

# Anaphors in English and the Scope of Binding Theory\*

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## 1 Introduction

Since the pioneering work of Lees and Klima (1963), it has commonly been assumed that a single generalization determines the possible antecedents of anaphors (reflexive and reciprocal expressions) in English. The mechanisms proposed to express this generalization have evolved considerably over the last quarter century, but the transformations proposed by Lees and Klima, the rules of interpretation formulated by Jackendoff (1972), and Principle A of Chomsky’s (1981, 1986) binding theory are all attempts to provide a unified account of the binding properties of the anaphors in (1), each of which is a coargument of its antecedent (ignoring “case-marking”, or nonpredicative, prepositions), as well as those in (2), each of which is properly contained within a coargument of its antecedent.

- (1) a. John<sub>*i*</sub> hates himself<sub>*i*</sub>.  
b. The men<sub>*i*</sub> admired each other<sub>*i*</sub>.  
c. Mary<sub>*i*</sub> explained Doris<sub>*j*</sub> to herself<sub>*i/j*</sub>.  
d. Dana<sub>*i*</sub> talked to Gene<sub>*j*</sub> about himself<sub>*i/j*</sub>.  
e. The men<sub>*i*</sub> introduced the women<sub>*j*</sub> to each other<sub>*i/j*</sub>.
- (2) a. John<sub>*i*</sub> found [a picture of himself<sub>*i*</sub>].

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- b. The women<sub>i</sub> selected [pictures of each other<sub>i</sub>].
- c. The men<sub>i</sub> admired [each other<sub>i</sub>'s trophies].
- d. The men<sub>i</sub> introduced the women<sub>j</sub> to [each other<sub>i/j</sub>'s spouses].

These examples, as well as the deviance of those in (3), are accounted for within Chomsky's binding theory by Principle A, which requires that a (governed) anaphor be A-bound (coindexed with a c-commanding NP in an argument position) within a suitably defined minimal syntactic domain.<sup>1</sup>

- (3) a. \*John<sub>i</sub> said Mary hates himself<sub>i</sub>.  
 b. \*John<sub>i</sub>'s mother hates himself<sub>i</sub>.

Although the view that all anaphors are subject to a single grammatical constraint is widespread, it has not gone unchallenged. Two of the most vocal challengers have been Paul Postal, who has defended the view (cf. Postal (1971)) that "picture noun reflexives" are not subject to the same constraints as "ordinary reflexives", and Susumu Kuno, who has argued at length (cf. Kuno (1972, 1976, 1987) and the references cited there) that reflexive pronouns are quite generally subject to constraints that must be stated in terms of such discourse notions as *point of view*, a concept first argued to be crucial for syntactic description by Kuroda (1965).

In this paper, we offer an account of anaphor binding that integrates these diverse perspectives. Agreeing with Postal, we argue (sections 3 and 4) that the apparent generalization about the distribution of the anaphors in (1) and those in (2) is spurious. Picture noun reflexives (in the absence of a possessor within the NP that gives rise to obligatory binding) are *exempt* from grammatical constraints on binding. Following Kuno, we provide (section 5) an account of such exempt anaphors in terms of discourse constraints, which interact with independently motivated processing-based factors as well. Amidst these interacting factors, we see the effects of a purely grammatical constraint closely analogous to Chomsky's Principle A. However, as we will argue in section 7, this syntactic constraint (which we also refer to as Principle A) is best formulated not in terms of such configurational relationships as c-command and government, but rather in terms of a rather traditional notion of relative obliqueness of grammatical functions, similar to various notions of grammatical hierarchy that have been proposed in the

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<sup>1</sup>In Chomsky (1986:171-174), this domain is taken to be the least maximal projection M containing a subject and the anaphor's governor such that for some (not necessarily the given) assignment of indices (subject to some version of the i-within-i condition) to the NP's (and AGR's of Infl's) in M, the anaphor is A-bound in M under that assignment. It is chiefly this version of Principle A that will be under discussion here. Later (pp. 175-177), modifying an earlier proposal by Lebeaux (1983), Chomsky sketches a rather speculative possible simplification of Principle A involving movement of anaphors to AGR at LF, thereby obviating the need for Principle A to refer to a subject or an i-within-i condition. We return briefly to this issue in section 5.

past.<sup>2</sup> The specific hierarchical relation which we will employ, called *local o(bliqueness)-command*, is formulated in terms of the list-valued feature SUBCAT(EGORIZATION), introduced in Pollard and Sag (1987; forthcoming); relevant theoretical background will be provided in Section 6.

## 2 Background

In this section we wish to make clear what we take to be at issue in our challenge to contemporary binding theory. Virtually all writers on this topic are agreed that one of the central goals of the theory is to characterize those conditions under which an anaphor *must* be bound. Such conditions, in most current syntactic theory, are presented in the form (4):

- (4) (Principle A):  
Every anaphor must be coindexed with an NP in an appropriately defined command relation, within an appropriately defined minimal syntactic domain.

Though this much is agreed, debates center around the questions of how the command relation and the minimal syntactic domain are to be defined.

Though various extant formulations of binding theory make differing predictions about the distribution of reflexive and reciprocal anaphors, most current proposals entail the following propositions:<sup>3</sup>

- (5) a. Every anaphor in English must have a coindexed, c-commanding antecedent NP within the same (root) sentence.  
b. There is no “discourse binding” of anaphors in English. (this follows from (a))  
c. There can be no *split antecedents* of anaphors in English. (since such pairs of antecedents would not qualify as a single binder, hence contradicting (a))  
d. For the purposes of binding theory, the privileges of occurrence of such NP’s as *themselves*, *each other*, *the picture of himself*, *each other’s books* are identical in non-subject contexts.

In due course, we will show that none of these propositions can be maintained in the face of the facts.

The version of Principle A we develop here is weaker than standard formulations in the sense that it rests on a crucial distinction between anaphors that must be bound in

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<sup>2</sup>E.g., the accessibility hierarchy of Keenan and Comrie (1977); the hierarchy of terms in Relational Grammar (Perlmutter and Postal (1977, 1984)); the ordering of arguments in versions of Categorical Grammar discussed by Bach (1979, 1980) and Dowty (1982a, 1982b); and the default hierarchy employed in the Lexical Rule of Functional Control proposed by Bresnan (1982).

<sup>3</sup>Exceptional in this respect are Bach and Partee (1980), Manzini (1983), and Chierchia (1987).

accordance with Principle A, and those which are exempt from that principle. It is precisely the exempt anaphors that falsify the propositions entailed by other extant formulations of binding theory. We do not offer here a complete treatment of exempt anaphors, but only an alternate account of the grammatical principle that requires nonexempt anaphors to be bound (in a sense to be made precise).

### 3 Exempt Anaphors

If we limit our attention to examples like (2), it appears that picture noun anaphors and possessive reciprocals are subject to the same constraints as the direct argument anaphors in (1): they seem to require the presence of a binder within an appropriate local domain. But as was pointed out by Jackendoff (1972), the antecedent of a picture noun reflexive need not in general c-command the anaphor:

- (6) [Jackendoff (1972: 137, ex. (4.123))]  
The fact that there is a picture of himself<sub>i</sub> hanging in the post office is believed (by Mary) to be disturbing Tom<sub>i</sub>.

Such examples can be readily multiplied for both reflexives and reciprocals:

- (7) a. The agreement that [Iran and Iraq]<sub>i</sub> reached guaranteed each other<sub>i</sub>'s trading rights in the disputed waters until the year 2010.  
b. A fear of himself<sub>i</sub> is John<sub>i</sub>'s greatest problem. [Higgins (1973)]  
c. The picture of himself<sub>i</sub> in the museum bothered John<sub>i</sub>.  
d. The picture of herself<sub>i</sub> on the front page of the Times made Mary<sub>i</sub>'s claims seem somewhat ridiculous.  
e. The pictures of each other<sub>i</sub> with Ness made [Capone and Nitty]<sub>i</sub> somewhat nervous.  
f. The picture of herself<sub>i</sub> on the front page of the Times confirmed the allegations Mary<sub>i</sub> had been making over the years.  
g. John<sub>i</sub>'s campaign requires that pictures of himself<sub>i</sub> be placed all over town. [Lebeaux (1984: 358, ex. (55b))]  
h. John<sub>i</sub>'s intentionally misleading testimony was sufficient to ensure that there would be pictures of himself<sub>i</sub> all over the morning papers.

Kim and Sandy<sub>i</sub> knew that *Computational Ichthyology* had rejected each other<sub>i</sub>'s papers.

- i. They<sub>i</sub> made sure that nothing would prevent each other<sub>i</sub>'s pictures from being put on sale. [Kuno (1987: 95)]

Given these observations, we can see that the peculiar binding properties of picture noun anaphors and possessive reciprocals (i.e. their failure to require a c-commanding antecedent) are in no way restricted to “psych” verbs. Hence, attempts to develop syntactic analyses of such verbs designed to square their binding properties with Principle A (e.g. Pesetsky (1987), and Belletti and Rizzi (1986)) address only a subset of the problem domain. Examples like (7)c are just one piece of a much larger puzzle, that of determining what constraints affect picture noun anaphors and possessive reciprocals. Note further that most of these examples (in particular (7a,d,e,f,g,h,i,j)) do not plausibly lend themselves to an analysis that appeals to Principle A holding at some other level of structure (e.g. d-structure or LF). The anaphors in these examples appear to simply be exempt from Principle A.

How then do we distinguish those anaphors that require a local binder from those that are exempt from this requirement? First note that there is a large class of additional cases where no local binder is required. These cases, which have frequently been discussed in the literature, e.g. by Ross (1970), Postal (1971), Kuno (1972, 1987), Lebeaux (1984), and Keenan (1988), are illustrated in (8):

- (8) a. John<sub>i</sub> had worked hard to make sure that the twins would be well taken care of. As for *himself*<sub>i</sub>, it was relatively unlikely that anyone would be interested in hiring an ex-convict who had little in the way of professional skills.
- b. Mary<sub>i</sub> was well aware that, although everyone knew that the building had been designed by John and *herself*<sub>i</sub>, only he would receive the professional recognition that would ensure his future in the field of architecture.
- c. Jessie<sub>i</sub> knew full well that the local people would all feel that people like *himself* were not to be trusted, let alone hired.
- d. Each student<sub>i</sub> was confident that the teacher would criticize everyone but *himself*<sub>i</sub>.

Here again, it is difficult to see how any movement, reconstruction, or other device relating levels of syntactic representation can be appealed to to analyze these examples as obeying Principle A. These anaphors too appear to be exempt.

There is, however, a simple generalization that predicts which anaphors are exempt. In all the examples where Principle A appears to hold, e.g. the examples in (1) (repeated here), the anaphor is in the same syntactic argument structure as its binder.

- (9) a. John<sub>i</sub> hates himself<sub>i</sub>.
- b. The men<sub>i</sub> admired each other<sub>i</sub>.
- c. Mary<sub>i</sub> explained Doris<sub>j</sub> to herself<sub>i/j</sub>.
- d. Dani<sub>i</sub> talked to Gene<sub>j</sub> about himself<sub>i/j</sub>.
- e. The men<sub>i</sub> introduced the women<sub>j</sub> to each other<sub>i/j</sub>.

That is, if the primary object is an anaphor, then it must be coindexed with the subject, as in (9a,b). If the anaphor is the object of a *to*-phrase, then it must be coindexed with either the subject or the primary object (if there is one), as in (9)c,d,e. And we can see that the coindexing requirement is indeed obligatory for coarguments from the ungrammaticality of the examples like the following:

- (10) a. \*The fact that Sue likes himself<sub>i</sub> is believed (by Mary) to be disturbing Tom<sub>i</sub>.  
 b. \*The agreement that [Iran and Iraq]<sub>i</sub> reached gave trading rights to each other<sub>i</sub>.

Similar observations hold with respect to anaphors within NP's that have a possessor:

- (11) a. John<sub>i</sub>'s description of himself<sub>i</sub> was flawless.  
 b. \*The fact that Mary<sub>i</sub>'s description of himself<sub>i</sub> was flawless was believed to be disturbing John<sub>i</sub>.

- (12) a. Their<sub>i</sub> agreement with each other<sub>i</sub> was celebrated by all.

b. \*Italy's agreements with each other<sub>i</sub> angered [Iraq and Iran]<sub>i</sub>.

The possessor functions exactly like a subject for purposes of binding theory. In an NP with a possessor, an anaphor that is the object of a nonpredicative PP dependent of that NP must have a binder within that NP, either the possessor (as in (11)) or another PP, as in (13).

- (13) Mary's letters to John about himself obsessed him.

