On the Fine Structure of the Binding Theory: Principle A and Reciprocals

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Robert Freidin
McGill University

Wayne Harbert
Cornell University

Within the Extended Standard Theory it is assumed that the distribution of lexical bound anaphors--e.g. reciprocals and reflexive pronouns--is accounted for by a general principle of the theory of binding, which is given schematically in (1).

(1) An anaphor must be bound in domain X.

An anaphor is considered bound where it is coindexed with a c-commanding NP, and bound in domain X where this c-commanding NP occurs in domain X. Following Chomsky (1981) (henceforth LGB) we will refer to (1) as Principle A of the binding theory. Further elaboration of Principle A raises two fundamental questions: i) what constitutes an anaphor? and ii) how is domain X to be characterized? The answers to (i) and (ii) are interdependent as will be discussed below. The main focus of this paper is on the characterization of domain X. We will demonstrate that a careful analysis of anaphor binding across pleonastic subjects (e.g. nonreferential it) raises empirical problems for current versions of Principle A (cf. LGB, chapter 3). We propose a modification of the notion "accessible subject" which eliminates the empirical problems. A brief discussion of some consequences of this modification follows.

As a point of departure, we begin with Chomsky's formulation

of Principle A as given in LGB, p. 220.

(2) An anaphor must be bound in its binding category,

where binding category is defined in (3) (= LGB, 3.2.3:(100)).

(3) β is a binding category for α if and only if β is the minimal category containing α and a SUBJECT accessible to α.

"The notion SUBJECT accords with the idea that the subject is the 'most prominent nominal element' in some sense, taking INFL to be the head of S" (LGB, p. 209). Thus SUBJECT translates as the agreement element in INFL (AGR either containing an empty N or being represented by it) where present, or the syntactic subject [NP,S] or [NP,NP]. Presumably, where both AGR and a syntactic subject are present, AGR is considered the more prominent nominal element and therefore takes precedence. This interpretation is not crucial for the analysis given below; however it is important to note that under the LGB formulation AGR and syntactic subject have equal force with respect to binding. A SUBJECT is accessible to an anaphor where it c-commands the anaphor. (Chomsky posits an additional condition on accessibility (the i-within-i condition) to which we return below).

Under this formulation of Principle A, the examples in (4) are excluded because the anaphor himself is free in its binding category--S in (4a) and NP in (4b), where Mary is an accessible subject.

(4) a. *John expected $[_S$ Mary to help himself$]$

b. *John sold $[_{NP}$ Mary's pictures of himself$]$

In (5) the anaphor is also free in its binding category; but here the analysis is somewhat more complicated.

(5) a. *John said that $[_{S'}$ himself$_i$ AGR$_i$ was happy$]$

b. *John said that $[_{S'}$ Mary$_i$ AGR$_i$ helped himself$]$

In (5a) AGR is SUBJECT and also coindexed with the anaphor himself. However himself is not properly bound in S', its binding category, since AGR is not a possible binder. Thus (5a) constitutes a violation of Principle A. Similarly (5b) violates Principle A because himself is free in its binding category S'--which is established by the presence of AGR. (5a) differs from (5b) in that (5b) contains a possible binder for the anaphor--i.e. the syntactic subject Mary, though presumably both are illformed due to the effect of AGR. Given the distinction between accessible

SUBJECT and possible binder, where syntactic subjects are included under both notions and AGR is excluded under the latter, the term 'bound' in the formulation of Principle A (1) above should be interpreted as 'bound to a possible binder'.

