.

(107) a. Detective Jones, knew the captain had signaled to position himself, under the table.
    b. Bill, knew she had said to behave himself.

Thus, in order to preserve Manzini’s Generalization, we must assume that these examples contain a phonetically unrealized object that functions essentially as a pronominal.

However, this is not the only possibility for verbs like signal, as the following examples show:

(108) a. The car signaled to turn left.

These examples are ambiguous. They allow the unexpressed object interpretation just discussed (the car in 108a could be a stopped police car signaling an oncoming motorist to make a detour; Col. Jones could be signaling a pilot to land). But the more natural interpretations involve the car in 108a signaling that it will make a left turn and Col. Jones signaling (perhaps to the control tower) that he will land; these readings would appear to be instances of simple subject control. Indeed, the same ambiguity persists even in the presence of an overt object, as 109 and 110 show.
(109) a. The parked police car signaled (to) the oncoming motorist to turn
    left.
    b. The speeding car signaled (to) the startled pedestrian to turn left.

(110) a. Col. Jones signaled (to) the pilot to land.
    b. Col. Jones signaled (to) the control tower to land.

And readings (with or without an overt object) are even available where control is ‘split’ between the signaler (subject) and the (perhaps unrealized) signalee:

(111) Col. Jones signaled to Capt. Rogers to synchronize watches.

Can the cases involving *signal* where no overt object controller is present be accounted for in terms of a null pronominal object, along the lines proposed by Manzini for *help*? Although the facts are not inconsistent with such an account, it lacks independent motivation; moreover, it provides no explanation for the fact that *signal* appears to permit either subject or object control, as the examples in 112 illustrate.

(112) a. Col. Jones, signaled (the control tower) to position himself, for a
    landing.
    b. Col. Jones, knew that the control tower had signaled (him,) to
    position himself for a landing.

We will offer our own account of these facts presently. For the time being we
simply anticipate that account by asserting that *signal* is not subject to the
semantically based control constraints and also (in case no object is present)
constitutes another genuine counterexample to Manzini’s Generalization.

The third class of potential problems for Manzini’s Generalization involves
control into extraposed VPs. Thus, corresponding to the examples in 101 (re-
peated in 113) are those in 114.

(113) a. It would help Bill to behave himself in public.
    b. It would help Bill’s development to behave himself in public.
    c. Mary knows that it would help Bill to behave herself in public.
    d. It reflects well on the whole corps to conduct oneself honorably
    in public.

(114) a. To behave himself in public would help Bill.
    b. To behave himself in public would help Bill’s development.
    c. Mary knows that to behave herself in public would help Bill.
    d. To conduct oneself honorably in public reflects well on the whole
    corps.

Similar examples can be constructed involving predicates like *bother, upset,
offoish*, etc., as well as with the copula.

As 113 and 114 suggest, none of these expressions is subject to semantically
based controller assignment. This is further supported by the examples in 115.

(115) a. John knew that to behave himself in public would upset/irritate/
    annoy/bother Mary.
    b. John knew that it would upset/irritate/annoy/bother Mary to be-
    have himself in public.
c. John was happy and excited. To have involved herself in the group was the most positive move his daughter could have made.

The unexpressed subject of subject and extraposed VP complements, as Manzini (1983:424) puts it, 'co'fers freely', even across discourse, as Bresnan (1982:328ff.) takes pains to establish:

(116) a. Mary was happy and excited. To have involved herself in the group was a risky action. But it was proving that she could change her life.
b. Tom felt sheepish. To have pinched those elephants was foolish.

(117) a. Mary was happy and excited. It was a risky action to have involved herself in the group. But it was proving that she could change her life.
b. Tom felt sheepish. It was foolish to have pinched those elephants.

It seems clear that no appeal to null pronominals can provide an appropriate controller within the minimal clause containing these controlled complements. Thus subject and extraposed VP complements are subject neither to semantic controller assignment principles nor to Manzini's Generalization.

We claim that there is a principled reason for this correlation. Manzini's Generalization obtains uniformly in those cases where the semantic controller assignment constraints are in force. On our view, this fact is a consequence of binding theory, in particular of Principle A, which requires anaphors (reflexives and reciprocals) to be coindexed with an appropriate antecedent in a certain local domain. According to the analysis of §4, the unexpressed subjects of complements that are subject to the principles of semantic controller assignment (control theory) are all reflexives. The binding theory, as revised at the end of §3 (to make subjects of a VP complement locally o-commanded by elements less oblique than that VP), thus has the consequence that these unexpressed complement subjects must be coindexed with the subject (or the object, if such exists) of the verb that subcategorizes for the complement in question. The SUBCAT lists that result from the interaction of control theory and Principle A are illustrated in 118.