If no possessor is present, or if the anaphor is itself the possessor, then such anaphors are exempt, as in the examples of (7). This is illustrated by (14).

- (14) John knew that the reports about himself were fabrications.

Thus, once we regard possessors as subjects, we can see that the environments where Principle A is in effect can be characterized in terms of the traditional notion of *relative obliqueness* (roughly equivalent to the relational hierarchy of Relational Grammar (Perlmutter and Postal (1977, 1984)), the relativization accessibility hierarchy of Keenan and Comrie (1977), and the hierarchy of grammatical relations embodied in Categorical Grammar (Dowty (1982a,b))), which is summarized by the ordering sketched in (15).

- (15) SUBJECT < PRIMARY OBJ < SECOND OBJ < OTHER COMPLEMENTS

The restricted reformulation of Principle A that is required can be stated roughly as follows:

- (16) An anaphor must be coindexed with a less oblique coargument, if there is one.

This form of Principle A immediately predicts contrasts like the one in (17) (noted by Postal (1971: 193)), which, as far as we are aware, are problematic for all formulations of Principle A stated in terms of c-command.<sup>4</sup>

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<sup>4</sup>As noted by one anonymous *LI* referee, the following example is also ungrammatical:

(17) a. Mary talked to John<sub>i</sub> about himself<sub>i</sub>.

b. \*Mary talked about John<sub>i</sub> to himself<sub>i</sub>.

Since *to*-phrases, which are standardly analyzed as *terms* in Relational Grammar and other frameworks that recognize such a notion, are lower in the relevant ordering (i.e. less oblique) than oblique dependents like *about*-phrases, it follows that the object of *about* can never be the antecedent of an anaphor that is the object of a *to*-phrase. This effect, it should be noted, is independent of whatever further linear order constraints on anaphors might be required in order to explain examples like (18), which are not ruled out by (16).

(18) a. ?Mary explained to himself<sub>i</sub> [the man from East Texas who was looking for increased self-awareness]<sub>i</sub>.

b. \*Mary talked about himself<sub>i</sub> to John<sub>i</sub>.

The formulation of Principle A in (16) also predicts that an anaphor like the one in (14) is exempt, since there is no less oblique potential binder within the NP's argument structure. Similarly, the reciprocal possessor in NP's like [*each other's gardens*] is exempt, since it is the least oblique dependent within the NP. These are precisely the anaphors that were cited earlier (7a,i,j) as problematic exceptions to Principle A. And likewise, the anaphors in phrases like [*as for himself*], [*John and herself*], and [*people like himself*] (cf. (8)) are exempt because they occur in phrases lacking a less oblique potential binder. Also exempt on this account are the subject anaphors in phrases like [*for each other to be nominated*].

We will make this proposal more precise in section 6. In the next section, we consider critically various attempts to reconcile subsets of these facts with binding theories stated in terms of *c*-command.

## 4 Previous Approaches to Exempt Anaphors

It has long been realized that the anaphors we are calling exempt may take as antecedents *c*-commanding NP's outside of the minimal clause containing the anaphor. Such examples were noted in Chomsky (1973: 261, exx. (155) and (157)):

(19) a. Why are [John and Mary]<sub>i</sub> letting the honey drip on each other<sub>i</sub>'s feet?

b. Why are they<sub>i</sub> letting the baby fall on each other<sub>i</sub>'s laps?

In discussing these examples (which are due to R. Kayne and Y. Bordelais), Chomsky speculated that the Specified Subject Condition might be reformulated in terms of the

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(i) \*Mary talked about John<sub>i</sub> to him<sub>i</sub>. This fact is predicted by our formulation of Principle C (130).

notion “specified agent”. Such a generalization, if correct, would be difficult to square with current formulations of binding theory. But, in any case, the generalization cannot be correct in light of examples like (20), where the relevant subject NP (*General Noriega*) is clearly agentive.

(20) Bush and Dukakis<sub>*i*</sub> charged that General Noriega had secretly contributed to each other<sub>*i*</sub>'s campaigns.

(20) should be compared with (21), where the anaphor is the direct syntactic argument of the verb.

(21)\*Bush and Dukakis<sub>*i*</sub> charged that General Noriega had secretly visited each other<sub>*i*</sub>.

The anaphor in this example, unlike the one in (20), is not exempt, and hence must be bound by its (only) coargument, the subject NP of the embedded sentence.

Given these observations, it is odd that recent discussions of binding theory have focussed on the question of how anaphors contained within embedded subjects, as in (22), or anaphors that follow expletive subjects (e.g. *there*), as in (23) cause the binding domain of anaphors to be minimally expanded (see, for example, Chomsky (1986: 173-174)).

(22) a. The men<sub>*i*</sub> knew that pictures of each other<sub>*i*</sub> would be on sale.

b. John<sub>*i*</sub> thought that the picture of himself<sub>*i*</sub> on the front page of the Times had been widely circulated.

(23) a. The men<sub>*i*</sub> knew that there were pictures of each other<sub>*i*</sub> on sale.

b. John<sub>*i*</sub> knew there was a picture of himself<sub>*i*</sub> in the post office.

The inappropriateness of this avenue of inquiry is underlined by the fact that exempt reflexives may also be discourse-bound, as in (24).

(24) a. John<sub>*i*</sub> was furious.

The picture of himself<sub>*i*</sub> in the museum had been mutilated.

b. Mary<sub>*i*</sub> was extremely upset.

That picture of herself<sub>*i*</sub> on the front page of the Times would circulate all over the world.

Under the right circumstances then, exempt reflexive anaphors need not have an antecedent within the same sentence, contradicting one of the critical predictions (see section 2) of extant binding theories.<sup>5</sup>

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<sup>5</sup>The same is true of reciprocal anaphors for many speakers (though judgements vary considerably), as the following example shows:

- (i) There was still the question of birthday presents for the twins. Tiny gilt-framed portraits of each other would certainly do, but there was also that life-size stuffed giraffe at F.A.O. Schwartz.

But anaphors which are coarguments of a subject or possessor may not undergo discourse control, as the deviance of examples like (25) shows.

- (25) a. John<sub>i</sub> was furious.  
\* Mary's picture of himself<sub>i</sub> in the museum had been mutilated.
- b. John<sub>i</sub> was furious.  
\* The fact that Mary had fought with himself<sub>i</sub> would be known to everyone.

Thus binding theory must distinguish between exempt and non-exempt anaphors, as we did in the previous section, in order to characterize when discourse binding of an anaphor is possible.

Chomsky (1981: 98-100; 1986: 172-173) offers an account of related data that makes appeal to a "hidden pronominal" within picture noun phrases. On his account, an example like (26) is analyzed as containing a phonetically unexpressed possessive pronoun (PRO), as shown in (27).

(26) We<sub>i</sub> felt that any criticisms of each other<sub>i</sub> would be inappropriate.

(27) We<sub>i</sub> felt that PRO<sub>i</sub>'s criticisms of each other<sub>i</sub> would be inappropriate.

The presence of such a pronominal, which undergoes control by the matrix subject, is intended to explain the fact that examples like (26) convey the inappropriateness of *our* criticisms of each other, whereas examples like (28), where no PRO is present, and hence no local binding is mandated, convey that *someone else's* criticism is inappropriate.

(28) We<sub>i</sub> felt that any criticisms of us<sub>i</sub> would be inappropriate.

Such a proposal seems untenable, however. First, unlike previous proposals where null pronominals occupy independently motivated syntactic positions, this analysis posits null possessive pronominals in positions where possessives may never occur:

(29) a.\*our any criticisms

b.\*any our criticisms

Second, as noted by Kuno (1987: 170ff.), Chomsky's proposal wrongly requires that in examples like (30), the null possessive pronominal be indexed in a manner that is inconsistent with what the sentence means.

(30) To replace the one she had written, John handed Mary<sub>i</sub> a description of herself<sub>i</sub> that he was sure would impress the committee.

More specifically, in the present case the null pronominal would be coindexed with *Mary*, though it is clear that Mary's self-description is not what the sentence is about.<sup>6</sup> Thus allowing the possibility of hidden pronominals fails to bring all cases of picture noun anaphors within the scope of a single binding principle.

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<sup>6</sup>We have adapted Kuno's examples without, we hope, doing injustice to his argument.

Inasmuch as “hidden pronominals” do not suffice to explain the full range of potential problems that picture noun anaphors pose for his binding theory, Chomsky (1986: 173-174) seeks to explain the possibility of examples like (31) by appeal to an “i-within-i” condition, which disallows indexings of a phrase that result in the coindexing of a phrase with another phrase that contains it.

(31) The children<sub>*i*</sub> thought that pictures of each other<sub>*i*</sub> were on sale.

The immediate effect of imposing this condition is to render the main clause in (31) the governing category in which *each other* must be bound, as desired. However, as Chomsky (1981, 229, fn. 63) points out, the statement of the i-within-i condition must be revised as in (32) so as not to rule out grammatical examples like *the man who saw himself*:

\*[...  $\alpha_i$ ...[ $\beta_i$ ... $\gamma_i$ ]... $\alpha_i$ ...] unless  $\gamma_i$  is the head of  $\beta_i$

The proposed revision appears to lack any principled basis. But even if it can be made to follow from other principles, the revised i-within-i condition does not account for the full range of examples we have been considering. In particular, it fails to account for examples (7a, g, h, and i), Chomsky’s own (1973) examples in (19), or example (20).<sup>7</sup>

There is an additional problem for any approach to exempt anaphors that is stated in terms of syntactic binding domains. As noted by Lebeaux (1984: 346; see also Bouchard (1982)), such anaphors may have split antecedents:

(32) John told Mary that there were some pictures of themselves inside.

The examples in (33) illustrate the same point:

- (33) a. Iran agreed with Iraq that each other’s shipping rights must be respected.  
 b. John asked Mary to send reminders about the meeting to everyone on the distribution list except themselves.

But this contradicts another of the critical predictions of extant binding theories enumerated in section 2.

Lebeaux also notes that when an anaphor is a direct syntactic argument of a verb, split antecedency is impossible:

(34) \*John told Mary about themselves.

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<sup>7</sup>The discussion in Chomsky (1981: 214) explicitly rejects the earlier attempt (Chomsky (1973)) to explain examples like (19) in terms of the notion “specified agent”, in favor of an account that defines binding domains by appeal to the “i-within-i” condition. But neither the account in Chomsky (1981) nor the subsequent proposal in Chomsky (1986) explains the grammaticality of the examples in (19) and (20).

Thus our restricted formulation of Principle A, stated in terms of argument structure and relative obliqueness, correctly distinguishes between anaphors with less oblique coarguments, which are required to be coindexed with one of those coarguments, and exempt anaphors, which are not subject to Principle A and hence are free to refer to a group entity that is introduced into a discourse by amalgamating the references of two distinct NP's.

We now turn to the problem raised by the assumption that binding constraints are stated in terms of c-command. In the most commonly discussed examples of anaphor binding, e.g. those in (1), it is evident that the anaphors are c-commanded by their antecedents. However, as noted by Chomsky (1981: 226), a serious problem arises in the case of examples like (35).

(35) I spoke to [John and Bill]<sub>i</sub> about each other<sub>i</sub>.

Under standard assumptions about constituent structure, the NP *John and Bill* is the object of the preposition *to* and hence does not c-command the anaphor *each other* in this example.

Chomsky considers the possibility that *spoke to* is reanalyzed as a verb, rendering *John and Bill* a direct object NP which does c-command the anaphor,<sup>8</sup> but observes the implausibility of this approach in the face of examples like (36) (Chomsky (1981: 226, ex. (vii))).

(36) I spoke angrily to the men<sub>i</sub> about each other<sub>i</sub>.

He concludes that “[i]t is not clear whether this approach is on the right track”. Accepting this assessment, we may conclude that, unless one entertains some otherwise unmotivated complication of the definition of c-command, examples of this sort pose a serious problem for attempts to formulate constraints on the binding of anaphors in terms of that notion.

In summary, exempt anaphors cannot be treated simply by redefining the notion of binding domain.<sup>9</sup> First, we have seen that anaphors that have a less oblique potential binder within the minimal argument structure must be coindexed with such a binder. Second, whereas we have seen that the antecedent of an exempt anaphor is sometimes a c-commanding NP in a larger syntactic domain (e.g. (19),(20)) we have also seen cases where the antecedent is more deeply embedded than the anaphor (e.g. (6),(7)a-h), cases of split antecedents for exempt anaphors (e.g. (33),(34)), and cases where the antecedent

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<sup>8</sup>For further discussion of the problems raised by such a proposal, see Postal (1986).

