

# Binding Theories: A Comparison of ‘Grammatical Models’

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## 1.0 Introduction

Binding theory is a good area to compare competing theories within the generative paradigm. In this paper I will focus on binding theories in the Principles and Parameters framework (Chomsky 1981, Lasnik & Chomsky 1993), Head-Driven Phrase Structure Grammar (Pollard & Sag 1994), and Lexical Functional Grammar (Bresnan 2000).<sup>1</sup> In addition I will discuss the Reflexivity approach as proposed in Reinhart & Reuland (1993). For reasons of space I will limit the empirical domain. Basically, I will limit my discussion to English examples like the ones in (1-4):

- (1) a. John<sub>i</sub> saw himself<sub>i</sub>  
b. John<sub>i</sub> saw him<sub>i</sub>  
b. \*Himself<sub>i</sub> saw John<sub>i</sub>
- (2) a. John talked to Mary<sub>i</sub> about herself<sub>i</sub>  
b. \*John talked about Mary<sub>i</sub> to herself<sub>i</sub>
- (3) a. \*John<sub>i</sub> saw himself<sub>i</sub>'s mother  
b. John<sub>i</sub> saw his<sub>i</sub> mother
- (4) a. John<sub>i</sub> believes himself<sub>i</sub> to kiss Mary  
b. \*John<sub>i</sub> believes himself<sub>i</sub> kisses Mary

In the next section I will first very briefly discuss the original formulation of the Binding Theory in Lectures of Government and Binding (Chomsky 1981) (2.1). Then I will give a short outline of the nonderivational Binding Theories of HPSG and LFG (2.2 and 2.3), and I will conclude with a discussion of the Reflexivity framework (2.4). In section 3 I will discuss what I take to be the most central features of the LGB version of the Binding Theory and how they are rooted in earlier work, and initiated later revisions. In doing so, I will be able to review the similarities and differences between the proposals discussed in section 2, and how they account for the core facts in (1-4).

## 2. Binding Theories<sup>2</sup>

### 2.1 Lectures of Government and Binding

Discussing anaphora within the generative research tradition should start with the Binding Theory (BT) as formulated in Chomsky's Lectures of Government Binding (LGB:188) (cf. 5-7):<sup>3</sup>

- (5) a. An anaphor is bound in its Governing Category

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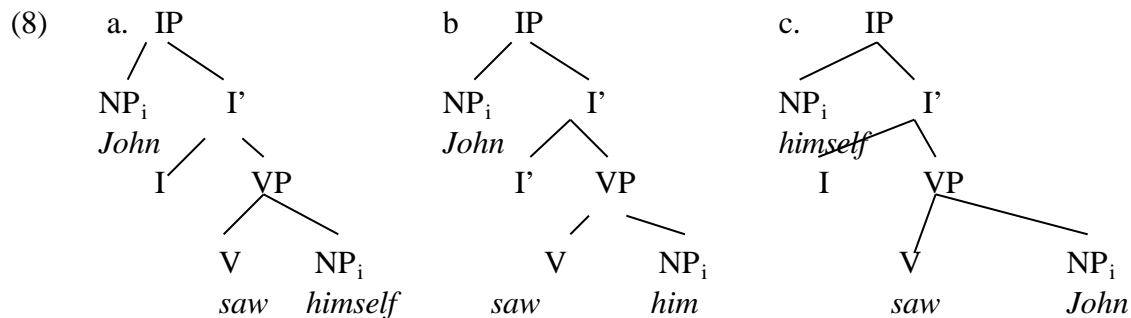
<sup>1</sup> With the introduction of Chomsky's Minimalist Program (Chomsky 1995) the perspective on interpretative dependencies has radically changed. Cf Reuland (2000) for discussion

<sup>2</sup> For reasons of space I will not discuss some of the general notions in the LGB/HPSG/LFG framework. I refer the reader to the works mentioned.

<sup>3</sup> To be complete, I will give condition C of all Binding Theories I present, but I will not discuss any condition C example.