Putting aside the question of AGR as an accessible SUBJECT for the moment, let us consider binding with respect to syntactic subjects--and in particular [NP,S]. In the LGB formulation, all syntactic subjects are equally accessible subjects and also possible binders--with one exception concerning coindexing of pleonastic subjects and the i-within-i condition (cf. LGB, p. 215) to which we return below. Thus there should be no difference in the grammaticality of the following pair of examples:

(6) a. *They expected $[_S$ John$_i$ to $\left\{\begin{matrix}\text{seem}\\ \text{be reported}\end{matrix}\right\}$ to

each other $[_S$ e_i to be crazy $]]$

b. They expected $[_S$ it to $\left\{\begin{matrix}\text{seem}\\ \text{be reported}\end{matrix}\right\}$ to each other

$[_S$that John is crazy$]]$

However there is a contrast between the two examples where (6a) is definitely illformed while (6b) is relatively wellformed (as indicated by the lack of a star). The examples differ solely with respect to the nature of the subject across which the anaphor each other is bound. In (6a) binding occurs across a lexical subject which bears a θ-role; whereas in (6b) binding is across a pleonastic subject which bears no θ-role.

In the discussion which follows we designate lexical subjects bearing a θ-role as θ-subjects in contrast to pleonastic subjects--i.e. non-θ subjects. Note that in both (6a) and (6b) binding is across a subject in a non-θ position.[1] The question arises as to whether the weak binding effect of it (if it exists) is due to its non-θ status or its occurrence in a non-θ position. These factors are separated in the following examples:

(7) a. They expect $[_S$ it to seem to each other that Mary

is lying$]$

b. They expect $[_S$ it to annoy each other that Mary

is lying$]$

In (7a) it is in a non-θ position (subject of seem), whereas in (7b) it is actually in a θ-position as illustrated in (8).

(8) The report annoyed us.

Given the θ-criterion, it follows that the report is in a θ-position. If the subject of annoy is a θ-position, then it in (7b) occurs in a θ-postion. Presumably the θ-role of this subject position is transferred to the S complement of annoy since nonreferential it may not bear a θ-role and the S must.

The examples in (7) seem substantially better than the illformed (6a)--indicating that non-θ subjects in general have a weaker opacity inducing effect than θ-subjects, whether or not they occur in θ-positions. Yet (6b) and (7a) seem to us somewhat better than (7b)--though the judgments are admittedly subtle, indicating that occurrence in a θ-position also contributes (weakly) to opacity effects. We conclude from this evidence that with respect to Principle A, θ-subjects are significantly stronger than non-θ subjects.

Given this qualitative difference between θ vs. non-θ subjects regarding opacity effects, we can now proceed to test the strength of AGR as an accessible subject for binding. If AGR is either a stronger or equally strong opacity inducing factor, then the weak effect of pleonastic it subjects should disappear when AGR also occurs in the clause containing the anaphor. Consider the examples in (9), which are analogous to (6) except that the embedded clause containing tha anaphor each other contains AGR as well.

(9) a. *They expected $[_S$ John$_i$ AGR would $\left\{\begin{matrix}\text{seem}\\ \text{be reported}\end{matrix}\right\}$ to each other $[_S$ e_i to be crazy$]]$

b. They expected $[_S$ it would $\left\{\begin{matrix}\text{seem}\\ \text{be reported}\end{matrix}\right\}$ to each other $[_S$ that John is crazy $]]$

If AGR is a strong opacity inducing factor then both (9a) and (9b) should be equally illformed. This is not the case however. Roughly the same difference in relative grammaticality holds for (9a-b) as for (6a-b). (9a) is definitely illformed, whereas (9b) is relatively wellformed in comparison (hence the lack of a star). In (9b) AGR fails to induce the strong opacity effect it should according to the LGB theory. Thus we are led to conclude that the strong opacity effect in (9a) is due to the θ-subject effect as in (6a).[2]

Nonetheless, there is one context where AGR appears to have a strong binding effect, as in (10).