<sup>9</sup>The taxonomy of properties of locally bound and nonlocally bound anaphors given in Lebeaux (1984) would seem to argue for a similar conclusion, though Lebeaux's treatment of binding in terms of predication leaves several key observations unexplained, e.g. the possibility of cross-discourse control. In addition, one of Lebeaux's claims, that locally bound anaphors admit of only “sloppy” interpretations in Verb Phrase Ellipsis, is highly questionable for reasons discussed in Sag (1976). Though the preference for such interpretations is clear, non-sloppy interpretations seem possible in examples like *If John<sub>i</sub> doesn't prove himself to be innocent, I'm sure that new lawyer he hired will*. For this reason, we are reluctant to use verb phrase ellipsis to buttress our claims about the different properties of the two classes of anaphors.

of an exempt anaphor is in the prior discourse context (e.g. (24)). But in none of these cases is an anaphor with a less oblique coargument exempted from Principle A (hence the deviance of the examples in (3), (10), (11)b, (12)b, (21), and (35)). Any attempt to allow larger binding domains to emerge from redefinition would not predict this difference in behavior between exempt and non-exempt anaphors. For this reason, we conclude that non-subject coargument anaphors are the only anaphors that should be constrained by Principle A.

## 5 Constraints on Exempt Anaphors

The tightly constrained formulation of Principle A we propose leaves a wide class of anaphors exempt from *grammatical* constraints. Yet exempt anaphors are not completely unconstrained with respect to the choice of antecedent. In this section we discuss both processing (*intervention*) and discourse (*point of view*) constraints on exempt anaphors.

Why have binding theorists tried to unify the account of coargument anaphors and exempt anaphors? The reason is that in simple examples like (2), repeated here, the observed coindexing seems obligatory.<sup>10</sup>

- (37) a. John<sub>i</sub> found [a picture of himself<sub>i</sub>].  
 b. The women<sub>i</sub> selected [pictures of each other<sub>i</sub>].  
 c. The men<sub>i</sub> admired [each other<sub>i</sub>'s trophies].  
 d. The men<sub>i</sub> introduced the women<sub>j</sub> to [each other<sub>i/j</sub>'s spouses].

Similarly, in examples like (38), it appears that the minimal c-commanding NP (i.e. *Tom*) is the only possible antecedent for the anaphor.

- (38) a. Bill remembered that Tom<sub>i</sub> saw [a picture of himself<sub>i</sub>] in the post office.  
 b. What Bill remembered was that Tom<sub>i</sub> saw [a picture of himself<sub>i</sub>] in the post office.  
 c. What bothered Bill was that Tom<sub>i</sub> had seen [a picture of himself<sub>i</sub>] in the post office.  
 d. Bill remembered that Tom<sub>i</sub> said that there was [a picture of himself<sub>i</sub>] in the post office.  
 e. What Bill remembered was that Tom<sub>i</sub> said that there was [a picture of himself<sub>i</sub>] in the post office.

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<sup>10</sup>We are indebted to two anonymous LI reviewers for raising the issues we address here.

These facts are predicted by standard versions of binding theory, in which Principle A is formulated so as to ignore the distinction between exempt and nonexempt anaphors. The restricted formulation of Principle A we have offered does not guarantee the coindexings indicated in these examples.

This, however, is a virtue of our analysis. Although there are diverse factors that interact to cause the coindexings indicated in these examples to be favored, these coindexings are not absolute. Hence they should not be enforced by principles of grammar, which state absolute constraints on binding. To see this, note first that changing the intervening NP *Tom* to an inanimate NP improves the acceptability of picture noun reflexives with non-local antecedents:<sup>11</sup>

- (39) a. ?Bill<sub>i</sub> remembered that *The Times* had printed [a picture of himself<sub>i</sub>] in the Sunday edition.
- b. ?What Bill<sub>i</sub> remembered was that *The Times* had printed [a picture of himself<sub>i</sub>] in the Sunday edition.
- c. ?What bothered Bill<sub>i</sub> was that *The Times* had printed [a picture of himself<sub>i</sub>] in the Sunday edition.
- d. Bill<sub>i</sub> suspected that *the silence* meant that [a picture of himself<sub>i</sub>] would soon be on the post office wall.

Quantified intervenors also enhance acceptability, as do expletive intervenors (also noted by Kuno (1987)):

- (40) a. Bill<sub>i</sub> thought that *nothing* could make [a picture of himself<sub>i</sub> in the Times] acceptable to Sandy.
- b. ?What Bill<sub>i</sub> wasn't sure of was whether *any newspaper* would put [a picture of himself<sub>i</sub>] on the front page.
- c. Bill<sub>i</sub> suspected that there would soon be [a picture of himself<sub>i</sub>] on the post office wall.
- d. Bill<sub>i</sub> knew that *it* would take a [picture of himself<sub>i</sub> with Gorbachev] to get Mary's attention.

These facts are reminiscent of those cited in the literature on “Super Equi NP Deletion” (Grinder (1970, 1971), Kimball (1971), Clements (1975), Jacobson and Neubauer (1976)). Super-Equi is a non-local anaphoric relation between the unexpressed subject of a gerund or infinitive phrase and an NP higher in the tree structure:

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<sup>11</sup>Closely related examples are noted by Kuno (1987: 95).

- (41) a. Mary<sub>i</sub> knew [that [PRO<sub>i</sub> getting herself arrested] would be unpleasant].
- b. John<sub>i</sub> thought [that the fact [that [PRO<sub>i</sub> criticizing himself] was hard] surprised Mary].

Super Equi, though unbounded in principle, is subject to an *Intervention Constraint* (Grinder (1970)), which rules out the possibility of a non-local controller when another possible controller intervenes, as shown in (42) (examples from Jacobson and Neubauer (1976: 434ff)).

- (42) a. \*John<sub>i</sub> thought [that Mary would be bothered by [PRO<sub>i</sub> shaving himself]].
- b. \*John<sub>i</sub> thought [that Mary was surprised by the fact [that [PRO<sub>i</sub> criticizing himself] was hard]].

The Intervention Constraint, in our view, is plausibly viewed as a processing-based factor that interacts with grammatical constraints in such a way as to render unacceptable a family of sentences that are otherwise grammatical.<sup>12</sup>

Now as the literature on Super Equi makes clear, there are certain intervenors that do not inhibit long distance control, e.g. expletives:

- (43) a. John<sub>i</sub> thought [that it would be illegal [PRO<sub>i</sub> to undress himself]]. (Clements (1975))
- b. John<sub>i</sub> thought [that it was likely [to be illegal [PRO<sub>i</sub> to undress himself]]].
- c. Mary<sub>i</sub> knew [that there would be no particular problem in [PRO<sub>i</sub> getting herself a job]].

And it is straightforward to show that inanimate intervenors also increase acceptability.

- (44) a. John<sub>i</sub> thought [that Proposition 91 made [PRO<sub>i</sub> undressing himself] illegal].
- b. Mary<sub>i</sub> knew [that the prevailing political climate would ensure [that [PRO<sub>i</sub> getting herself arrested] would be unpleasant]].

The similarity between the the way intervenors affect Super Equi sentences and the observed facts of exempt anaphors is striking. In fact, Jacobson and Neubauer (1976: 435) suggest in passing that (for many speakers) both phenomena are governed by the very same Intervention Constraint. Once this insight is appreciated, we can begin to understand how many researchers have mistakenly thought that exempt anaphors

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<sup>12</sup>See the closely related proposal in Kuno (1987: 74ff), stated in terms of Langacker's (1969) notion of *chain of command*.

obey the same constraints as non-subject coargument anaphors. Structures containing animate intervenors define environments virtually identical to those where Principle A does hold. It is only when we consider examples lacking strong (typically animate) intervenors that we see that the constraint in question is weaker than Principle A.

Another factor that appears to affect the acceptability of exempt anaphors is the nature of the determiner. Changing the determiner of a picture noun phrase to *the* or *that*, i.e. making the phrase more definite, often improves acceptability:

- (45) a. What Bill<sub>i</sub> finally realized is that The Times was going to print [that picture of himself<sub>i</sub> with Gorbachev] in the Sunday edition.
- b. Bill<sub>i</sub> finally realized that if *The Times* was going to print [that picture of himself<sub>i</sub> with Gorbachev] in the Sunday edition, there might be some backlash.
- c. Bill<sub>i</sub> suspected that the silence meant that [the picture of himself<sub>i</sub> with Gorbachev] had already gone to press.

These examples also demonstrate another important factor that has long been recognized to be relevant to the acceptability of picture noun reflexives: *point of view*. The differences between reportive and non-reportive style and their importance for the statement of linguistic principles have been discussed at length in the literature.<sup>13</sup> The conclusion reached within this tradition of research, by and large ignored in current discussions of binding theory, is that reflexive pronouns, in particular (exempt) picture noun reflexives, often are assigned an antecedent on the basis of point of view, the reflexive taking as its antecedent an NP whose referent is the individual whose viewpoint or perspective is somehow being represented in a given text. We will make no attempt here to summarize the evidence for this conclusion except to cite two further pieces of evidence supporting it.

Consider the discourse in (46).

- (46) John<sub>i</sub> was going to get even with Mary. That picture of himself<sub>i</sub> in the paper would really annoy her, as would the other stunts he had planned.

In the most natural interpretation of (46), the narrator has taken on John's perspective, or viewpoint. This perspective is moreover maintained throughout the two sentence text. And the picture noun reflexive is naturally interpretable as referring to John.

Compare this with the discourse in (47), where Mary's viewpoint is presented.

- (47)\*Mary was quite taken aback by the publicity John<sub>i</sub> was receiving. That picture of himself<sub>i</sub> in the paper had really annoyed her, and there was not much she could do about it.

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<sup>13</sup>A few relevant references are: Kuroda (1965, 1973), Kuno (1972, 1975, 1983, 1987), Kuno and Kaburaki (1975), Cantrall (1974), Banfield (1982), Sells (1987), Zribi-Hertz (1989) and Iida (forthcoming).

Here the picture noun reflexive with *John* as antecedent is unacceptable. In order to refer to John in such a text, a non-reflexive pronoun must be used, as in (48).

- (48) Mary was quite taken aback by the publicity John<sub>i</sub> was receiving. That picture of him<sub>i</sub> in the paper had really annoyed her, and there was not much she could do about it.

This kind of observation strongly suggests that when a reflexive is exempt from Principle A, it is constrained, in part, to take as its antecedent an NP referring to the individual whose viewpoint the text presents.

In addition, it is generally assumed in discourse studies that each sentence (or clause) presents at most one viewpoint.<sup>14</sup> This assumption, taken together with the claim that exempt anaphors refer to the individual whose viewpoint is expressed, leads to the conclusion that if a single clause has more than one such anaphor, they will be referentially identical. This conclusion appears to be correct for English, as the unacceptability of the following examples shows.

- (49) a. \*John told Mary that the photo of himself with her in Rome proved that the photo of herself with him in Naples was a fake.  
 b. \*John traded Mary pictures of herself for pictures of himself.

This fact, incidentally, is paralleled in Japanese, where two occurrences of the *zibun* in a simple clause must be coreferential. A sentence may contain two non-coreferential occurrences of *zibun* just in case they occur in different clauses each of which presents a distinct viewpoint. Thus (50) can convey that Taroo could not defend Hanako from the criticism of her (Hanako's) friend, but (50) cannot convey that Taroo could not defend Hanako against the criticism of his (Taroo's) friend (Iida (forthcoming)).

- (50) Hanako-wa Taroo-ga zibun-o [zibun-no tomodati-no  
 Hanako-TOP Taroo-SUBJ self-OBJ self-of friend-of  
 hihan-kara] mamorikire-nakatta] koto-o sitteita.  
 criticism-from defend-could-not CMP know  
 Hanako<sub>i</sub> knew that Taroo<sub>j</sub> couldn't defend her<sub>i</sub> against her<sub>i</sub>/\*his<sub>j</sub> friend's criticism

But in an example like (51), where the embedded *no* clause may induce a shift in viewpoint, no such constraint is to be observed.

- (51) Hanako<sub>i</sub>-wa [zibun<sub>i</sub>-ga sono toki sudeni [Taroo-ga<sub>j</sub>  
 Hanako-TOP self-SUBJ that time already Taroo-SUBJ  
 zibun<sub>i/j</sub>-o kiratteiru-no]-o sitteita koto]-o mitometa-gara-nakat-ta  
 self-OBJ hate-CMP-OBJ know CMP-OBJ admit-want-not-past  
 'Hanako<sub>i</sub> did not want to admit that she<sub>i</sub> already knew at the time that Taroo<sub>j</sub>  
 hated her<sub>i</sub>/himself<sub>j</sub>.