- b. A pronominal is free in its Governing Category
  - c. An R-expression is free
- (6)  $\alpha$  is the governing category for  $\beta$  iff  $\alpha$  is the minimal category containing  $\beta$ , a governor of  $\beta$ , and a SUBJECT accessible to  $\beta$ .
- (7) a.  $\alpha$  is bound by  $\beta$  iff  $\alpha$  and  $\beta$  are coindexed,  $\beta$  c-commands  $\alpha$  (and  $\alpha$  is in an A-position)
- b.  $\alpha$  is free iff it is not bound
  - c.  $\alpha$  c-commands  $\beta$  iff the minimal maximal projection dominating  $\alpha$  dominates  $\beta$ , and  $\alpha$  does not dominate  $\beta$ .

In (1a/8a) the anaphor in object position must be bound in its governing category. IP is the governing category for *himself* because it is the minimal category containing the reflexive, its governor *saw* and an accessible subject. Since the reflexive is coindexed with the c-commanding NP *John* within its governing category, binding condition (5a) is satisfied:



In (1b/8b) the governing category of *him* is exactly the same as in (8a) since *him* occupies the same position as the reflexive in (8a). However, in (8b) the coindexing results in the pronoun being bound in its governing category, which is excluded by binding condition (1b). In (8c) the governing category of *himself* is again the IP because INFL is taken as an accessible subject (although not a possible antecedent) and as the governor of the reflexive. Within this governing category the reflexive is not bound, violating condition (5a), since it is not c-commanded by the object NP *John*.

## 2.2 Head-Driven Phrase Structure Grammar

In the HPSG-version of Binding Theory (Pollard & Sag 1994:238-281), some central features of the LGB-approach are retained, although substantially redefined. Its core features are given in (9-11): the binding conditions (9), a ‘superiority’ restriction and a domain restriction (10-11).

- (9) a. A locally o-commanded anaphor (ana) must be locally o-bound
- b. A personal pronoun (ppro) must be locally o-free
  - c. A nonpronoun (npro) must be o-free.
- (10) a. Y (locally) o-binds Z just in case Y and Z are coindexed and Y (locally) o-commands Z.
- b. Z is (locally) o-free if Z is not (locally) o-bound.

- c. Let  $Y$  and  $Z$  be *synsem* objects with distinct LOCAL values,  $Y$  referential. Then
  - (i)  $Y$  locally o-commands  $Z$  just in case  $Y$  is less oblique than  $Z$ .
  - (ii)  $Y$  o-commands  $Z$  just in case  $Y$  locally commands  $X$  dominating  $Z$
- (11) a. A synsem object  $Y$  is less oblique than a synsem object  $Z$  just in case it precedes  $Z$  on the SUBCAT list of some lexical head.
- b. The SUBCAT value of a sign  $X$  is a list of synsem objects, corresponding to the SYNSEM values of the other signs selected by  $X$  (i.e.  $X$ 's valence).
- c. The ordering of synsem objects is: subj.>obj.>sec.obj.>obl<sub>pp</sub>>verb./pred.comp

If we apply these definitions to the HPSG representations of (1a-c),

- (12) a. [SUBCAT NP:*npro*<sub>*i*</sub>, NP:*ana*<sub>*i*</sub> ]
- b. [SUBCAT NP:*npro*<sub>*i*</sub>, NP:*ppro*<sub>*i*</sub> ]
- c. [SUBCAT NP:*ana*<sub>*i*</sub>, NP:*npro*<sub>*i*</sub> ]

we get the following result. In (12a) the object anaphor is locally o-commanded by the subject *John* and therefore it has to be locally o-bound. Given the definition in (10a) this is the case, and, thus, binding condition (9a) is satisfied. In (10b) the object pronoun is locally o-bound. As a result binding condition (9b) is violated because pronouns should be locally o-free. The case of (1c/12c) is interesting. In this case the anaphor is not locally o-commanded because it is a subject, and, therefore, less oblique than the coindexed object it is coindexed with (cf. 11a). Not being locally o-bound, means that binding condition (9a) is vacuously satisfied: the anaphor in subject position in (1c) is what Pollard & Sag (1992,1994) call an exempt anaphor. The fact that (1c) is ungrammatical must, thus, be due to an other principle of grammar. Pollard & Sag suggest that the reason is simple: (1c/12c) is ungrammatical because the English reflexive lacks a nonnominative form. They argue that *himself* is accusative as can be conclude from its morphology, and, therefore, is disallowed from serving as the subject of a finite verb.<sup>4</sup>

