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Supplementing the Binding Theory: On the Question of Proper Binding

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In this essay I want to propose that the phenomenon of proper binding is relevant to the theory of grammar and suggest that, if allowed to play a part in the writing of a generative grammar, proper binding can serve as an interface between the form of the grammar and its use in discourse pragmatics. With the term proper binding I refer to the prescriptive and descriptive statement requiring that anaphor and bound pronouns agree with their antecedents with respect to person, number, gender. In this vein, proper binding relates to the theory of grammar in the same way that government does. Like government, proper binding is the appropriation, on the part of generative grammar, of a traditional term and phenomenon, in order to present it in a new light.

In its new role in the theory of grammar, proper binding provides a way to conjoin conditions A and B of the Binding Theory, turning them into a single statement. In particular, there will be no need to refer to the definition of the notion 'governing category.' The fact that the definition of the notion 'governing category' defines a domain that is syntactically equivalent to the domain of a clause (or a nominal) indicates that there is a duplication taking place to the extent that the use of these two terms refer to the same domain. Within the Government and Binding theory of grammar, such duplication is needed in order to make the clause into a complete functional complex; that is, the duplication allows every piece of information within a clause to play a role in the explanation of the way anaphors and pronominals behave (Chomsky, 1986). While recognizing the need for the duplication at the level of formal grammar, proper binding itself has no need for the duplication because, for its purposes, it is enough to refer to the categorical domain in which an element may be bound. In this respect, proper binding does not make descriptively explicit in any precise way the specific constituents needed to construct the notion of a governing category. It does not seek to account for obligatory co-reference and obligatory disjoint reference in the same way the Binding Theory does. What proper binding proposes instead is a supplementary statement that would, first of all, rule in as grammatical all constructions in which an anaphor or a bound pronominal agrees with its antecedent in terms of person, number, and gender. Secondly, it would designate as ungrammatical those constructions in which such agreement does not occur. And thirdly, it would, on the basis of generalized agreement, rule out as ungrammatical those cases that the Binding Theory rules out because of its theory-internal definition binding. To the extent that it can deal with all these cases following generalized agreement, proper binding is compatible with the Binding Theory. And further, because the notion of generalized agreement is a semantic notion, proper binding has a fairly direct link to discourse pragmatics. Thus proper binding seeks to stand between the pure form of the grammar and how that form may be used in co-operative discourse.

This paper has three sections, the first section is a short sketch of the BT as Howard Lasnik constructs it in his *A Course in GB Syntax* (1988). With this short exposition I am interested in showing how the strict requirement that the BT account for the form of the grammar leads to a definition of governing category that loses the intuition that anaphors are subject to

obligatory coreference and pronominals are not. The second section deals with the details of proper binding. The last section suggests ways in which proper binding may be used as a grammatical interface between syntax and discourse.

The Binding Theory

In chapter 2 of *A Course*, Lasnik presents the essentials of Binding Theory, doing so in terms of approximations. He goes through several approximations to conditions A and B or the Binding Theory before he presents the final product. In the course of this procedure he also defines the basic relations that will have much to say about how statements in the grammar are to be made. The relation of constituent-command relation, for instance, requires that in a configuration where a node C immediately dominates a node A and also dominates a node B, node A gets to define the c-commanding domain. This is prototypically exemplified with the subject constituent of a clause; the subject c-commands all the elements inside the predicate of a clause. The relation of binding is defined in terms of c-command and co-indexation: A binds B iff (i) A c-commands B and (ii) A and B are coindexed. What the BT seeks to accomplish through the use of indices, proper binding tries to accomplish through generalized agreement. This is an interesting difference between the two approaches addressed in section two. With respect to the final version of the BT, where the approximations state conditions A and B by making reference to a clause (or NP) as a binding domain, in the final version of the BT, reference to this domain via the clause is displaced in favor of the new expression 'governing category.'

(1) A. An ANAPHOR must be bound in its governing category (GC).
B. A PRONOUN must be free in its governing category (GC).

This new expression also receives a definition by approximations. The first approximation, for instance, defines GC in the following way:

(2) α is the GC for β iff α is the minimal NP or S containing β and a governor of β

In the final version of GC a more highly specified structure emerges, the definition making reference to every major constituent of the clause.

(3) The GC of α is the minimal NP or S containing α, a governor of α, and a SUBJECT accessible to α

In this definition, not only do we have a highly-specified domain, we also have a specialized reference to the SUBJECT, which, in capital letters signifies an AGR-subject and a lexical NP-subject. The specialized reference comes in the relation of accessibility, described thus:

(4) β is accessible to α if
a. β c-commands α, and
b. β is not co-indexed with any category containing α

The statement (4.b) is also known as the i-within-i filter. The final version of the BT requires the statement of (4.b) in order to account for constructions in which an ANAPH refers out of its tensed clause in violation of the Tensed-Sentence Condition, or TSC. The TSC prohibits any relation between X and Y in a configuration such as the following:

(5) ... X ...[α ... Y ..., where α = Tensed Clause

In this configuration, Y is an ANAPH and X an antecedent, but Y should not be able to pick up X as its antecedent because the morpheme Tense keeps Y from referring out of α. A clause like (6) below is lost to the TSC because it cannot account for its grammaticality and its failure to pattern after (7):

(6) The men think THAT picture of each other will be on sale.