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<sup>14</sup>Kuno (1987: 207ff) discusses related facts in terms of his *Ban on Conflicting Empathy Foci*.

In the analysis developed by Iida (forthcoming), a unified account of *zibun* binding is offered in terms of viewpoint. An instance of *zibun* always takes as its antecedent an NP whose referent is the individual whose viewpoint is presented by a sentence containing that instance. When a given clause allows only one such viewpoint, multiple occurrences of *zibun* will be coreferential (as in (50)); but when embedding allows new viewpoint domains to be introduced (as in (51)), two occurrences of *zibun* need not be coreferential.

The fact that subjecthood is often (but not always) correlated with viewpoint explains the near correlation of subjecthood with *zibun* antecedency that is often cited as absolute in the literature. But stating the condition on *zibun* antecedency solely in terms of viewpoint allows Iida to unify the account of the previous examples with that of examples like (52), where the *zibun* antecedent *Taroo* is not the subject at any level of syntactic analysis:

- (52) [zibun<sub>i</sub>-no buka-no            husimatu-ga]  
       self<sub>i</sub>-of    subordinate-of misconduct-SUBJ  
       Taroo-no syusse-o            samatagete-simatta.  
       Taroo-of promotion-OBJ blocked-have  
       ‘Misconduct of his<sub>i</sub> subordinate has blocked Taroo<sub>i</sub>’s promotion’

It should be noted in passing that examples such as (52) would also be problematic for any account of long-distance reflexives which predicted obligatory binding by a c-commanding subject, e.g. versions of Principle A which assume movement from an argument position to AGR (see p. 2, fn. 1). Indeed, accounts of this kind have been proposed for the Chinese long-distance reflexive *ziji* (Battistella (1987); Cole et al. (1990)); but examples such as (53) – (55) (due to Tang (1989)), where the subject antecedent fails to c-command the anaphor, are inconsistent with such an account.

- (53) [Zhangsan<sub>i</sub> de    jiaobao]<sub>j</sub> hai le    ziji<sub>i/\*j</sub>  
       Zhangsan    PART pride    hurt PER self  
       ‘Zhangsan’s pride harmed him’
- (54) [Wo<sub>i</sub> ma    ta]<sub>j</sub> duì ziji<sub>i/\*j/\*k</sub> meiyou    haochu  
       I    scold he    to self    not-have advantage  
       ‘That I scolded him did me no good’
- (55) [[[Zhangsan<sub>i</sub> de]    baba]<sub>j</sub> de]    qian]<sub>k</sub> bei  
       Zhangsan    PART father PART money BEI  
       ziji<sub>\*i/j/\*k</sub> de    pengyou touzou le  
       self    PART friend    steal    PER  
       ‘[[Zhangsan<sub>i</sub>’s father]<sub>j</sub>’s money]<sub>k</sub> was stolen by his<sub>\*i/j/\*k</sub> friend.’

Tang proposes an alternative account whereby, in case a c-commanding subject fails to be animate, antecedency can pass to the highest animate subject (or possessor) embedded within it.

However, as noted by Wang (1990), Tang’s judgements seem to reflect only preferences for topic (or viewpoint). Tang’s example (55), for example, may occur in discourses like the one in (56).

- (56) Zhangsan<sub>i</sub> de baba de qian bei ziji<sub>i</sub> de pengyou touzou le.  
 Zhangsan<sub>i</sub>'s father's money BEI self<sub>i</sub>'s friend steal PER  
 Mama de shu ye bei ziji<sub>i</sub> de pengyou touzou le.  
 mother's book also BEI self's friend steal PER  
 'Zhangsan<sub>i</sub>'s father's money was stolen by his<sub>i</sub> friend. (His) mother's books were  
 also stolen by his<sub>i</sub> friend'

And here it is clear that *ziji* can take *Zhangsan* as its antecedent. Moreover, in examples like the following (also due to Wang (1990)) *ziji* can only be coindexed with *Zhangsan*:

- (57) [Zhangsan<sub>i</sub> de baba de qian he mama de shu]  
 Zhangsan PART father PART money and mother PART book  
 dou bei [ziji<sub>i</sub> de pengyou] touzou le  
 both/all BEI self PART friend steal PER  
 'Zhangsan<sub>i</sub>'s father's money and (his) mother's books were both stolen by his<sub>i</sub>  
 friend.'

Indeed, such examples suggest the possibility that discourse-based notions such as viewpoint or center of attention, perhaps in interaction with purely syntactic constraints, play a role in the interpretation of *ziji* as well.

In support of the movement-to-AGR account of long-distance anaphor binding, Chomsky (1986: 174-175) cites example (58), noting that “[h]ere the binder of *each other* must be *they*, not *us*, as the sense makes clear.”

- (58) They told us that pictures of each other would be on sale.

However, as Chomsky acknowledges in a footnote, “the relevant facts are less clear than the exposition assumes.” Accepting this assessment, we find the reading of (58) where *us* antecedes the reciprocal to be quite acceptable. Indeed, in structurally identical examples such as (59), the matrix object is the preferred antecedent.

- (59) a. John told his two daughters that each other's pictures were prettier.  
 b. The matchmakers told Zhang Xiansheng and Li Xiaojie that each other's parents were richer than they really were

On the basis of the foregoing facts, we consider an account of long-distance anaphor binding based upon movement to AGR (or some analog in terms of structure sharing) to be untenable.

English “psych” verbs, e.g. *bother*, present another case in which failure to consider a sufficiently wide range of data has led previous analyses to overlook the possible role of viewpoint in determining the antecedent of anaphors. It is natural to assume that the bearer of the experiencer role (e.g. the direct object of *bother*) is the individual whose viewpoint is being reflected. And so we observe contrasts like (60a,b):

- (60) a. The picture of himself<sub>i</sub> in *Newsweek* bothered John<sub>i</sub>.

b.\*The picture of himself<sub>i</sub> in *Newsweek* bothered John<sub>i</sub>'s father.

Though attempts have been made to reanalyze such examples syntactically in order to reconcile them with Principle A (Belletti and Rizzi (1986), Pesetsky (1987)), it might just as plausibly be maintained that (60)b is bad precisely because sentences containing verbs like *bother* tend to present the experiencer's (John's father's) viewpoint (not John's). This account is further supported by the grammaticality of examples such as those in (61):

- (61) a. The picture of himself<sub>i</sub> in *Newsweek* dominated John<sub>i</sub>'s thoughts.  
b. The picture of himself<sub>i</sub> in *Newsweek* made John<sub>i</sub>'s day.  
c. The picture of himself<sub>i</sub> in *Newsweek* shattered the piece of mind that John<sub>i</sub> had spent the last six months trying to restore.

Note that (61)a and (61)b are structurally the same as (60)b; the difference is that in all the examples in (61), it is John whose viewpoint is reflected. It is difficult to imagine any principle involving a configurationally determined notion of binding domain, however formulated, that would account for such facts.

Finally, we consider a proposal made by Zribi-Hertz (1989), who discusses examples like (62).

- (62) a. Its burden did not rest upon herself<sub>i</sub> alone.  
b. His<sub>i</sub> wife was equally incredulous of her innocence and suspected himself<sub>i</sub> to be the cause of her distress.  
c. Désirée had undoubtedly explained to them the precise nature of her relationship with himself<sub>i</sub>.  
d. But Rupert<sub>i</sub> was not unduly worried about Peter's opinion of himself<sub>i</sub>.  
e. Miss Stepney<sub>i</sub>'s heart was a precise register of facts as manifested in their relation to herself<sub>i</sub>.

These examples arguably all contain non-exempt anaphors in violation of Principle A and are predicted to be ungrammatical by the analysis we have put forth. Indeed, such examples are uniformly judged ungrammatical by American speakers (insofar as we have been able to ascertain) and illustrate a type of example that have been assumed to be ungrammatical in virtually all previous treatments of English reflexives.<sup>15</sup>

However, as Zribi-Hertz points out, such examples are attested in the works of various writers:

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<sup>15</sup>An exception is Kuno (1987: 75), who cites examples like *??Mary wouldn't care a bit about anybody's pictures of herself*. as nearly acceptable for many speakers.

- (63) Clara<sub>i</sub> did not know whether to regret or to rejoice at their arrival; she<sub>i</sub> did not get on well with either of them (...), and yet, on the other hand their presence did not intensify the difficulty, but somehow dissipated and confused it, so that at least its burden did not rest upon herself<sub>i</sub> alone. [Margaret Drabble]
- (64) Not till she had, with difficulty, succeeded in explaining to him<sub>i</sub> that she had done nothing to justify such results and that his<sub>i</sub> wife was equally incredulous of her innocence and suspected himself<sub>i</sub>, the pastor, to be the cause of her distress, did his<sub>i</sub> face light up with understanding. [William Gerhardie]
- (65) Whom he<sub>i</sub> [Philip] was supposed to be fooling, he<sub>i</sub> couldn't imagine. Not the twins, surely, because Désirée, in the terrifying way of progressive American parents, believed in treating children like adults and had undoubtedly explained to them the precise nature of her relationship with himself<sub>i</sub>. [David Lodge]
- (66) But Rupert<sub>i</sub> was not unduly worried about Peter's opinion of himself<sub>i</sub>. [Iris Murdoch]
- (67) Miss Stepney<sub>i</sub>'s [heart was] a precise register of facts as manifested in their relation to herself<sub>i</sub>. [Edith Wharton]

It is interesting to note that none of her examples are from spoken language, an idiom that seems to exclude the possibility of such violations of Principle A.

The examples in (63) – (67) suggest either (1) that there exist differences among varieties of English with regard to the precise formulation of Principle A, or (2) that grammatical constraints can sometimes be relaxed by writers who exercise certain license with their language. The latter possibility seems particularly plausible if there is an inherent association of reflexives with point of view. This association works in tandem with Principle A in everyday language use, but may provide an overarching strategy for reflexive interpretation in highly stylized narrative that supercedes Principle A.

In any case, the stark unacceptability of examples like those in (62), in contrast to the fully acceptable examples we have considered involving exempt anaphors with non-local antecedents, e.g. those in (68), is in need of explanation.

- (68) a. The picture of herself<sub>i</sub> on the front page of the Times made Mary<sub>i</sub>'s claims seem somewhat ridiculous.
- b. The picture of herself<sub>i</sub> on the front page of the Times confirmed the allegations Mary<sub>i</sub> had been making over the years.
- c. They<sub>i</sub> made sure that nothing would prevent each other<sub>i</sub>'s pictures from being put on sale.
- d. John<sub>i</sub> was furious.  
The picture of himself<sub>i</sub> in the museum had been mutilated.

- e. The agreement that [Iran and Iraq]<sub>i</sub> reached guaranteed each other<sub>i</sub>'s trading rights in the disputed waters until the year 2010.
- f. Bill<sub>i</sub> finally realized that if *The Times* was going to print [that picture of himself<sub>i</sub> with Gorbachev] in the Sunday edition, there might be some backlash.

On our theory, it is a properly formulated Principle A that provides this explanation.

## 6 Principle A: Prolegomena

How then can Principle A be formulated so as to reflect the difference between exempt and non-exempt anaphors? As we have seen, an adequate theory of English anaphors must provide a conception of syntactic structure that embodies the notion of relative obliqueness described in section 3. In addition, the concept of obliqueness that is embodied in such a theory must be such that the structural differences occasioned by the presence of “case marking” (nonpredicative) prepositions (e.g. *to*, *with*) do not alter obliqueness relations. Thus a direct object NP and a *to*-phrase object must both be counted as less oblique than the object of a preposition like *about* in order to account for the parallel applications of Principle A in examples (69a,b):

- (69) a. Kim<sub>i</sub> told Bill<sub>j</sub> about himself<sub>i/j/\*k</sub>.  
 b. Kim<sub>i</sub> talked to Bill<sub>j</sub> about himself<sub>i/j/\*k</sub>.

We would like to suggest that exactly the right concept of syntactic argument structure for expressing Principle A is available within head-driven phrase structure grammar (HPSG), a theory of syntax (and semantics) that we have been developing for several years.<sup>16</sup>

In HPSG, verbs and other lexical items that head phrases bear a lexical specification for a feature SUBCAT, which takes as its value a list of specifications corresponding to the various complements (broadly construed to include subjects, including possessive phrases within NP's) 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.<sup>17</sup> Thus the SUBCAT list for an intransitive verb contains exactly one NP, corresponding to the verb's subject; and the SUBCAT list for

<sup>16</sup>See Pollard and Sag (1987, forthcoming) and also Sag and Pollard (1989).