(10) a. *They expected $[_S$ that each other AGR were crazy$]$

b. *They expected [$_S$ it to be reported [$_S$ that each other AGR were crazy]]

In neither example in (10) is binding across a θ-subject. In (10a) binding does not cross the domain of any syntactic subject, while in (10b) it occurs across the domain of a non-θ subject, nonreferential it. Yet both examples are as strongly illformed as cases where binding occurs across the domain of a θ-subject (cf. (6a)). In both examples in (10) AGR is local with respect to the anaphor each other. Yet locality by itself is not sufficient to account for the strong binding effect in (10) since AGR is also local with respect to the anaphor in (9b) where there is no strong binding effect. That is, the local effect of AGR holds for subjects, and not apparently for non-subjects. We will refer to this local strong binding effect of AGR as the NIC effect.[3]

To summarize, AGR has a strong binding effect which holds for only its associated subject position. For local non-subject positions as in (9b), the opacity inducing effect of AGR is comparatively weak (if it exists at all). The opacity of non-subject positions is determined primarily by the thematic property of c-commanding subject NPs. We conclude therefore that the binding effects of AGR and syntactic subject cannot be collapsed under the notion SUBJECT as discussed above (cf. (3)).

Granting this conclusion, it is still possible to avoid having to stipulate two apparently unrelated opaque domains for binding--the c-command domain of a θ-subject and the subject of a finite clause (or more generally, a subject marked for agreement with the verb of its clause (see George & Kornfilt (1981) for discussion)[4], provided the NIC effect can be reduced to the θ-subject effect. If such a reduction is possible, then the NIC cases in (10) must be interpreted so that the anaphor is free in the domain of a θ-subject. Since the only θ-subject that might qualify is the anaphor itself, it should be the case that the anaphor is free in its own domain--i.e. the domain of a θ-subject. However, this account requires that the illformed cases (e.g. (11a)) be distinguished from the wellformed cases (e.g. (11b)) which differ only in the absence of AGR.

(11) a. *We expect [$_{S*}$each other AGR would win]

b. We expect [$_{S*}$each other to win]

In other words, S* in (11a) must be designated as the domain of a θ-subject with respect to the anaphor, while S* in (11b) must not. Although AGR is easily identified as the salient feature which distinguishes the two S*s, exactly how the distinction is to be given formally is far from obvious. For now this remains a nontrivial desideratum in our analysis.

Thus far we have argued that the notion "accessible SUBJECT" as it applies to Principle A with respect to the binding possibilities for reciprocals should be limited to θ-subjects--in effect, syntactic subjects. Note that this notion of θ-subject must extend to traces as well as lexical subjects as illustrated in (12).

(12) *John$_i$ seemed to them [$_S$ e$_i$ to annoy each other]

The trace in (12) should be analyzed as a θ-subject even though it does not bear a θ-role strictly speaking. Thus we might sharpen the notion "θ-subject" as "any subject in a chain which bears a θ-role." For example, John$_i$ and e$_i$ in (12) form a chain bearing the θ-role for the subject of annoy.

In the LGB theory, the notion "accessible" is constrained by the i-within-i condition on wellformedness of indexing structures, given in (13).

(13) *[$_\gamma$ ... δ ...], where γ and δ bear the same index. (LGB, p.212)

The incorporation of (13) into Principle A accounts for the apparent wellformedness of (14), under the assumption that subject NPs are coindexed with the AGR of their clause.

(14) They$_i$ expected that [$_S$ [$_{NP_j}$ pictures of each other$_i$]

AGR$_j$ would appear in the local newspapers]]

Since NP$_j$ must be coindexed with AGR, neither NP$_j$ nor AGR may also be coindexed with each other given (13). AGR is therefore not an accessible SUBJECT for each other, which consequently need not be bound in the complement clause.

Note that the i-within-i condition is necessary for the binding theory if we assume that AGR functions as an accessible SUBJECT. If not, as we have argued, then it is not clear that (13) is relevant for Principle A with respect to (14) since NP$_j$ dominates each other; thus it does not c-command the anaphor and consequently is not accessible to it given the basic definition of "accessible" (see footnote 0).[5] However, (14) may be relevant to the proper reduction of the NIC effect to a θ-subject effect.