(7) *The men think THAT each other are intelligent.

With (7), the TSC has no problems. The lower clause, being tensed, keeps the anaphor from referring out of that domain. The BT accounts not only for the behavior of the anaphor in (7) but also for the anaphor in (6), which behaves in contrast to (7). How (6) is ruled in as grammatical is the work of the i-within-i filter, (4.b) above. That filter allows the matrix clause subject to be the relevant (accessible) SUBJECT for the RECIPROCAL-*each other*. Let us apply the definition in (4) of accessible SUBJECT to the following structures (8), the embedded clause of (7):

(8) [THAT pictures of each other AGR-will be on sale]

AGR, as the inflected pronominal in the verb, while it appears as a potential SUBJECT-ß for a RECIP-α, does not qualify as accessible. In others words, if we were to put the index of ß on the category containing α, namely the NP-*pictures of each other*, we would create an i-within-i structure. The general effect of the i-within-i filter is to insure that the same index does not appear too often in a particular construction, effectively ruling out those constructions in which indices seem to 'bunch up.' In (8) above AGR must co-index with the NP-*pictures of each other*, thus making AGR inaccessible to the RECIP. Only the SUBJECTs of the matrix clause are accessible to the RECIP. As we can see, in this approach, for α to have an accessible SUBJECT-ß, α must be able to recognize its antecedent through the empirical filter of the i-within-i condition, submitting the potential SUBJECT-ß (the AGR of (8)) to an indexing test. By requiring this test, the grammar is simply using every formal element at its disposal in order to write the most constrained grammar possible. In such a grammar, the RECIP will not fail to get its antecedent; either it will find the GC in which it is bound or it will be free (unbound) in that same GC. In the second case, we can only expect ungrammaticality. Despite the deficiencies that surround the BT, there is a certain elegance that emerges when one follows how exactly an ANAPH escapes the Tense of the lower clause in which it finds itself and accesses a SUBJECT in the matrix clause. That chain of reasoning shows that the BT has a way to let anaphors in tensed embedded clauses refer to an antecedent found not in the lower, tensed clause but in the upper, containing clause.

As mentioned above, one problem that accompanies this version of the BT is the way in which the definition of GC reproduces exactly the domain of a clause. The problem here is not

so much that one has to mention two types of SUBJECTS, a lexical head, and the referential element under consideration as it is that the semantic intuition that the RECIP and the accessible SUBJECT of the matrix clause are obligatorily coreferential is made opaque by the pure form of the grammar. It is for this reason that I believe that the notion of proper binding is relevant to the BT. As a supplement to the BT, proper binding can easily take care of the straightforward cases of both obligatory coreference and obligatory disjoint reference. As for the more difficult cases, proper binding will not fail to interpret these, even in the absence of a fully worked out definition of GC. Let us turn to section two in order to see how proper binding is relevant to the BT.

Proper Binding as a Supplement to the Binding Theory

In a theory of grammar in which one does not need a fully worked out definition for the notion 'governing category,' proper binding will play the role of insuring that generalized agreement, as a bundle of formal elements in the grammar, does not get violated. In this respect, generalized agreement and the i-within-i condition have a similar function: as i-within-i gives empirical content to the definition of GC, so generalized agreement furnishes the descriptive features needed to account for an improper binding. In other words, as the i-within-i filter identifies cases of indexation that lead to ungrammaticality, so the relation of proper binding highlights those cases in which there is a mismatch between the features of a potential antecedent and the features of an anaphor or a bound pronominal. Since proper binding works in such close tandem with the i-within-i condition we might speculate if the latter is not an instance of the latter.

As a supplement to the BT, proper binding enters the grammar as a strategy for collapsing Conditions A and B into a single statement, which we might call the Proper Binding Statement (PB) and articulate as in (9):

(9) ANAPHS and PRONS are properly bound in γ, where
(i) γ = a minimal NP or S and (ii) no indexed element in γ violates the i-within i condition

One of the most immediate ways in which one can see the relevance of the proper binding statement to the BT comes in the form of the following data:

(10) a. *Himself likes John
b. *each other left
c. *the boys like herself
d. *the boys believe that Mary likes himself

To account for these data is no simple task for the BT. For (10.b) the BT needs to stipulate that a root clause is the GC for a governed element such as the RECIP (*Course*, p. 62). For the PB-statement, none of these cases is problematical. For (10.a) we simply say that there is impropriety of precedence. For (10.b) the reciprocal lacks a structurally represented antecedent to bind properly in its clause. Also, while (10.c) exhibits a mismatch of number and gender, (10.d) exhibits one of gender: *himself* does not agree with *Mary*. Further, if proper binding straightforwardly accounts for those cases in which a construction with indexed elements must

be ungrammatical because the featural structure between antecedent and anaphor do not match, it can also, obviously, account for those cases in which the indexing in a construction must yield a grammatical structure, and this thanks to the similarity of function between i-within-i and generalized agreement.