(118) promise:  SUBCAT (NP_i, (, NP), VP[SUBCAT (NP:refl_i)])
persuade:  SUBCAT (NP, NP_i, VP[NP:refl_i])
try:  SUBCAT (NP_i, VP[SUBCAT (NP:refl_i)])
want:  SUBCAT (NP_i, VP[SUBCAT (NP:refl_i)])

The revised definition of local o-command in fact rules out the possibility of any SUBCAT list where a noninitial controlled complement lacks a local o-commander. Since the SUBCAT list of a verb determines which NPs will be realized in a given clause, it follows that a controlled subject will have a controller within the minimal clause containing it. Manzini's Generalization is thus a consequence of the interaction of PEAR and Principle A.

But what about the several exceptions to Manzini's Generalization discussed above? We analyze these as cases where the referential parameter of the unex-
pressed complement subject is specified not as reflexive, but rather as pronominal (ppro).

First, consider the help of participation. In this case we assume not only that the complement subject is pronominal, but also that this pronominal is constrained by the participatory semantics of help to refer to some group to which the helper belongs. It is easy to see that this assumption is consistent with all the facts about help above (103–105); in addition, it accounts for the otherwise puzzling fact that 119 is grammatical only on a reading where Kim is one of the professors.

(119) The professors, knew that Kim had helped get themselves, plusher offices.

We return next to the facts about signal illustrated in (106–112) above. A natural account of these facts, incorporating key insights of Bresnan’s (1982) treatment in terms of anaphoric control, is that signal subcategorizes optionally for an object, and obligatorily for an infinitive VP complement bearing the specification [ext-arg pron]. In the event that the ext-arg (unexpressed complement subject) is instantiated as an anaphor, then it is controlled by either the subject or the object (if any) of signal, as in 106, 108–110, and 112. But when it is instantiated as a pronominal (e.g. the control tower signalled to land, or 107), then Principle B of the binding theory will require that the unexpressed complement subject not be coindexed with any argument of signal.42 The essential prediction of this analysis—that the complement subject of signal can be either a reflexive or a nonreflexive pronoun—is that the interpretation of the unexpressed subject is free. If this is right, then some instances of signal are not subject to our proposed semantically-based constraints on controller assignment, and also counterexemplify Manzini’s generalization.

Finally, we consider subject and extraposed VPs. The former are exempt from Manzini’s Generalization simply because, by definition, the subcat element of a subject can never be o-commanded (since nothing is less oblique than the subject); in this case it has no bearing whether the unexpressed subject of the VP is an anaphor or a pronominal. Subjects of extraposed VPs we propose to handle in essentially the same way as signal: they may be realized either as an anaphor (113a) or as a pronominal (113b–d). To conclude, although Manzini’s Generalization does not hold in all cases, its correct predictions are derived in our account from the interaction of control theory and binding theory.

5.2. Visser’s Generalization. We now turn to the issue of Visser’s Generalization, which states that ’subject-controlled’ verbs cannot undergo passivization:

(120) a. Kim was persuaded to leave (by Dana).
   b. *Kim was promised to leave (by Dana).

Following Pollard 1984 and Pollard & Sag 1987, we treat passivization in terms of a lexical rule that cyclically permutes subcat lists. This is illustrated in 121.

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42 The formulation of Principle B given in Pollard & Sag 1991a, requires that a pronominal not be locally o-bound.
(121) Passive Lexical Rule (PLR):

\[ \text{read, devour,...:} \]
\[ \text{SUBCAT } \langle \text{NP}_1, \text{NP}_2 \rangle \rightarrow \text{SUBCAT } \langle \text{NP}_2, \text{PP[by]}_1 \rangle \]
\[ \text{give, donate,...:} \]
\[ \text{SUBCAT } \langle \text{NP}_1, \text{NP}_2, \text{PP[to]}_3 \rangle \rightarrow \text{SUBCAT } \langle \text{NP}_2, \text{PP[to]}_3, \text{PP[by]}_1 \rangle \]
\[ \text{give, hand,...:} \]
\[ \text{SUBCAT } \langle \text{NP}_1, \text{NP}_2, \text{NP}_3 \rangle \rightarrow \text{SUBCAT } \langle \text{NP}_2, \text{NP}_3, \text{PP[by]}_1 \rangle \]
\[ \text{promise, persuade,...:} \]
\[ \text{SUBCAT } \langle \text{NP}_1, \text{NP}_2, \text{VP[inf]} \rangle \rightarrow \text{SUBCAT } \langle \text{NP}_2, \text{VP[inf]}, \text{PP[by]}_1 \rangle \]