In LGB, Chomsky extends the i-within-i analysis to examples like (15).

(15) a. They$_i$ believe [$_S$ it$_j$ would annoy John [$_{\bar{S}_j}$ that

[$_{NP}$ each other's$_i$ pictures] were being overrated]]]

b. They$_i$ believe [$_S$ it$_j$ would annoy John [$_{\bar{S}_j}$ for [$_{NP}$ each other's$_i$ pictures] to win prizes]]

Coindexing of pleonastic *it* with the $\bar{S}$ complement of *annoy* renders *it* non-accessible to the anaphor in S by virtue of (13).

This analysis encounters two difficulties--one conceptual and the other empirical. Conceptually, where both α and β in (13) are NPs, as in (14) and (i) or (ii-b) of footnote 5, the i-within-i condition appears to be a natural condition on coreference. In constructions like (15), however, where α is an $\bar{S}$, the issue of coreference disappears. Unlike the indices of NPs, the index of $\bar{S}$ does not seem to be a referential index. Thus the generalization of the i-within-i condition to such cases is not a natural one. Empirically, this analysis appears to make incorrect predictions about the wellformedness of sentences like (16).

(16) a. They$_i$ believe [$_S$ it is likely [$_{\bar{S}}$ that [$_{NP}$ each other's$_i$ pictures] are being overrated]]

b. They$_i$ believe [$_S$ it is likely [$_{\bar{S}}$ for [$_{NP}$ each other's$_i$ pictures] to win prizes]]

In (15) the pleonastic subject occurs in a θ-position and is assumed to be coindexed with the postverbal $\bar{S}$ in order for the latter to acquire a θ-role, thereby satisfying the θ-criterion. This provides the coindexing necessary for the extension of the i-within-i analysis. In (16) the pleonastic subject occupies a non-θ position. Thus there is no motivation for assuming coindexing between *it* and the $\bar{S}$ complement of *likely*. Given this analysis, there ought to be a significant difference in wellformedness between the examples in (15) and (16) under the *LGB* theory, where (16) is illformed and (15) (because of the i-within-i condition) is wellformed. However, these examples do not manifest the predicted difference. They seem to us to be essentially wellformed, on a par with examples like (6b). If there is a difference, it appears to be in favor of (16) over (15) (contrary to the *LGB* analysis), where pleonastic subjects in θ-positions induce a slight opacity effect as mentioned above.

Under our analysis of Principle A, the extension of (13) to account for the relative wellformedness of (15), with its attendant problems, is unnecessary. The relative wellformedness of both (15) and (16) follows from the weak effect of non-θ subjects for binding. In this respect these examples fall together with (6b), (7), and (9b). Our analysis suggests further that the difference in wellformedness between (15) and (16)--if it exists--is just another instance of the difference between (7b) and (7a) respectively. That is, condition (13) is not at issue.

In the preceding discussion we have attempted to illustrate that Principle A has a fine structure whereby θ-subjects have strong opacity inducing effects in contrast to non-θ subjects and AGR which have relatively weak effects, with the exception of the NIC effect for AGR as noted above. We noted that pleonastic subjects may manifest a slightly stronger effect when they occur in a θ-position or are locally bound to AGR. Still to be determined is the exact hierarchy of strength for these weak effects.