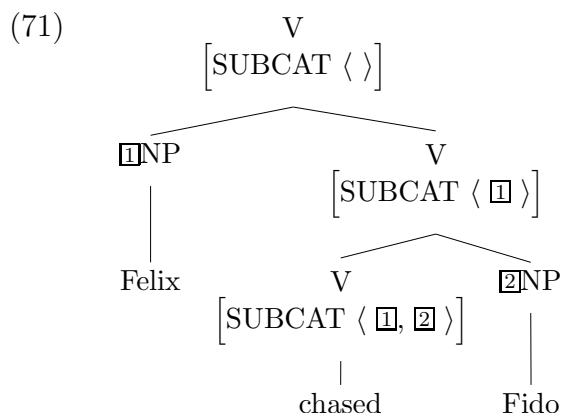
<sup>17</sup>In the case of English double-object verbs, we take the immediately postverbal NP to be less oblique. Thus in (i) *Sandy* is the primary (less oblique) object and *the book* the secondary (more oblique) object; while in (ii) it is *the book* that is the primary object.

- (i) Kim gave Sandy the book.

a (strict) transitive verb contains exactly two NP's, the first corresponding to the verb's subject and the second to its (primary) object, as illustrated in (70).

- (70) a. died  
       SUBCAT ⟨NP⟩
- b. chased  
       SUBCAT ⟨NP, NP⟩

The satisfaction of SUBCAT specifications replaces  $\bar{X}$  theory as the fundamental principle underlying the construction of headed phrases.<sup>18</sup> 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 (71): (Here, V[SUBCAT ⟨ ⟩] is functionally equivalent to 'S' and V[SUBCAT ⟨NP⟩] to 'VP'.)



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 (71) 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”).

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(ii) Kim gave the book to Sandy.

In particular, we eschew 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.

<sup>18</sup>This statement is something of a simplification, as SUBCAT specifications serve only to relate heads to complements. As described in Pollard and Sag (forthcoming), other features are employed to mediate dependencies which obtain between noncomplements (e.g. adjuncts and markers) and the heads they depend on.



$$(74) \left[ \begin{array}{l} \text{CATEGORY} \\ \text{CONTENT} \end{array} \left[ \begin{array}{l} \text{HEAD} \quad \textit{verb} \\ \text{SUBCAT} \quad \langle \text{NP}:x, \text{NP}:y \rangle \\ \text{RELATION} \quad \textit{chase} \\ \text{AGENT} \quad x \\ \text{PATIENT} \quad y \end{array} \right] \right]$$

$$(75) \left[ \begin{array}{l} \text{CATEGORY} \\ \text{CONTENT} \end{array} \left[ \begin{array}{l} \text{HEAD} \quad \textit{noun} \\ \text{SUBCAT} \quad \langle \rangle \\ x \end{array} \right] \right]$$

As with other verbs (and other predicative categories), the content specification is a predicate-argument structure, similar to a logical formula except that argument positions are indicated by labelling their (theta-)roles rather than positionally; universal grammatical principles (the Semantics Principle and the Head Feature Principle – Pollard and Sag (forthcoming)) ensure identity of content and head specifications between a lexical head and its phrasal projections.<sup>20</sup> Role assignment is effected by requiring that the contents of the subcategorized NP’s (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 NP’s themselves, called *parameters*, are analogous to logical variables, and are indicated here by lower-case letters from the end of the alphabet.<sup>21</sup> 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 by 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 role to its complement’s object (since the verb has access only to the complement’s content, not 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.<sup>22</sup>

We turn now to the parameters that constitute the contents of NP’s. For present purposes, there are two important points to note about parameters: (1) parameters bear *indices*, which play much the same role as the NP indices widely employed in syntactic theory; and (2) there are different sorts of parameters, corresponding to different kinds

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<sup>20</sup>The Semantics Principle in fact must be more complex than this, in order to allow for adjuncts.

<sup>21</sup>For simplicity we ignore quantification here.

<sup>22</sup>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 and Pollard (1989) and Pollard and Sag (forthcoming).

of NP's with differing referential properties. We consider these points in turn.<sup>23</sup>

As shown in (76), the index of a parameter itself has internal structure, viz. the features PERSON, NUMBER, and GENDER (informally, *agreement* features).<sup>24</sup>

$$(76) \quad \left[ \begin{array}{c} \textit{parameter} \\ \\ \text{INDEX} \left[ \begin{array}{c} \text{PER} \\ \text{NUM} \\ \text{GEND} \end{array} \right] \end{array} \right]$$

It is identity (structure-sharing) of indices that corresponds in our theory to the standard notion of coindexing for NP's, which figures centrally in binding 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.<sup>25</sup> Since the agreement features belong to the internal structure of indices, it follows immediately that coindexed NP's (such as an anaphor and its antecedent) necessarily bear identical specifications for person, number, and gender.<sup>26</sup>

On the other hand, since 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, cross-linguistic prediction.

Second, we consider the classification of parameters into sorts on the basis of the referential properties of the NP's which bear them. At the top level of the classification, we posit a distinction between parameters which are *referential* (*ref*), as opposed to those which are merely *expletive* (*expl*). In English, expletive parameters are classified as either *it* or *there*, while referential parameters fall into the three subsorts nonpronominal (*nonpro*), anaphor (*ana*), or personal-pronominal (*ppro*), i.e. pronouns which are not anaphors). For overt nominals, the three sorts of referential parameter correspond to Chomsky's three-way classification of NP's as R-expressions, anaphors, or pronominals.<sup>27</sup> The classification of NP parameters is summarized in (77):

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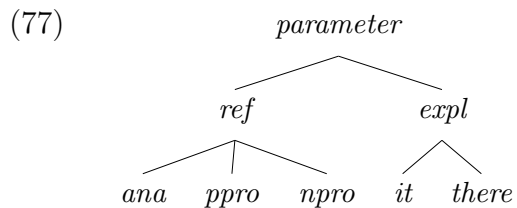
<sup>23</sup>We ignore here *restrictions* on parameters, in virtue of which heads impose semantic selectional restrictions on their complements.

<sup>24</sup>Here and throughout, we indicate the *sort* of a linguistic object via upper left annotation.

<sup>25</sup>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, the referent of an NP coincides with the anchor of the NP's parameter.

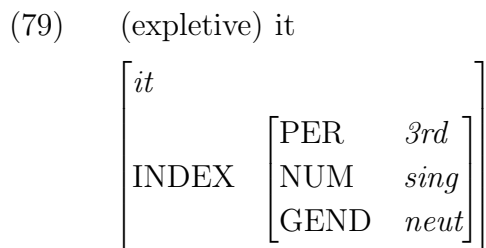
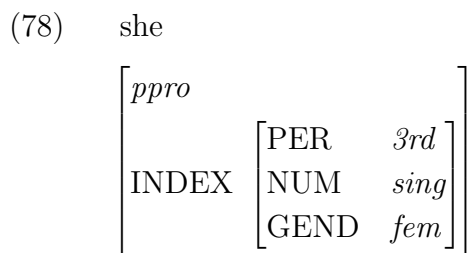
<sup>26</sup>The idea that agreement features are not syntactic features, but rather features associated with NP indices, has been proposed independently in various forms by, *inter alia*, Lapointe (1980), Hoeksema (1983), and Chierchia (1987). Some syntactic, semantic, and pragmatic consequences of this hypothesis are discussed in Pollard and Sag (forthcoming).

<sup>27</sup>The HPSG classification of empty categories differs in a number of respects from that assumed in GB theory. See Pollard and Sag (forthcoming) for discussion.

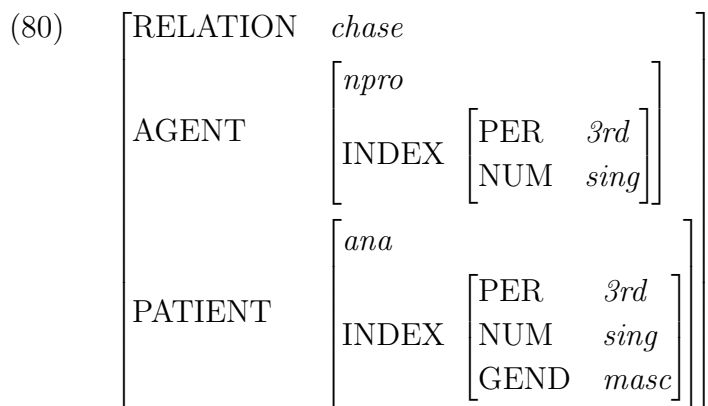


### Sortal Hierarchy of Parameters

By way of illustration, the parameters of representative NP's are given in (78):



Let us now summarize the ideas just presented. An NP has a parameter as 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 *Fido chased himself* is as indicated in (80).



What is missing in (80) is precisely the information that binding theory should supply – namely, that the two parameters must be coindexed.

On the account that we will set forth in the following section, it is lists of SUBCAT specifications on lexical heads that provide the appropriate hierarchical structure for the formulation of Principle A (and for other principles of binding theory as well). For example, in the sentence just discussed, the SUBCAT list of the verb *chased*, which will contain information that is structure-shared with the actual subject and object, will be as in (81) (here we write, for example, NP:*ana* as an abbreviation for an NP whose semantic content is a parameter of sort *ana*):

(81)  $\langle \text{NP:}npro, \text{NP:}ana \rangle$

Hence Principle A can be stated simply as a constraint requiring coindexing between an NP:*ana* and a less oblique phrase on the same SUBCAT list (the precise formulation will be given in (87) below). This will in turn ensure that the two indices in a structure like (80) will be token-identical.

To see that this approach also provides a proper account of prepositional objects and their participation in binding relations, consider the structure in (82).

(82)

$$\begin{array}{cc}
 & \text{PP} \\
 & \swarrow \quad \searrow \\
 \text{P} & \text{NP} \\
 | & | \\
 \text{to} & \text{Kim}
 \end{array}$$

On our account, a more detailed representation of (82) is as shown in (83):

(83)

$$\begin{array}{c}
 \left[ \begin{array}{l} \text{CAT} \left[ \begin{array}{l} \text{HEAD} \quad \boxed{2} \\ \text{SUBCAT} \langle \rangle \end{array} \right] \\ \text{CONT} \boxed{1} \end{array} \right] \\
 \swarrow \quad \searrow \\
 \left[ \begin{array}{l} \text{CAT} \left[ \begin{array}{l} \text{HEAD} \quad \boxed{2} \textit{prep} \\ \text{SUBCAT} \langle \boxed{3}\text{NP:}\boxed{1} \rangle \end{array} \right] \\ \text{CONT} \boxed{1} \end{array} \right] \quad \boxed{3}\text{NP} \left[ \begin{array}{l} \textit{npro} \\ \text{PER} \quad \widehat{3}\text{rd} \\ \text{NUM} \quad \textit{sing} \end{array} \right] \\
 | \qquad \qquad \qquad | \\
 \text{to} \qquad \qquad \qquad \text{Kim}
 \end{array}$$

Here we see that the lexical entry for *to* (and other nonpredicative prepositions) identifies the preposition’s content with that of the preposition’s object. This content (here a nonpronominal parameter) is in turn identified with the PP’s content, in virtue of the Semantics Principle. For this reason, PP’s headed by nonpredicative prepositions have as their content the very parameter that is introduced by the preposition’s object.

It follows from this analysis that the SUBCAT list of a sentence like *Kim talks to himself* is as shown in (84)a and that of *Sandy talked to Kim about himself* is as shown in (84)b.

- (84) a.  $\langle \text{NP:}npro, \text{PP:}ana \rangle$   
 b.  $\langle \text{NP:}npro, \text{PP:}npro, \text{PP:}ana \rangle$

Thus objects of nonpredicative prepositions may appear in syntactic positions where they fail to c-command the anaphors they bind, but PP's headed by such prepositions have referential parameters as their semantic content, just as referential NP's do. Hence if binding constraints are stated as constraints on SUBCAT lists, rather than in terms of constituent structure, the structural differences between prepositional objects and other objects are correctly predicted to be irrelevant to binding theory.

## 7 Reformulating Principle A

In the preceding section we argued that the c-command relation is not directly relevant for the correct formulation of Principle A (and, we argue elsewhere, for binding theory as a whole). In its stead, we introduce the relation we call *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 (85):<sup>28</sup>

- (85) Definitions of Local O-Command and Local O-Binding  
*A locally o-commands B* just in case the content of A is a referential parameter and there is a 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 local o-binders, must be referential (i.e. have referential parameters as their content); the significance of this will become clear below when we consider expletive pronouns.<sup>29</sup>

With these two definitions in place, we now formulate Principle A as follows:

- (86) 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 SUBCAT list, then it must be coindexed with 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 may be subject to other processing-based or discourse-based constraints of the kind discussed above.