Passivization thus creates SUBCAT lists where the by-phrase is the most oblique dependent element. Like similar lexical rules, passivization preserves semantic role assignment.

Let us consider the passivization of control verbs in more detail. PLR applies to an object control verb like persuade to give a lexical entry whose SUBCAT specification is as shown in 122.

(122) \text{SUBCAT } \langle \text{NP}, \text{VP[SUBCAT } \langle \text{NP:refl} \rangle], \text{PP[by]} \rangle

Principle A requires that the unexpressed subject of the VP complement be coindexed with the subject NP, the only available local o-commander. This coindexing also satisfies control theory: because PLR preserves semantic role assignment, the subject NP is assigned the INFLUENCED role in the passive verb's content. Binding theory and control theory thus impose the same constraint, jointly guaranteeing that the result of applying PLR to a verb like persuade will be a SUBCAT list like 123.

(123) \text{SUBCAT } \langle \text{NP}_i, \text{VP[SUBCAT } \langle \text{NP:refl} \rangle], \text{PP[by]} \rangle

Consider now the application of PLR to promise. The result will be essentially the same as 122. And Principle A will again require the coindexing in 123. However, here control theory and binding theory part company. Because PLR preserves semantic role assignment, the by-phrase is assigned the role of COMMITTOR. Thus control theory requires that the unexpressed subject of the VP complement be coindexed with the by-phrase. The result will be a SUBCAT list like 124.

(124) \text{SUBCAT } \langle \text{NP}_i, \text{VP[SUBCAT } \langle \text{NP:refl} \rangle], \text{PP[by]}_i \rangle

Now in each case, this SUBCAT list will give rise to sentences that are ruled out by independently motivated factors, namely sentences like those in 125a–b:

(125) a. *Kim, was promised to leave by Sandy, /Kim,.

b. *John, was promised to leave by him,.

c. ?*John, was promised to leave by himself,.

Ex. 125a is ruled out by Principle C of our binding theory, which entails that nonpronominals (including proper names and quantified NPs) can never be coindexed with a local o-commander.\(^{43}\) Ex. 125b is similarly ruled out by principle B of the binding theory, which disallows the coindexing of a pronominal

\(^{43}\) In fact, Principle C guarantees that a nonpronominal is never coindexed with any o-commander. For further discussion, see Pollard & Sag (1991b:ch. 5).
(an element whose parameter is of sort \textit{ppro}) with any of its local o-commanders.

This leaves the matter of 125c. Whatever the status of this example may be (and the judgments of many speakers, the authors included, are uncertain at best), there is nothing in our theory as it stands that actually rules it out. Now it has often been assumed in the literature that reflexives (for whatever reason) cannot appear in passive \textit{by}-phrases, so it may be that 125c is ruled out by other (perhaps pragmatic) constraints that are independent of control and binding.\textsuperscript{44} If this is indeed the case, then the \texttt{SUBCAT} list in 124, the only PLR output that satisfies both binding theory and control theory, is one that never can appear in a well-formed linguistic structure.

There is one further problem that remains to be discussed. Visser’s Generalization of course also applies to ‘short’ passives (those that lack a \textit{by}-phrase) like 126:

\begin{quote}
(126) *Dana was promised to leave.
\end{quote}

This fact must be a consequence of a fully developed theory of complement control, as it may well be under our account, given the following observations.

According to control theory, the unexpressed anaphor subject of the VP complement has to be identified with the promiser (which is not linguistically expressed); but, according to Principle A, it must be bound by its (unique) referential o-commander \textit{Dana} (the one to whom the promise is made). The ill-formedness of 126 thus arises from the impossibility of satisfying these conflicting demands. The trouble with this account is that it is not quite true that the demands of control theory and binding theory cannot be jointly satisfied: they could be, if Dana happened to have been the promiser. In other words, our theory as stated predicts not that 126 is ungrammatical, but rather that the only possible interpretation available for 126 is one paraphrasable as \textit{Dana promised himself to leave}.