Our analysis has dealt almost exclusively with reciprocals because they provide the clearest cases. We turn now to the question of whether this analysis generalizes to the other type of lexical bound anaphora, reflexive pronouns. We believe that it does--again on the basis of the relative grammaticality judgments. Thus consider the following pair of examples:

(17) a. *Tom expects $[_S$ Mary to $\left\{\begin{matrix}\text{seem}\\ \text{be reported}\end{matrix}\right\}$ to himself $[_S\ e_i$ to be lying$]]$

b. ?Tom expects $[_S$ it to $\left\{\begin{matrix}\text{seem}\\ \text{be reported}\end{matrix}\right\}$ to himself $[_{\bar{S}}$ that Mary is lying$]]$

Although there is a certain awkwardness in using a reflexive pronoun in (17b) where a non-reflexive pronoun would serve for the intended reading, we find that there is a qualitative difference between (17a) where binding occurs across a θ-subject and (17b) where binding occurs across a non-θ subject.[6]

Note that NP-trace binding is not sensitive to the distinction θ- vs. non-θ subject.

(18) *He_i was expected $[_{\bar{S}}$ for $[_S$ it to be hurt $e_i]]$

cf. It was expected for him to be hurt.

Thus if Principle A accounts for (18), then it will be necessary to distinguish between lexical anaphors and NP-e.

It should also be noted that the interpretation of pronouns with respect to disjoint reference is not sensitive to the distinction between θ and non-θ subjects. Thus the pronoun he in (19) may be interpreted as coreferential with John where the pronoun is free in the domain of a non-θ subject.

(19) John expected it to annoy him that Mary was arriving late.

In this way our analysis provides additional evidence for the asymmetry between the domain in which an anaphor must be bound and the domain in which a pronoun must be free. That is, the domain X for Principle A will not be the same as the domain statement for Principle B:

(20) Principle B: a pronoun must be free in domain Y.

See Huang (1982) for discussion.

Our analysis suggests that the notion θ-subject is crucial for binding of lexical anaphors. This seems natural in that anaphors, having no inherent reference, must get their reference from some antecedent which does. Since non-θ subjects do not qualify as possible antecedents, it seems natural that they wouldn't define strong opaque domains. However with pronouns it is not necessary that they have an antecedent in the sentence in which they occur. Thus it seems reasonable that opaque domains for pronouns are determined differently than for anaphors.

FOOTNOTES

[0]The definition of accessible is as follows: α is accessible to β if and only if α is in the c-command domain of β. (Cf. LGB, p. 212).

[1]That is, in a non-argument position in the terminology of Freidin (1978) (not to be confused with the notion A-position in LGB). Recall that it follows from the θ-criterion (in particular, Functional Uniqueness in its strong form--see Freidin (1978, footnote 25)) that movement can only occur into non-θ positions.

[2]Comparing (6b) and (9b), it may be that the latter is very slightly worse (though again judgments here are rather subtle). If so, then AGR might provide a slight increment to opacity effects. In LGB, (p. 214) an example involving binding across a pleonastic subject is marked ungrammatical:

(i) *They think it bothered each other that S.

This example incorporates two factors which may have slight opacity effects: AGR in the embedded clause and the presence of it in a θ-position. However, compared with (ii) where binding occurs across a θ-subject, (i) is relatively wellformed.

(ii) *They think Mary's report bothered each other.

For some reason (i) seems better if the embedded predicate takes an auxiliary--e.g. will bother or has bothered.

[3]The Nominative Island Condition (Chomsky (1980)) prohibits the occurrence of nominative anaphors--in effect, anaphor subjects of finite clauses. Thus the NIC covers the one case of strong binding effects which is not accounted for by θ-subjects.

[4]Recall that such a stipulation has been considered a defect in previous formulations of the binding theory--see LGB, p. 158.

[5]Notice that independent motivation for (13) is given in LGB as in (i) which involves the indexing of a pronoun rather than an anaphor.

(i) *$[_{NP_i}$ the owner of $[_{NP_i}$ his$]$ boat$]$

Yet the following example involving an anaphor seems relatively wellformed when compared with its pronominal counterpart.

(ii) a, Every owner of a picture of himself is conceited to some degree.

b. Every owner of a picture of him is conceited to some degree.

(ii-b) is impossible on the coreferent reading, where him and owner corefer.

[6](17b) seems better with seem than with be reported, though why this should be is unclear.

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