Paradigm (12) below is a prototypical set of data that allows the BT to speak in terms of the Tensed-S effect in (10.a) and the Specified Subject Condition effect (SSC) in (12.b-c). The BT rules out (12.a) as ungrammatical, calling it a Condition A violation. The SSC takes a structural formula much like the one for the TSC, except that the value of α differs, as (11) stipulates:

(11) ... X ...[α ... Y ...
where α contains a specified subject Z

(12.b-c) are hence SSC-effects because the specified subject Z NP-*Mary* lacks the obligatory coreference between antecedent and reflexive. For the BT, these also amount to condition A violations because the ANAPHS cannot, in any case, refer out of their tensed clause. Moreover, the BT designates (12.d) as ungrammatical, calling it a condition B violation: the pronominal is bound when it should be free.

(12) a. *John$_i$ believes that himself$_i$ likes Mary
b. *John$_i$ believes that Mary likes himself$_i$
c. *John$_i$ believes that Mary to like himself$_i$
d. *John$_i$ likes him$_i$

The proper binding statement has a way to rule out (12.a-c). It has little to say about (12.d) unless we force *him* to behave like an anaphor, which is what the indexing is forcing. To rule out (12.a-c), the PB-statement first assigns γ to the lower clause, and then requires the anaphor in that domain to match feature for feature with a potential antecedent. If it fails to do this, it is shown to be improperly bound. The RECIP ends its search for an ANTECEDENT. (10.d), as we have said, represents an ungrammatical case determined by the definition of Binding. In (10.d) the pronominal is properly bound in γ iff it is free in γ in the BT sense of free and bound. That is, in terms of the proper binding statement, we can simply say that a pronominal is proper in γ when it is free to refer and pick up and ANTEC, whether that ANTEC is structurally represented or not.

Consider a couple of cases that prove to have interesting explanations in terms of proper binding. The first has to do with the empty category PRO, the non-phonetic subject of infinitival clauses:

(13) It is important [PRO to understand the problem]

As far as the empty category in (13) is concerned, the PB-statement treats it as a pronoun that must be proper in γ, in this case the lower clause. In (13) PRO is free to refer and is thus proper in γ. Similarly, for a pair of clauses like (14.a,b).

(14) a. The boys$_i$ know how PRO$_i$ to behave themselves$_i$
b. They know how PRO$_i$ to behave oneself$_i$

The PB-statement will simply take it for granted that both PRO and the ANAPH search for a category in which each can be properly free and bound, respectively. In (14.a) for instance, the reflexive matches with PRO in terms of featural structure and thus PRO properly binds the reflexive. The reflexive is thus proper in its own γ. PRO is free in the γ of the reflexive but has its proper binding with the ANTEC NP-*the boys*. Thus, PRO too has its own γ. This type of data shows the further relevance of proper binding to the BT and its applicability to a non-phonetic category like PRO. In sum, it is an interesting fact that proper binding can account for the behavior of PRO.

Next consider how proper binding would analyze the Japanese reflexive system. Katada (1990) presents a three-way system by which Japanese reflexives may pick up a nearby ANTEC. The three reflexives are:

(15) zibun 'self'
zibun-zisin 'self-self'
kare-zisin 'he-self'

Each of these reflexives, Katada points out, "displays contrastive binding behavior in a systematic fashion" (p. 288). Katada demonstrates this point with the following sentence:

(16) John-ga^{i} [Bill-ga^{j} Mike-ni^{k} { zibun?$^{i, j, *k}$ / zibun-zisin?$^{*i, j, *k}$ / kare-zisin?$^{*i, j, k}$ }
NOM NOM DAT
+no koto-o hanasita to] itta
ACC

'John said that Bill told Mike about self'

In this paradigm *zibun* may pick as its ANTEC, the lower or the higher clause NOM-Case NPs *John* or *bill*, but may not pick up the DAT-Case NP-*Mike*. By contrast, *zibun-zisin* may pick up only the lower clause NOM-Case NP. The DAT-Case NP is still not an option with these two reflexives. The third reflexive restricts itself to the lower clause and may pick up either the NOM- or DAT-Case NP. What this Japanese data suggests, along with the English cases in which an ANAPH refers out of a Tensed clause, is that the tendency is for ANAPHS to break out of so-called opaque domains. As such, what proper binding says about English reflexives applies to the Japanese reflexives as well. *Zibun* makes obligatory coreference with a subject constituent possible. Where *i* is the index, the coreference is bound to the higher clause subject. Stated in terms of proper binding, one can say that it makes the reference to that SUBJECT proper, in much the same way that in (7) and (8) above, the NP-*the men* is an accessible SUBJECT to the ANAPH-*each other*. Similar analyses can be given for the other two reflexives. But I will stop here, deferring discussion of the PB-statement's capacity to interface syntax and discourse, in order to give that topic a fuller treatment elsewhere.

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