Yet we know independently that short passives never admit reflexive interpretations. Thus there is no way to understand 127 as a paraphrase of 128.

\begin{quote}
(127) The only barber who was ever shaved was Figaro.
(128) The only barber who was ever shaved by himself was Figaro.
\end{quote}

In light of this nonequivalence, it is clear that some account \textsc{must} be provided for this fact about unexpressed \textit{by}-phrases, considerations of complement control aside. It is equally clear that virtually any such account will suffice to explain the deviance of 126.\textsuperscript{45}

\textsuperscript{44} However, in Pollard & Sag 1991a we cite counterexamples to this constraint (of a sort noted by Morgan 1969):

\begin{quote}
(i) The only barber who was shaved by himself was Figaro.
\end{quote}

One might expect that examples like (ii), analogous to (i), would be more acceptable than 125c:

\begin{quote}
(ii) The only president who was promised by himself not to raise taxes is George Bush.
\end{quote}

It is not clear to us if this expectation is fulfilled.

\textsuperscript{45} One highly speculative proposal along these lines might be that, in short passives, the \textit{by}-phrase is actually realized as a null pronounal. If this is right, it would then follow from the binding theory, as desired, that no self-promising interpretation of 126 is available. Unfortunately this
A further point warrants mention before we conclude this discussion. First, it is generally thought, on the basis of examples like (129), that subject-raising verbs are also governed by Visser’s Generalization.

(129) a. Sandy struck Kim as unreliable.
   b. *Kim was struck as unreliable by Sandy.

Strike can be seen to be a subject-raising verb, which assigns no semantic role to its subject, by the grammaticality of examples like (130).

(130) a. It struck me as very unlikely that Dana would get the job.
   b. There struck Sandy as being too many Republicans on the committee.

But, as has commonly been observed, subject role assignment is an essential prerequisite for passivization.46

(131) a. *Our party was rained on by it.
   b. *A furor was arisen by there.

Thus the fact that subject-raising verbs fail to passivize is part of a more general constraint on passivization, one that is irrelevant to our account of Visser’s Generalization.

Second, by-phrase controllers, though impossible in the VP, are permitted within nominal constituents, as noted by Bresnan (1982) and others (see §2 above):

(132) a. We appreciated [the promise by Hearst to endow the center].
   b. [A promise by Jamie not to chew gum] would have been appreciated by all.

These are correctly predicted to be grammatical under our theory, despite uncertainty as to the precise nature of nominal subcat lists. As argued in Pollard & Sag 1991a, the subcat list of nominals like those in 132 (in contrast to those nominals that combine with possessor phrases) contain only a det, a VP, and a P[by]. The det is not a potential binder, and hence not a local o-commander of the unexpressed subject of the VP. If the by-phrase locally o-commands the VP, then both binding theory and control theory are satisfied by coindexing the unexpressed subject and the by-phrase. If the VP is less oblique than the by-phrase, then the unexpressed anaphor subject of the VP is locally o-commanded by nothing and hence exempt from Principle A. In this case, that anaphor must still be coindexed with the by-phrase in order to satisfy control theory.

To summarize, we have presented a revision of binding theory based on an extended definition of ‘local o-command’. This redefinition, taken together with the assumption that the unexpressed subjects of many controlled complements are anaphors, allows us to derive the correct predictions of Manzini’s Gen-

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46 In a number of recent proposals, passivization is in fact characterized as a ‘demotion’ (Bresnan & Kanerva 1989, Kiparsky 1987) of the ‘highest’ 6-role, a characterization that immediately predicts the impossibility of passivization in these cases.
eralization and (with certain key lacunae) many of the predictions of Visser’s Generalization from the interaction of our control theory with independent principles.

**Conclusion**

6. Previous accounts of control have been surveyed and criticized by numerous authors, including Radford (1981), Bresnan (1982), Manzini (1983), Chierchia (1984), Foley & Van Valin (1984), Cutrer (1987), and Farkas (1988). Nonetheless, a brief overview of the inadequacies of previous accounts will provide an important perspective on the claims we have advanced.