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<sup>28</sup>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. See section 9 below.

<sup>29</sup>Cf. Rizzi's (1990:87) definition of the binding relation in terms of *referential* indices.

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 (87).<sup>30</sup>

(87) a. [SUBCAT ⟨ NP:*npro*<sub>i</sub>, NP:*ana*<sub>i</sub> ⟩]

b. Mary<sub>i</sub> hates herself<sub>i</sub>.

c. \*Mary<sub>i</sub> thinks John<sub>j</sub> hates herself<sub>i</sub>.

Similarly, since nonpredicative PP's 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:

(88) a. [SUBCAT ⟨ NP:*npro*<sub>i</sub>, PP:*ana*<sub>i</sub> ⟩]

b. [Kim and Sandy]<sub>i</sub> depend [on each other]<sub>i</sub>.

c. \*[Kim and Sandy]<sub>i</sub> think John<sub>j</sub> depends [on each other]<sub>i</sub>.

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 (89) and (90):

(89) a. [SUBCAT ⟨ NP<sub>i</sub>, NP<sub>j</sub>, PP:*ana*<sub>i/j</sub> ⟩]

b. Mary<sub>i</sub> explained Bill<sub>j</sub> to himself<sub>j</sub>.

c. Mary<sub>i</sub> explained Bill<sub>j</sub> to herself<sub>i</sub>.

d. \*John<sub>k</sub> forgot that Mary<sub>i</sub> had explained Susan<sub>j</sub> to himself<sub>k</sub>.

(90) a. [SUBCAT ⟨ NP<sub>i</sub>, NP<sub>j</sub>, NP:*ana*<sub>i/j</sub> ⟩]

b. He<sub>i</sub> sold the slave<sub>j</sub> himself<sub>i</sub>.

c. He<sub>j</sub> sold the slave<sub>j</sub> himself<sub>j</sub>.

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<sup>30</sup>We use XP<sub>i</sub> as an abbreviation for an XP whose parameter bears the index i.

We follow Wilkins (1988: 209) in taking the examples in (90) to suffer from only pragmatic malaise.<sup>31</sup>

On the other hand, (91)b is correctly predicted to be ill-formed since the SUBCAT list (91)a violates Principle A:

- (91) a. \*[SUBCAT ⟨ NP<sub>i</sub>, NP:*ana*<sub>j</sub>, NP<sub>j</sub> ⟩]  
 b. \*I<sub>i</sub> sold himself<sub>j</sub> the slave<sub>j</sub>.

Adopting the standard assumption that *to*-phrases are less oblique than *about*-phrases,<sup>32</sup> analogous effects are predicted with respect to examples like those in (92).

- (92) a. [SUBCAT ⟨ NP<sub>j</sub>, PP[*to*]<sub>i</sub>, PP[*about*]:*ana*<sub>i/j</sub> ⟩]  
 b. Mary<sub>j</sub> talked to John<sub>i</sub> about himself<sub>i</sub>.  
 c. Mary<sub>j</sub> talked to John<sub>i</sub> about herself<sub>j</sub>.  
 d. \*John<sub>k</sub> thought that Mary<sub>j</sub> had talked to Susan<sub>i</sub> about himself<sub>k</sub>.  
 e. \*Mary<sub>j</sub> talked about John<sub>i</sub> to himself<sub>i</sub>.  
 f. \*Mary<sub>j</sub> talked to himself<sub>i</sub> about Bill<sub>i</sub>.

A variety of facts about the binding relations of prepositional objects are thus correctly analyzed.<sup>33</sup>

As noted earlier, anaphor arguments of nouns must have a (less oblique) antecedent within the NP if there is a possessor NP present. This fact follows directly from Principle A, if we adopt the analysis of NP's developed in Pollard and Sag (1987), where it is argued that common nouns subcategorize for possessors or determiners, obligatorily for singular nouns, and optionally for plural and mass nouns. On this analysis, a phrase like

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<sup>31</sup>Jackendoff (1972) regards these examples as unacceptable (as does Postal (1971)) and suggests that they have the same general form as \**I bought the slave it.* and \**I sold the slave him.*, whose deviance, it is generally agreed, is to be explained on grounds of cliticization and/or phonological phrasing.

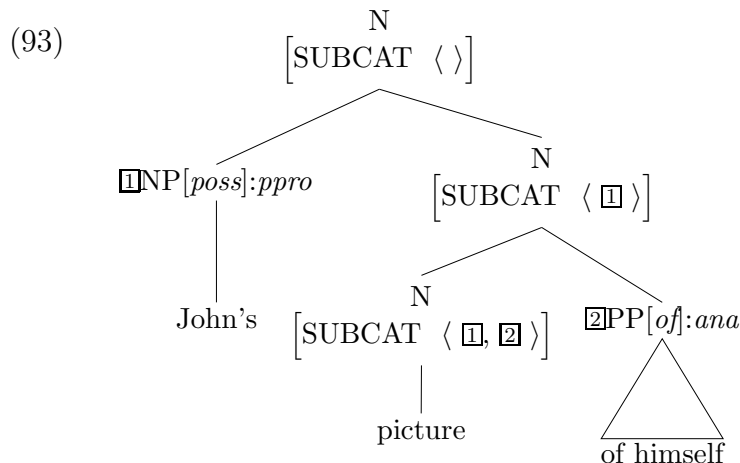
<sup>32</sup>See, for example, the Relational Grammar analyses of “3-to-2 Advancement” (Perlmutter and Postal (1977, 1983)), which presume that *to*-phrases are *terms*, and hence less oblique than *about*-phrases.

<sup>33</sup>The theory presented here fails to explain the badness of \**Mary<sub>j</sub> talked about himself<sub>i</sub> to John<sub>i</sub>*, as compared with *Mary talked about the boat to John*, which seems acceptable (if not impeccable), particularly in case *to John* bears contrastive pitch accent. We also have no explanation for the grammaticality of (i) (pointed out to us by an anonymous *LI* referee).

- (i) Mary dates men similar to herself.

The natural assumption is that the SUBCAT list of *similar* here is  $\langle$ NP, PP[*to*]:*ana*<sub>i</sub> $\rangle$ , so that the unrealized subject of *similar* (which must be coindexed with *men*) is wrongly predicted to bind the anaphor.

*John's picture of himself*, which has the structure shown in (93), will have the SUBCAT list given in (94).<sup>34</sup>



(94)  $\langle \text{NP}[\text{poss}]:\text{npro} (, \text{PP}[\text{of}]:\text{ana}) \rangle$

Here Principle A ensures that the anaphor is locally o-bound by the only available local o-commander, viz. the possessor phrase. In addition, phrases like *John's pictures of each other* are predicted to be ungrammatical in any context, since the reciprocal must be bound by John (by Principle A) but it cannot be (because of conflicting agreement features).

By contrast, in NP's like those in (95) and (96), the SUBCAT lists contain no local o-commanders for the anaphor; consequently the anaphor is exempt from Principle A.<sup>35</sup>

- (95) a. the pictures of himself  
 b. [SUBCAT  $\langle \text{DetP}, \text{PP}[\text{of}]:\text{ana} \rangle$ ]

- (96) a. pictures of each other  
 b. [SUBCAT  $\langle \text{PP}[\text{of}]:\text{ana} \rangle$ ]

As we saw in section 2, this is exactly the desired result.

Anaphors that appear in initial position on SUBCAT lists are also exempt from Principle A, according to our treatment. Because they have no local o-commanders, they are not required to be locally o-bound. Such is the case with possessive reciprocals (e.g. *each other's* in *each other's books*).

<sup>34</sup>Here the symbol “NP[poss]” should be regarded as an abbreviation for whatever analysis of these phrases is eventually adopted. In Pollard and Sag (forthcoming, Chapter 1), they are analyzed as Determiner Phrases. The essential points of the present discussion carry over to that analysis as well. Here, N[SUBCAT  $\langle \rangle$ ] is functionally equivalent to ‘NP’ and N[SUBCAT  $\langle [1] \rangle$ ] to ‘NOM’ or  $\bar{N}$

<sup>35</sup>Under natural assumptions, the content of a nonpossessive determiner will be something other than a referential parameter. See Pollard and Sag (forthcoming) for discussion.

However, our analysis also predicts that all subject anaphors are exempt, a conclusion that is not obviously correct. The anaphor in (97), for example, is not affected by Principle A, as a subject anaphor has no o-commander.

(97) \*Himself left.

Here we follow Brame (1977) in ruling out all examples where an anaphor is the subject of a finite verb on lexical grounds. In English, anaphors simply have no nominative forms. In fact, reflexive anaphors, as their morphology suggests, have only accusative forms, and hence may occur neither as finite clause subjects nor as possessors.

On the other hand, Principle A does not prevent anaphors from serving as subjects of non-finite clauses where, on independent grounds, we know that the subject must be in the accusative case:

(98) a. John wanted more than anything else for her/\*she to get the job.

b. The men preferred for him/\*he to do the hard work.

The question then arises whether the anaphors in examples like the following are subject to Principle A.<sup>36</sup>

(99) a. John<sub>*i*</sub> wanted more than anything else for himself<sub>*i*</sub> to get the job.

b. The men<sub>*i*</sub> preferred for each other<sub>*i*</sub> to do the hard work.

On standard accounts, this question is answered affirmatively. But there is good reason to question the correctness of such accounts. Whatever factors, e.g. point of view, are at work to determine the coindexing indicated in such examples, such factors are also at work in examples like (100).

(100) a. What John<sub>*i*</sub> would prefer is for himself<sub>*i*</sub> to get the job.

b. The thing [Kim and Sandy]<sub>*i*</sub> want most is for each other<sub>*i*</sub> to succeed.

In these examples, there is no possible appeal to Principle A, however formulated, inasmuch as the antecedents are in remote syntactic domains. Yet the indicated coindexing seems just as obligatory as it does in (99). For this reason, it would be missing a generalization to formulate Principle A so as to include in its domain examples like (99) (but not examples like (100)). However, the local o-command formulation of Principle A given above entails that the anaphors in all these examples are exempt. Hence one must appeal to other factors to explain what appears to be obligatory binding in both kinds of cases. The case for such an account is supported by the existence of discourses like those in (101), where the anaphor in question can be replaced by a personal (i.e. nonanaphor) pronoun (also bearing contrastive pitch accent) with the same index in the same position:

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<sup>36</sup>Notice that in such examples, the anaphor subject must bear contrastive pitch accent, which in turn is associated with interpretive focus. For example, in (99)a the interpretation is that John wants himself to get the job as opposed to anyone else getting the job. This should be compared with *John wanted more than anything else to get the job*, where the interpretation is that John wants to get the job as opposed to wanting something else (e.g. to buy a condo on Maui).

- (101) a. John and Mary have had a falling out. She’s been angling to manage the new project, but he<sub>i</sub> would prefer for HIMSELF<sub>i</sub>/HIM<sub>i</sub> to get the job.
- b. John<sub>i</sub> would prefer for Mary to come to drive to his place rather than for HIMSELF<sub>i</sub>/HIM<sub>i</sub> to have to walk all the way over to hers.

Assuming (as we do in Pollard and Sag (forthcoming); see also (130) below below) a formulation of Principle B such that that personal pronouns must not be locally o-bound, such examples are predicted to be grammatical. But if binding domains are defined in such a way (e.g., as on the standard account) as to make the binding of the anaphor in (101a,b) obligatory, the personal pronoun will wrongly be disallowed by Principle B. It is not possible to rescue the standard account by assuming that the pragmatics of focus somehow blocks or overrides the application of Principle B, for this is not possible in case the anaphor is in a position which is uncontroversially subject to obligatory binding, as shown by the discourse in (102):

- (102) John and Mary have had a falling out. She’s been angling to manage the new project, but he<sub>i</sub> wound up appointing HIMSELF<sub>i</sub>/\*HIM<sub>i</sub>.

Thus such examples provide independent support for our claim that whatever command relationship is relevant for binding theory does not relate the subject of a *for*-infinitive to the subject of the superordinate clause.

By contrast, our formulation of Principle A does provide an immediate account of the obligatory binding in examples such as (103).

- (103) a. Mary<sub>i</sub> believes herself<sub>i</sub> to be superior.
- b. They<sub>i</sub> consider themselves<sub>i</sub> superior.
- c. We<sub>i</sub> regard each other<sub>i</sub> as imposters.