### 2.3 Lexical-Functional Syntax

Bresnan (2000) gives an outline of the basic binding theoretic concepts in LFG. Just as in the case of HPSG, the core features of the LGB-approach are retained, with one clear exception: the notion c-command is replaced by Syntactic Rank (cf. 13a,b), a relation of relative prominence on functional structure based on the relational hierarchy in (13c):

- (13) a.  $A$  locally outranks  $B$  if  $A$  and  $B$  belong to the same f-structure and  $A$  is more prominent than  $B$  on the relational hierarchy in (13c).
- b.  $A$  outranks  $B$  if  $A$  locally outranks some  $C$  which contains  $B$ .
- c. Relational hierarchy: SUBJ > OBJ > OBJ > OBL > COMPL > ADJUNCT

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<sup>4</sup> Another option, perfectly compatible with the Binding Theory outlined in (9-11) is to invoke Rizzi's Anaphor Agreement principle, which states that anaphors are disallowed in agreement positions, such as the subject position of finite verbs in English (Rizzi 1990).

Replacing the notion Governing Category by the concept of the Nucleus of an f-structure (cf. 14), and defining binding as in (15), the Binding Theory itself can be formulated as in (16):

- (14) Given an f-structure  $f$ , the nucleus of  $f$  is the subset of  $f$  consisting of the PRED element and all of the elements whose attributes are functions designated by the PRED (= the predicate and its argument functions)
- (15) a.  $A$  binds  $B$  if  $A$  outranks  $B$  and  $A$  and  $B$  are coindexed.  
 b.  $B$  is bound/free if some/no  $A$  binds  $B$
- (16) a. A nuclear (reflexive) pronoun must be bound in the minimal nucleus that contains it  
 b. A nonnuclear pronoun must be free in the minimal nucleus that contains it.  
 c. (Other) nominals must be free.

Now take a look at the LFG representations of (1a-c) in (17a-c):<sup>5</sup>

- (17) a. 
$$\left[ \begin{array}{l} \text{PRED} \quad \text{'see (} f \text{ SUBJ) (} f \text{ OBJ)'} \\ f: \text{SUBJ} \quad [ \text{'John}_i \text{'}] \\ \text{OBJ} \quad [ \text{'himself}_i \text{'}] \end{array} \right]$$
- b. 
$$\left[ \begin{array}{l} \text{PRED} \quad \text{'see (} f \text{ SUBJ) (} f \text{ OBJ)'} \\ f: \text{SUBJ} \quad [ \text{'John}_i \text{'}] \\ \text{OBJ} \quad [ \text{'him}_i \text{'}] \end{array} \right]$$
- c. 
$$\left[ \begin{array}{l} \text{PRED} \quad \text{'see (} f \text{ SUBJ) (} f \text{ OBJ)'} \\ f: \text{SUBJ} \quad [ \text{'himself}_i \text{'}] \\ \text{OBJ} \quad [ \text{'John}_i \text{'}] \end{array} \right]$$

In (17a) the object reflexive is bound by the subject *John* in its nucleus; i.e. the subject and the object are coindexed and the former outranks the latter. Given the definition in (16a) this means that binding condition A is satisfied. In (17b) the object pronoun is bound by the subject within its nucleus, thus resulting in a violation of binding condition (16b). The case of (1c/17c) is simple; the reflexive subject is coindexed by an element in its nucleus, the object, but is not bound because the subject outranks the object.

## 2.4 Reflexivity

Reinhart and Reuland (1993) propose that there are two modules regulating the distribution of anaphors/pronominals. Configurational effects are due to a condition on chain formation (18), while the domain of reflexivization is defined over predicates without making reference to syntactic structure (19).<sup>6</sup>

- (18) Condition on A-chains: A maximal A-chain ( $\alpha_1, \dots, \alpha_n$ ) contains exactly one link -  $\alpha_1$  - which is

<sup>5</sup> I am taking over Bresnan's abbreviations of f-structures.

<sup>6</sup> The relevance of the distinction between syntactic and semantic predicates will become clear in 3.4.