Rosenbaum 1967: Rosenbaum attempts to predict controller choice in terms of his Minimal Distance Principle, which states that the NP closest to the subject of the complement is its controller under the transformation of Equi NP Deletion. This proposal fails to allow even for verbs like *promise*, which take subject control even when an object NP is present. Rosenbaum’s analysis deals only with verbs, and hence fails to express the semantic generalizations that govern both nominal and verbal control structures, constructions whose semantics is of *influence* type (e.g. *how’s about* and remote control). No account is provided by Visser’s Generalization or controller shifts.

Jackendoff 1972, 1974: This is the original source of the insight that fundamental semantic generalizations (stated in terms of thematic roles) govern control in both verbal and nominal constructions. Jackendoff’s analysis (especially as articulated in Jackendoff 1974) could be naturally extended to deal with remote control and the *how’s about* construction. However, nothing in his analysis explains Visser’s Generalization, the possibility of *by*-phrase control in nominals, or controller shifts.

Chomsky 1980, 1981: Chomsky accepts a version of Rosenbaum’s Minimal Distance Principle, marking exceptions like the verb *promise* as [+ SC] (exceptionally taking subject control). This proposal fails to express Jackendoff’s semantic generalizations that hold across verbal and nominal control structures, *influence*-sort constructions and remote control. The analysis of Visser’s Generalization that Chomsky offers is subject to numerous objections, as argued in detail by Bresnan (1982:359ff.). In his brief discussion of controller shifts, Chomsky suggests (1981:76) that ‘choice of controller is determined by θ-roles or other semantic properties of the verb, or perhaps pragmatic conditions of some sort’. Our semantic control constraints and treatment of controller shifts in terms of coercion are consistent with Chomsky’s suggestion.

Bach 1979, 1980: In Bach’s Categorial Grammar analysis, controller assignment, following ideas due originally to Partee and Thomason (see, for example, Thomason 1974), is based on the notion ‘next argument’. *Promise* combines first with its NP object, second with its VP complement, and last with its subject. *Persuade* and similar verbs combine first with their VP complement (to form a *transitive verb phrase*), second with their object, and last with their subject. Hence the controller (of the unexpressed subject) of a VP com-
plement is (the individual associated with) the next argument in the syntactic (and semantic) combinatorics of the verb.

There are several points to be made in connection with this proposal. First, it seems inconsistent with the existence of verbs like signal, where the controller need not be syntactically realized at all (see §5.1). Second, the assumption that promise-type and persuade-type verbs have different syntactic argument orders is in our view dubious on other grounds. Whereas SUBCAT lists of the sort employed in HPSG reflect an ordering of a verb’s syntactic arguments that corresponds in the main to the Montague-style hierarchical argument structure that Bach advocates, the former do not distinguish between promise-type and persuade-type verbs. This is because the syntactic argument order, which corresponds to the traditional notion of obliqueness order, plays an important role in the generalizations governing reflexive binding, the application of lexical rules, and linear order possibilities. By the available criteria, promise-type and persuade-type verbs have identical argument orderings, as shown in particular by the fact that both are governed by the linear precedence rule that ensures that primary objects precede more oblique VP complements.

In Bach’s analysis, it is essentially an accident that the object NP argument of promise is ordered like a primary object of the sort that persuade combines with. For this reason, we remain skeptical of the claim, essential to Bach’s analysis, that the two classes of verbs are to be distinguished at all with respect to syntactic argument order. The only additional syntactic evidence Bach offers for this distinction is the difference in acceptability of such ‘Heavy NP Shift’ pairs as Kim persuaded to resign the leaders of the dissident groups that had been organizing the workers vs. *Kim promised to resign the leaders of the dissident groups that had been organizing the workers. Such contrasts, however, cannot be attributed to differences in argument order in Bach’s analysis, for examples like *Kim wanted to resign the leaders of the dissident groups that had been organizing the workers are as unacceptable as the shifted examples with promise, yet the want cases must be analyzed on the model of persuade on Bach’s analysis, because they exhibit object control. On our view, what renders the ‘Heavy NP Shift’ examples with want and promise worse than their counterparts with persuade is the fact that they give rise to ‘garden paths’. That is, because of the optionality of their objects, they, unlike persuade, are locally parseable as subject control verbs. Finally, given that the combinatoric properties of verbs and nouns are quite different, it is not at all clear how Bach’s approach to controller assignment can express the semantic generalizations that hold across verbal and nominal construction types, as well as in constructions whose semantics is of influence type and remote control.