This is because in HPSG, as in most lexically-based theories, the reflexive anaphor in such examples is the primary object of *believe*, not the subject of a “small clause”.<sup>37</sup> The relevant SUBCAT lists here are those shown in (104):

- (104) a. [SUBCAT ⟨ NP<sub>i</sub>, NP:*ana*<sub>i</sub>, VP[*inf*] ⟩]
- b. [SUBCAT ⟨ NP<sub>i</sub>, NP:*ana*<sub>i</sub>, AP ⟩]
- c. [SUBCAT ⟨ NP<sub>i</sub>, NP:*ana*<sub>i</sub>, PP[*as*] ⟩]

The anaphors in these SUBCAT lists are in accord with Principle A: the object anaphors are coindexed with the only available local o-commanders.

We now turn to the binding properties of the expletive NP’s *it* and *there*. As noted by Kuno (1987: 95ff), expletive *it*, when it occurs in construction with an extraposed clause, may render an anaphor exempt from Principle A. He cites the following examples of anaphors with non-local antecedents:

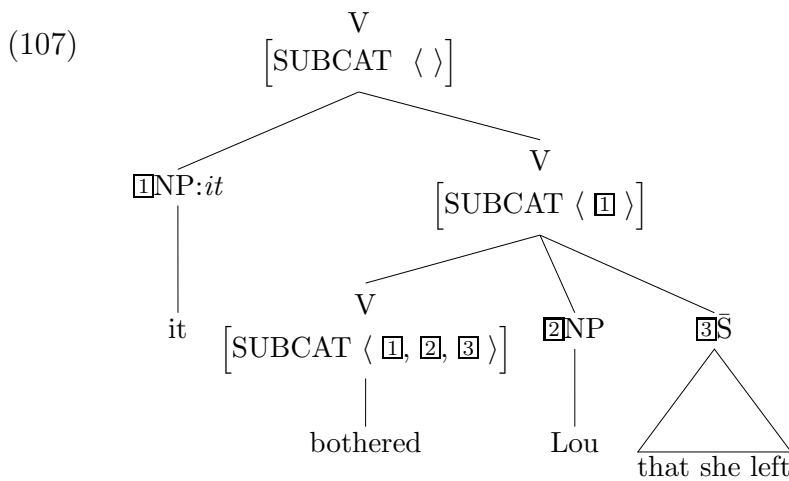
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<sup>37</sup>For a defense of this view (which is in essence a nontransformational variant of a raising analysis), see Pollard and Sag (forthcoming, Chapter 3).

- (105) a. They<sub>i</sub> made sure that it was clear to each other<sub>i</sub> that this needed to be done.  
 b. They<sub>i</sub> made sure that it was clear to themselves<sub>i</sub> that this needed to be done.  
 c. They<sub>i</sub> made sure that it wouldn't bother each other<sub>i</sub> to invite their respective friends to dinner.

Kuno's observation follows immediately from our theory. In Pollard and Sag (forthcoming), we propose that the lexical entries for verbs and adjectives taking *it*-subjects and extraposed clausal complements are derived via lexical rule from verbs that take sentential subjects<sup>38</sup> The SUBCAT lists of these derived lexical entries are illustrated in (106) and the structure that arises from (106)a is illustrated in (107).

- (106) a. [SUBCAT < NP:*it*, NP,  $\bar{S}$  >]  
 b. [SUBCAT < NP:*it*, (PP[*to*],)  $\bar{S}$  >]



Kuno's examples thus involve SUBCAT lists of the sort illustrated in (108).

- (108) a. [SUBCAT < NP:*it*, NP:*ana*,  $\bar{S}$  >]  
 b. [SUBCAT < NP:*it*, PP[*to*]:*ana*,  $\bar{S}$  >]

In (108a,b), the anaphors are not locally o-commanded, because the subject's parameter is nonreferential. Therefore, these anaphors are not required to be locally o-bound, i.e. they are exempt from Principle A.

Similar predictions are made about sentences involving the expletive pronoun *there*, though these are somewhat more difficult to test because of the conflict between the definiteness of anaphors and the "definiteness restriction" on the post-copular NP in *there*-constructions. Note first that anaphors embedded within the post-copular NP, e.g. those in (109), are not at issue here.

<sup>38</sup>As is well known, some extraposition verbs (e.g. *seem*) cannot be so derived, and hence must be listed in the lexicon with appropriate SUBCAT values.

- (109) a. The men<sub>i</sub> knew that there were pictures of each other<sub>i</sub> on sale.  
 b. John<sub>i</sub> knew there was a picture of himself<sub>i</sub> in the post office.  
 c. John<sub>i</sub> realized that the fact that there were pictures of each other<sub>j</sub> in their<sub>j</sub> dressing rooms would annoy [the two male leads]<sub>j</sub>.

Because these anaphors have no local o-commander within the picture NP, they are exempt from Principle A, as explained earlier, and are free to take non-local antecedents, as they do in these examples.

What is at issue is the status of examples like (110).

- (110) a.?John<sub>i</sub> knew that there was only himself<sub>i</sub> left.  
 b.?John realized that there was only each other<sub>i</sub> preventing [Kim and Sandy]<sub>i</sub> from realizing their goals.  
 c.?John<sub>i</sub> was devastated by the loss of his entire family. Now there was only himself<sub>i</sub> remaining.

These are not ruled out by Principle A, as the SUBCAT list in question, that of the verb *be* in its *there*-subject use, is the one shown in (111):

- (111) [SUBCAT ⟨ NP:*there*, NP:*ana*, XP[+PRD] ⟩]

Because the parameter of *there* is nonreferential, the anaphor in (111) has no local o-commander and therefore need not (indeed cannot) be locally o-bound. As the examples in (110) show, this is the correct result (modulo definiteness effects): the antecedent of a postcopular anaphor in the *there* construction may be in a higher clause, in a non-c-commanding position, or even in prior discourse.

It is interesting to observe that sentences containing meteorological verbs with *it* subjects exhibit binding properties different from those just considered. When an anaphor is properly contained within the argument of a meteorological predicate, it appears to be exempt from Principle A:

- (112) a. John<sub>i</sub> knew that it would rain on that picture of himself<sub>i</sub> that was sitting on the patio.  
 b. The men<sub>i</sub> knew that it would rain on each other<sub>i</sub>'s parades.

This is just as predicted by our account.

But an anaphor argument of a meteorological verb seems not to allow a remote antecedent, as the following examples show.

- (113) a.\*John<sub>i</sub> knew that it would rain on himself<sub>i</sub>.  
 b.\*The men<sub>i</sub> knew that it would rain on each other<sub>i</sub>.

If these judgements are correct, then perhaps the solution is to treat meteorological *it* as a referential (nonexpletive) pronoun, as suggested by Bolinger (1973). On Bolinger’s analysis, this pronoun is treated as *ambient*, i.e. as involving environmental reference. Once we treat such *it* subjects in terms of referential parameters, then the anaphors in (113) are locally o-commanded and must be locally o-bound, which they cannot be because of semantic and agreement conflicts. This proposal, however speculative, would account for the deviance of the examples in (113).

*It*-clefts appear to behave in a manner analogous to *there*-sentences. The subject pronoun in examples like (114) has an expletive parameter.

(114) a. It was herself<sub>*i*</sub> that Mary<sub>*i*</sub> liked best.

b. It was each other<sub>*i*</sub> that the twins<sub>*i*</sub> liked best.

On one possible analysis of *it*-clefts, which employs a version of the SLASH feature originally introduced by Gazdar (1981), the SUBCAT list for the examples in (114) is as shown in (115):

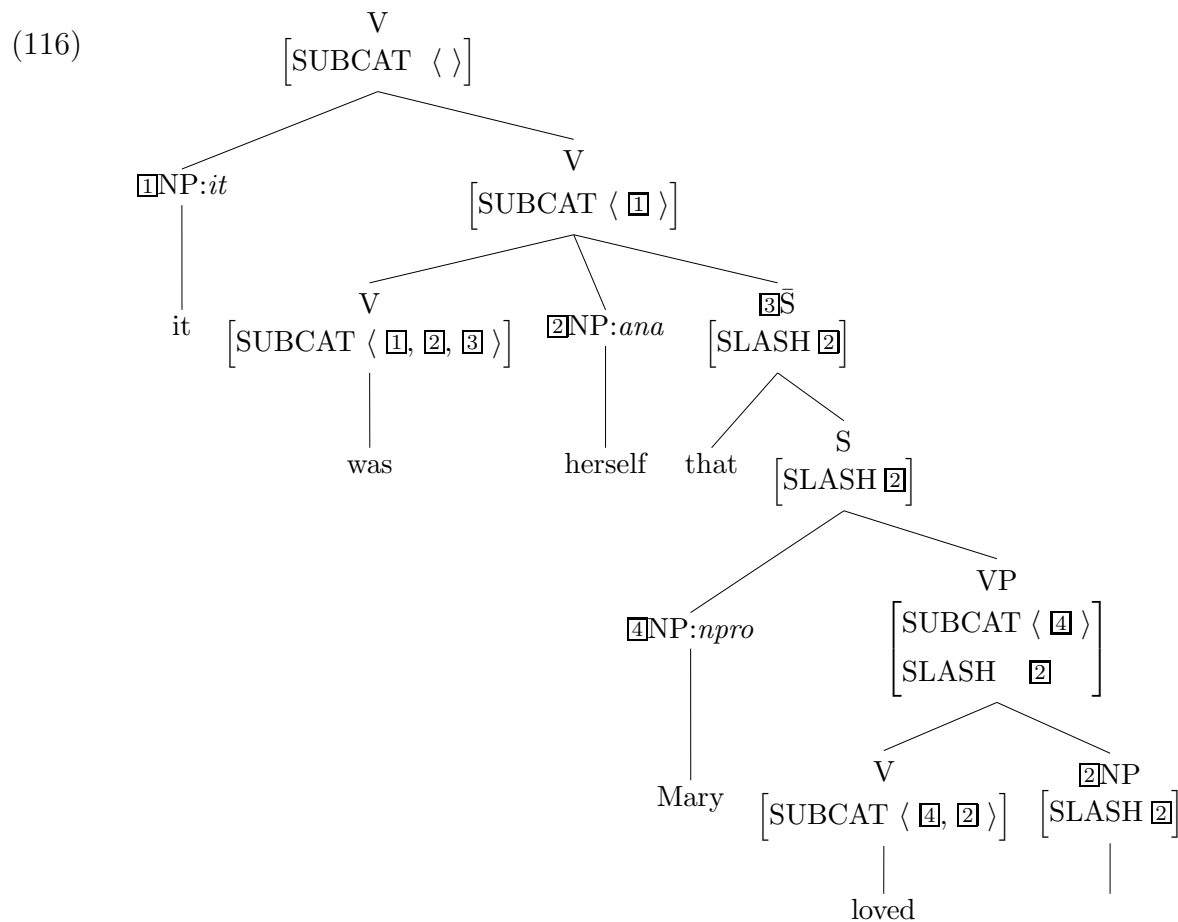
(115) [SUBCAT < NP:*it*, □NP:*ana*,  $\bar{S}$ [SLASH □] )]

The basic idea here is that the copula which figures in the cleft construction subcategorizes for an expletive *it* subject, some second complement (the “focus”), and a finite clause (the “presupposition”) containing a trace whose category and content are identical with (structure- shared with) those of the second complement. Speaking somewhat loosely, the category and content of the trace are passed, in the form of a SLASH specification, up the path (essentially similar to Kayne’s (1983) notion of g-projection path) to the node where the trace becomes bound.<sup>39</sup> Since the anaphor on this SUBCAT list is not locally o-commanded, it might appear at first blush that it is predicted to be exempt from Principle A.<sup>40</sup> However, inasmuch as the content of the focus complement is, by assumption, shared with that of the trace, it follows that the trace too has an anaphoric parameter, as shown in (116):

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<sup>39</sup>For a detailed account of the theory of extraction phenomena that we are assuming here, see Pollard and Sag (forthcoming, Chapter 4).

<sup>40</sup>We observe in passing that anaphors appear to be exempt quite generally in copular constructions. Thus our account does not yet explain why anaphors in examples like *The one who John<sub>*i*</sub> likes best is himself<sub>*i*</sub>* are exempt. This suggests that the notion of *exempt anaphor* is in need of a deeper explanation, one that is able to exploit properties of the argument structure of the copula.



This in turn has as a consequence that the SUBCAT list of the lower verb in (116) contains an anaphor (indicated by the tag “ $\bar{2}$ ”) with a local o-commander (*Mary*, indicated by the tag “ $\bar{4}$ ”). Principle A will therefore require that this anaphor trace be coindexed with the *npro* parameter of *Mary*. Since the parameter of the trace *is* the parameter of *herself*, it follows that *Mary* and *herself* must be coindexed in (116). In essence, what we have here is the effect of a reconstruction analysis.