Bach’s analysis explains Visser’s Generalization under the assumption that only transitive verb phrases undergo passivization. Controller shifts, however, are not explained.

One might attempt to reconcile Bach’s analysis with the broader range of facts we have discussed by stating the ‘next argument’ generalization directly on semantic structures. For example, both the noun promise and the verb promise are treated (either directly or via meaning postulate) in terms of an
expression of intensional logic promise', which denotes a function from NP interpretations to functions from VP interpretations to VP interpretations. Thus both nominal and verbal uses of promise will give rise to intensional logic expressions like promise'(x)(VP')(y), where the controller is identifiable as the individual corresponding to the next argument semantically. Verbal and nominal uses of appeal will likewise be associated with expressions like appeal'(VP')(x)(y), where the 'next argument' is the individual corresponding to the to-phrase.

We are extremely skeptical of any proposal that attributes linguistic significance to semantic argument order. In Montague semantics, real-world relations are modelled by functions from possible worlds to other functions, and the roles in those relations are modelled by the argument positions in those other functions. But the order of the arguments of those other functions does not model anything; it is just an artifact of the model, much as the wheels, levers, or pulleys in a desk-top model of the solar system don't represent any aspect of the solar system. To attribute linguistic significance to that aspect of the semantic model (rather than regarding argument order as a purely syntactic property) seems to us to make little theoretical sense.

Bresnan 1982: Bresnan's control theory, couched in terms of Lexical Functional Grammar (LFG), draws a fundamental distinction between two types of control: functional control, which involves the functional structures of the controller and the controlled element, and anaphoric control, which apparently involves sharing of only semantic indices. It is stipulated that some complement-taking verbs undergo functional control, whereas other verbs and all nominal constituents undergo anaphoric control. Anaphoric control is subject to semantic (thematic) constraints, while functional control is stated in terms of a hierarchy of grammatical functions: unless a complement-taking verb is exceptionally marked as taking subject control, it takes second-object (OBJ2) control (if it selects for an OBJ2), otherwise (primary-) object control (if it selects for a primary object), otherwise subject control. We hasten to point out that this hierarchy of grammatical functions coincides with the HPSG obliqueness hierarchy. However, as pointed out in Farkas 1988, Bresnan’s control theory fails to predict the fundamental correlation between type of semantic relation and controller choice, which (as noted by Radford 1981:381 and others) appears to be exceptionless and universal. In addition, since nominal and verbal control are treated by unrelated mechanisms, this analysis fails to express the semantic generalizations governing controller assignment that hold across verbal and nominal control structures, influence-type constructions and remote control.47

Bresnan’s explanation of Visser’s Generalization turns crucially on the assumption that equi verbs like promise are subject to functional control, rather

47 Bresnan (1982:353, 358) criticizes Anderson’s 1977 thematic treatment of control on the grounds that examples like Tabs started being kept on celebrities involve 'nonthematic' NPs like tabs. Since start is a raising verb, our proposal does not predict controller assignment in semantic terms, and hence is not subject to Bresnan’s objection. However, this argument is in any case less than persuasive in light of the results obtained by Wasow et al. (1983), who show that interpretations must be assigned to ‘pieces’ of idiomatic expressions of this sort.
than anaphoric control. Since only subjects, direct objects, and second objects can be functional controllers, there can be no passive lexical entry for a verb like promise. Such an entry would require that functional control be assigned to a by-phrase or an empty grammatical function (given that lexical rules preserve control assignment). By-phrases may be controllers in nominal constructions, however, because nouns undergo anaphoric control, which is not subject to the same restrictions as functional control. Thus Bresnan’s account of Visser’s Generalization crucially involves the claim that the verb promise and the noun promise assign control on the basis of unrelated mechanisms, a claim that leaves the semantic generalizations about control completely unexplained.

Bresnan also seeks to explain controller shifts in terms of the difference between functional and anaphoric control, arguing that the to be allowed to type of complement undergoes the latter, not the former. This view is tied to the claim that to be allowed to complements engender a promise interpretation of the verb promise and undergo anaphoric, rather than functional, control. This shift in control type, as noted in Farkas 1988, is unmotivated. In addition, as we have already seen, the assumption that to be allowed to complements occur with the promise interpretation of the verb cannot explain such contrasts as The fortune cookie promised Montana that he would be allowed to play on Sunday vs. The fortune cookie promised Montana to be allowed to play on Sunday. Our own analysis, by contrast, treats this class of exceptions to Visser’s Generalization in terms of causative coercion, a phenomenon which has considerable independent motivation.