It is not clear that this is the right prediction. The critical data are those in (117).

(117) a. It was herself<sub>*i*</sub> that Mary<sub>*i*</sub> thought Bill<sub>*j*</sub> admired  $t_i$  most.

b. It was himself<sub>*j*</sub> that Mary<sub>*i*</sub> thought John<sub>*j*</sub> admired  $t_j$  most.

The proposal just outlined predicts that only (117)b is grammatical, for the anaphor on the SUBCAT list of the most deeply embedded verb in (117)a would not be locally o-bound, in violation of Principle A. This prediction seems to be correct for some speakers. For other speakers, however, not only are both (117)a,b possible, but so are the examples in (118):

(118) a. It was himself<sub>*j*</sub> that John<sub>*i*</sub>'s fantasies most centrally concerned.

b. John<sub>*i*</sub> knew that it was himself<sub>*i*</sub> that they were after.

These differing patterns of data find a relatively straightforward alternative analysis that is still consistent with the version of Principle A that we have proposed. On this alternative analysis, the SUBCAT list for *be* (in its *it*-cleft function) would not identify the entire content of the post-copular NP and the SLASH value, but instead would merely require them to be coindexed, as shown in (119).

(119) [SUBCAT ⟨ NP:it, NP<sub>*i*</sub>,  $\bar{S}$ [SLASH NP<sub>*i*</sub>] ⟩]

Since the content of the trace is now distinct from (but coindexed with) the post-copular NP (the second NP in (119)), when the latter is an anaphor, the former need not be. Consequently, Principle A will be in force neither in the higher structure (the cleft structure) nor in the lowest structure (the one containing the trace). As a result, a post-copular anaphor will be entirely exempt from Principle A, which in turn means that all the examples in (117) and (118) will be allowed, as desired. In short, we take these variations in judgement to be a consequence of minor idiolectal differences in the lexical entry for the copula involved in the cleft construction.

Our SLASH-based analysis of filler-gap constructions makes a number of further predictions about binding phenomena. Consider first *wh*-questions. Phrases like *which picture of himself* or *which pictures of each other* contain exempt anaphors, as there is no locally *o*-commanding NP on the noun's SUBCAT list. Consequently, we correctly predict that any of the coindexings illustrated in the following examples are possible:

- (120) a. Which picture of himself<sub>*i*</sub> does John<sub>*i*</sub> think Mary sold?  
 b. Which picture of herself<sub>*i/j*</sub> does Susan<sub>*i*</sub> think Mary<sub>*j*</sub> prefers?  
 c. John<sub>*i*</sub> wondered which picture of himself<sub>*i/j*</sub> Bill<sub>*j*</sub> would prefer.  
 d. Which picture of herself<sub>*i*</sub> did John prove Mary<sub>*i*</sub> believed Bill had sold?  
 e. Which pictures of herself<sub>*i*</sub> did it seem to Mary<sub>*i*</sub> that they were going to publish?  
 f. Which picture of herself<sub>*i*</sub> did John say was most to Mary<sub>*i*</sub>'s taste?  
 g. John<sub>*i*</sub> was quite agitated.  
 It was uncertain which picture of himself<sub>*i*</sub> would appear in the Times.

As before, the antecedent of an exempt anaphor may appear (modulo non-grammatical factors) lower in the structure, higher in the structure, or even in the prior discourse context. We note in passing that such facts seem impossible to reconcile with any account based upon reconstruction. In addition, attempts to explain the interaction of *wh*-movement and binding constraints by allowing the latter to apply at any level of transformational derivation (Barss (1986)) seem equally problematic. In examples like (120e,f,g), like many we have already considered, there are no intermediate structures where the appropriate *c*-command relations hold.

Finally, consider instances of “Topicalization” where the filler is an anaphor:

(121) a. John<sub>i</sub> loves his twin brother. But himself<sub>i</sub>, he<sub>i</sub> hates t<sub>i</sub>.

b. \*John<sub>i</sub> knows that Mary<sub>j</sub> loves his twin brother. But himself<sub>i</sub>, he<sub>i</sub> thinks she<sub>j</sub> hates t<sub>i</sub>.

In this construction, as in *wh*-structures, we assume that the entire content of the filler – in this case a parameter of the sort *ana* – (as well as the category) is identified with the content of the trace.<sup>41</sup> Consequently, the parameter of the anaphor in (121)a is also the parameter of the object of *hates*, and hence is required to be coindexed with *he* by Principle A. In (121)b, the parameter of *himself* is also the parameter of the object of *hates*. Hence it must be coindexed with *she* by Principle A; but it cannot be, because of agreement conflict. Thus in this construction, where both the category and the content of the filler are identified with those of the SLASH value, and hence with those of the trace, it follows that the dislocated anaphor behaves as if it were in the position of the trace. These predictions seem correct, though intuitions about these sentences are somewhat uncertain.

## 8 A Thematic Alternative to Principle A?

It is tempting to try to derive the effect of the obliqueness hierarchy from other primitives. As some people have suggested<sup>42</sup>, certain conditions on anaphor binding might be seen in terms of a hierarchy of thematic relations, rather than a hierarchy of grammatical relations such as we have proposed. Jackendoff (1972), for example, seeks to explain constraints on reflexives by appeal to a thematic hierarchy:

Agent < Location,Source,Goal < Theme

together with a condition that a reflexive cannot thematically outrank its antecedent. A proposal of this sort makes many of the same predictions as our own analysis.

Thus, the deviance of the examples in (122), which we explain in terms of the obliqueness hierarchy, might also be explained in terms of Jackendoff's thematic hierarchy, as in fact it is in the analysis of Wilkins (1988).

(122) a. \*I sold himself<sub>i</sub>[GOAL] the slave<sub>i</sub> [THEME].

b. \*Mary talked about John<sub>i</sub> [THEME] to himself<sub>i</sub> [GOAL].

Because the hierarchy of grammatical relations bears a close relation to the thematic hierarchy, it is often difficult to distinguish the predictions made by these two approaches,

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<sup>41</sup>Thus again we achieve the effect of a reconstruction analysis. For further discussion of how our binding theory shares the advantages of standard reconstruction analyses while avoiding their pitfalls, see Pollard and Sag (forthcoming, Chapter 6).

<sup>42</sup>See, *inter alia*, Jackendoff (1972), Wilkins (1988), and Hellan (1988).

though a reduction of our *local o-command* account to one stated in terms of the thematic hierarchy would of course be welcome progress.

The problems we see facing such a reduction of local o-command to the thematic hierarchy are the following. First, the examples in (123) are predicted to be ungrammatical by the thematic analysis (the reflexives in (122) are agents and therefore outrank their antecedents on the thematic hierarchy), a prediction argued to be correct by Jackendoff (1972).

(123) a. John was shaved by himself.

b. John was hit by himself.

Such examples, judged in isolation, are often considered to be deviant. But, as noted already by Morgan (1969), this judgement is questionable. Examples like (124), well-formed for virtually all speakers, are incorrectly ruled out by analyses based on the thematic hierarchy.

(124) a. The only barber who was shaved by himself was Figaro.

b. The only pitcher who was ever hit by himself was Cy Young.

Whatever deviance inheres in examples like (123)a,b must have some other explanation.

Second, consider (125)a-c:

(125) a. I sold the slave<sub>*i*</sub> [THEME] to himself<sub>*i*</sub>[GOAL].

b. I sold the slave<sub>*i*</sub> [GOAL] himself<sub>*i*</sub>[THEME].

c. \*I sold himself<sub>*i*</sub> [GOAL] the slave<sub>*i*</sub>[THEME].

These contrasts would appear to pose a paradox for any account of reflexive binding stated in terms of the thematic hierarchy. If GOAL is higher than THEME on the thematic hierarchy, then why is (125)a possible? If the THEME is higher than GOAL, then why is (125)b good and (125)c impossible? The answer to these questions offered by Wilkins (1988) is that the THEME argument in (125)a and the GOAL arguments in (125)b,c are also PATIENTS. And, since PATIENT is higher on the thematic hierarchy than GOAL or THEME, these examples constitute no violation of the thematic hierarchy condition.<sup>43</sup>

This multiple  $\theta$ -role approach may ultimately prove to be successful, yet one cannot fail to observe (as noted by Wilkins (1988: 209)) that in all relevant examples, the PATIENT turns out to be the NP adjacent to the verb, i.e. the primary object, which

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<sup>43</sup>Wilkins, following Jackendoff (1987), suggests as a criterion for patienthood the possibility of occurring in the X position in such sentence frames as *What happened to X is ...* or *What Y did to X is ...*

in turn is less oblique than the anaphor it binds, just as predicted by our obliqueness-based account.

We should add that examples like (126) may also pose difficulties for accounts stated in terms of a thematic hierarchy condition:

- (126) a. John<sub>i</sub> seems to himself<sub>i</sub> to be unproductive.  
b. John<sub>i</sub> seems to be unproductive to himself<sub>i</sub>.

Although similar examples involving first person reflexives are cited as ungrammatical by Postal (1971: 35), (126) seems to be only as peculiar as the message it conveys (compare the grammatical deviance of \**Mary talked about John to himself*). Consequently, (126)a,b should in all likelihood be treated as grammatical, in particular as not being ruled out by Principle A. The problem examples like this pose is simply that the subject bears no thematic role, and hence presumably is thematically outranked by the role-assigned reflexive that it binds, in violation of the thematic hierarchy condition.

Other problematic cases include examples like (127).

- (127) a. Max strikes himself as qualified for the job.  
b. He looks funny to himself.  
c. Schwarz is acceptable to himself (just as he is).

Again, Postal (1971: 47) treats examples like these as ungrammatical (and as providing motivation for the transformation of *Psych Movement*, applying subject to his *Crossover Constraint*). And again, it seems clear that these examples are only pragmatically deviant. The difficulty in interpreting the examples in (127) is precisely the difficulty of imagining an appropriate context. In order to interpret (127)a, for example, one must imagine that Max is somehow disassociated from himself, or in some other peculiar mental state where he gets only fleeting impressions of himself. If Max were in a more familiar mental state, where he has reasonable self-knowledge, we would be likely to report that *Max believes himself to be qualified for the job*. The deviance of (127)a is thus attributable to a conflict between the meaning of *strike* and customary assumptions about people's self-knowledge. Once this is appreciated, binding theory is seen to play no role in the explanation of (127)a. And much the same is true of (127)b,c, whose grammaticality (*pace* Postal) can be appreciated with little or no contextualization.

But given that these examples should not be ruled out by Principle A, the problem they pose is the same as that posed by the examples in (126). The subject antecedent of the reflexive either bears no  $\theta$  role, or else it is a theme. In either case, the reflexive it antecedes outranks it on the thematic hierarchy, in violation of the thematic hierarchy condition.

In sum, though it is tempting to speculate that a thematically based condition on anaphors might replace the condition we have formulated in terms of the hierarchy of

grammatical relations, there remain a number of outstanding problems that must first be solved before any version of the thematic hierarchy condition can be maintained.

## 9 Conclusion

In this paper, we have attempted to reassess the basic facts of English anaphors. In so doing, we have drawn a fundamental distinction between those anaphors that are subject to a grammatical constraint – Principle A – and those that are exempt from that constraint. We have further argued that Principle A should be formulated in terms of relational, rather than configurational, superiority, i.e. in terms of relative obliqueness, rather than in terms of *c*-command. We have also made an explicit proposal for formulating Principle A in terms of SUBCAT lists, which, motivated entirely on independent grounds within the framework of head-driven phrase structure grammar, provide a precise theoretical model of the notion “hierarchical syntactic argument structure”.

In fact, as argued in Pollard and Sag (forthcoming), the entirety of binding theory, not just Principle A, can profitably be recast in terms of relative obliqueness. Among the numerous possible formulations and parametrizations of such a theory that suggest themselves, perhaps the simplest is the following. We begin by defining global versions of *o*-command and *o*-binding, as in (128):

(128) Definitions of O-Command and O-Binding

*A o-commands B* just in case A locally *o*-commands some C dominating B.

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

The binding theory can now be stated in its entirety as follows:<sup>44</sup>

(129) Binding Theory

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

B. A personal pronoun must be locally *o*-free.

C. A nonpronoun must be *o*-free.

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<sup>44</sup>This formulation of binding theory is partly configurational inasmuch as nonlocal *o*-freeness (which involves the configurational notion of *domination*) figures in the statement of Principle C. In Pollard and Sag (forthcoming, Chapter 6), we posit a subtly different and more empirically adequate formulation which makes no appeal to domination.

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