Manzini 1983: Manzini develops a revision of Chomsky’s analysis of control which entails that every unexpressed subject of a VP complement (in her analysis, the pro subject of an S’) will have a controller in an appropriate c-command relation. She treats counterexamples like signal and help by assuming phantom (phonetically unexpressed) controllers, a position we have argued against.

Manzini presents no theory of controller assignment at all, except the cryptic suggestion that improper control assignments are ‘excluded for other reasons—say, on semantic grounds’ (423). Since she presents no theory of controller choice, her analysis obviously includes no account of Visser’s Generalization or of controller shifts.

The architecture of our theory, however, preserves the essential architecture of Manzini’s in that binding theory interacts with controller assignment principles (which we have formulated explicitly) to derive the correct predictions of what we have referred to as ‘Manzini’s Generalization’.

Chierchia 1983, 1984, 1989: In Chierchia’s theory, control is a purely semantic phenomenon governed by meaning postulates that establish entailment relations between property-taking expressions and proposition-taking expressions. All such theories (including those of Bach, discussed above, and that of Dowty 1985) are subject to an important objection concerning the analysis of agreement. If control relations do not consist in the identification of variables (or indices), then there is no principled explanation for the apparently universal
fact that coindexing entails agreement for such features as person, number, and gender (but not case). On our theory, such agreement follows immediately from the structure of linguistic information and the treatment of control relations in terms of coindexing of parameters. But on a property-based theory, there appear to be only two possible approaches to agreement. The first, developed by Dowty & Jacobson (1989), is to treat all agreement phenomena as semantic in nature. However, as noted by Chierchia (1989:150), this treatment ‘becomes extremely artificial (if viable at all) for languages with grammatical gender’, a conclusion we are in complete agreement with (see Pollard & Sag (1991b:ch. 2) for further discussion). The second approach, that of Chierchia (1989:150), is to stipulate a principle guaranteeing that ‘two items are syntactically related [e.g. in an agreement relation—IAS&CP] iff they are semantically related’. This is precisely the principle that is derived, rather than stipulated, under our theory, where control relations are nothing more than identities of the indices of parameters.

Quite apart from this fundamental objection to property-based accounts of control, there are other aspects of Chierchia’s theory that are problematic. For example, controller assignment is predicted in part in terms of the hierarchy of thematic roles indicated in 133.

\[(133) \text{Theme} < \text{Source} < \text{Goal} < \ldots < 0'\]

In the default case, the controller is required to be the syntactic dependent bearing the highest role on this hierarchy. As Farkas 1988 points out, however, the fact that this thematic condition is only a default is a serious weakness of Chierchia’s analysis. Even verbs whose semantics is of influence-sort, like require, order, ask, and tell, which take source arguments on his analysis but require goal control, must be treated as exceptions. In short, nothing in this account adequately reflects Jackendoff’s semantic generalizations, which are exceptionless and arguably universal.

Chierchia also imposes an adjacency condition on controller assignment. This condition, which presupposes a Montague-style ordering of semantic arguments, requires that the controller also be an argument that is adjacent to the controlled property—the controller must be the immediately prior argument or the immediately following argument in the hierarchical semantic argument structure. This condition thus relies on Bach’s analysis of promise and persuade as taking their complements in different orders (otherwise the controller of the complement of the verb promise would not be adjacent to the argument it controls), which we have already criticized. In particular, Chierchia’s proposal relies in essential ways on the semantic formulation of argument order, which, as noted above, is purely an artifact of the Montague semantics model of interpretation, and hence should not be assigned linguistic significance. 48

48 Chierchia cites data from Italian as evidence for weakening Bach’s ‘next argument’ principle to an ‘adjacent argument’ principle. The relevant examples include Correre piace a noi ‘to run pleases us’, where object control of the subject VP is obligatory. Such examples require no weakening of our analysis, however, as the unexpressed anaphor subject of these infinitival subjects has no local o-commander, and hence may be coindexed with the a-phrase objects without en-
Chierchia seeks to explain Bach's Generalization in a curious manner. Recognizing that verbs like signal (whose controller PP argument is readily omi-
sible) are counterexamples, Chierchia assigns these to a separate class of
semi-obligatory control verbs, which are identical to obligatory control verbs
except that they are (by stipulation) exempted from Bach's and Manzini's gen-
eralizations. Our own approach requires no such complication.

As for Visser's Generalization, Chierchia's explanation, like Bach's, turns
on the differing argument orders assigned to promise-type and persuade-type
verbs. And Chierchia essentially accepts Bresnan's treatment of controller
shifts, which relies on the analysis of be promised to be allowed to complements
in terms of the promise that relation, an analysis we have already criticized (see
above).

Farkas 1988: Farkas explains controller assignment in terms of an abstract
notion of responsibility, a regularity that holds across diverse situation types.
On her view, the controller can in general be identified semantically as the
individual who is 'responsible for bringing about' (35–38) the situation corre-
responding to the complement. Assignments of responsibility are part of the
satisfaction conditions of the predicates associated with the relevant verbs.
Clearly, there is something right about this observation. The analysis we have
presented, which assumes three independent semantic control constraints, fails
to express the generalization Farkas isolates. We could, in fact, adopt Farkas's
suggestion, and collapse at least two of our constraints into one, perhaps by
collapsing the influenced and committer roles into a single role responsible-
party; but lack of independent motivation has prevented us from making this
move.

Farkas does not present a theory that deduces her responsibility relation;
she simply assumes that responsibility restrictions exist as part of lexical sat-
isfaction conditions. Thus, although Farkas criticizes all theories of control
that are based on semantic or thematic roles, it is not at all clear what additional
explanation has been gained under her proposal. Our point is not to criticize
Farkas, whose suggestion we believe is fundamentally correct, but rather to
point out that (a) more work must be done before a deeper explanation of
controller assignment is actually achieved, and (b) if such further work is suc-

gendering violations of Principle A. Crucially contrasting data from English (e.g. the ambiguity of
John, said that getting himself arrested would bother Bill) lead Chierchia & Jacobson (1986) to
claim that verbs like please and bother are ambiguous in English, according to whether the subject
argument expresses a proposition or a property. No such ambiguity is required within our approach,
however, once it is understood that these relations are simply not subject to semantic control
constraints.

49 We note in passing that Chierchia's assumption that by-phrases function as VP modifiers (that
are adjoined to VP structures), rather than as syntactic arguments of passive verbs, leaves unex-
plained the fact that by-phrases may precede other complements, even when no Heavy NP Shift
has taken place: Kim was persuaded by Lee to go to the store. For an analysis of such examples
consistent with our assumption that by-phrases are optional syntactic complements, not modifiers,

50 Farkas treats verbs whose relation is of orientation sort by an independent principle.
cessful, it would in fact simplify our own analysis, leaving all other details intact.

Farkas seeks to explain Bach’s and Visser’s generalizations in terms of four assumptions: (1) for verbs involving her notion of responsibility, the controller can only be the one given by her Principle of Controller Choice, which states that the participant responsible for the situation of the complement is its controller; (2) the controller must be syntactically realized; (3) the (object of the) by-phrase is not a possible controller; and (4) passivization and detransitivization are operations that preserve relations between semantic arguments. Although (2) in fact stipulates Manzini’s Generalization (unlike our proposal to derive its correct predictions from the theory of binding), Farkas does not discuss counterexamples like signal or help. Nor does her account explain why by-phrases can be controllers within NPs (a promise by Hearst to endow the center) but not within VPs.

To explain controller shift, Farkas appeals to an additional principle of Marked Controller Choice, whereby control is assigned not to the individual in the responsibility relation to the complement’s situation, but rather to the individual whose actions are determined by the responsible individual. While we agree that the controller of the unexpressed subject of to be allowed to complements is typically related to the responsible individual in this way, Farkas has not provided any real explanation of controller shift, for the possibility of ‘marked controller choice’ is simply stipulated. Our own account, by contrast, seeks to explain the appearance of controller shift through the interaction of binding theory with the independently motivated notion of causative coercion.

As is evident from this review, the analysis of controlled complements we have presented weaves together a number of insights from previous studies. We have attempted, wherever possible, to incorporate relevant analytic insights and account for established generalizations. Yet our analysis is more than a synthesis—it is an attempt to deduce the properties of controlled complements from the interaction of semantic constraints, causative coercion, and binding theory. We believe that this account succeeds in incorporating relevant insights from previous analyses, while avoiding their pitfalls.

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