+R.

- (19) a. A reflexive-marked (syntactic) predicate is reflexive  
b. A reflexive (semantic) predicate is reflexive-marked

Reflexivity is, thus, a property of predicates (cf. 19) that must be linguistically licensed, for instance by marking the anaphor with SELF, where reflexive and reflexive marking are defined as in (20):

- (20) a. A predicate is reflexive iff two of its arguments are coindexed  
b. A predicate (of P) is reflexive-marked iff either P is lexically reflexive or one of P's arguments is a SELF-anaphor

The property R in (18) reflects whether or not an anaphoric expression is fully specified for phi-features:

- (21) An NP is +R iff it carries a full specification for  $\phi$ -features (gender, number, person) and structural Case.

Furthermore, NPs are partitioned into three classes according to the properties SELF and R: SELF-anaphors (+ SELF,-R), e.g. English *himself*; SE-anaphors (-SELF,-R), e.g. Norwegian *seg*, a type of reflexive not available in English; pronouns/R-expressions (-SELF,+R), e.g. English *him*. Being marked [+ SELF] means that an element is able to reflexivize the predicate (cf. 20b).

Ignoring, for the moment, the distinction between semantic and syntactic predicates, we will apply these definitions to the examples in (1), her repeated as (22);

- (22) a. John<sub>i</sub> saw himself<sub>i</sub>  
b. John<sub>i</sub> saw him<sub>i</sub>  
b. \*Himself<sub>i</sub> saw John<sub>i</sub>

To begin with, all predicates in (22) are reflexive, because the two arguments of the predicate are coindexed. In (22a) and (22c) the predicate is also reflexive-marked because one of the arguments of *saw*, the object in (22a) and the subject in (22c) is occupied by a [+SELF]-marked element, the English reflexive *himself*. This means that binding conditions (19a) and (19b) are satisfied in both cases. In (22b), however, the predicate is not reflexive-marked, because the pronominal does not count as a reflexivizer of the predicate. Condition (19a) is not applicable, but condition (19b) is violated.

The following step is to see if the Chain condition (18) is satisfied. In all cases the two arguments of the predicate form a chain:

- (23) a. [ John<sub>i</sub>, himself<sub>i</sub> ]  
b. [ John<sub>i</sub>, him<sub>i</sub> ]  
c. [ Himself<sub>i</sub>, John<sub>i</sub> ]

As an R-expression, *John* is taken to be fully specified for phi-features, making it a +R-element. Reinhart & Reuland argue that the English reflexive is -R because, though marked [+3rd, +masc, -pl], it is unspecified for Case, since it does not contrast with *heself*.<sup>7</sup> The pronoun *him* is also fully phi-feature specified [+3rd, +masc, -pl, +Acc Case], and thus +R-specified. This being the case, chain formation in (23b) and (23c) will violate condition (18). In (23b) the chain contains two +R-elements, and in (23c) the chain is headed by a -R element. The conclusion must be that (22c) is not excluded by the binding conditions itself, but by illegitimate chain formation. Note that (22b) is excluded both by the condition on chain formation (18), and by binding condition (19b).

### 3 A Comparison

#### 3.1 Overt and empty categories

It is important to understand that, in the P&P framework, Binding Theory not only deals with the distribution of reflexives, reciprocals and pronouns. From Chomsky's Conditions on Transformations (1973) onwards, the study of reciprocals, reflexives and pronouns was always tied to the study of other grammatical phenomena such as WH-movement, NP-movement, or control (cf. Aoun 1986, a.o.).

In Chomsky (1973, 1976, 1977) two major restrictions on rules of extraction/insertion are introduced, the Specified Subject Condition and the Tensed-S condition. He observes that both reciprocal formation and WH-movement appear to be subject to the Specified Subject Condition (SSC), as the b-examples of (24-25) make clear:

- (24) a. The men<sub>i</sub> saw pictures of each other<sub>i</sub>  
 b. \*The men<sub>i</sub> saw John's pictures of each other<sub>i</sub>
- (25) a. Who<sub>i</sub> did you see pictures of e<sub>i</sub>  
 b. \*Who<sub>i</sub> did you see John's pictures of e<sub>i</sub>

In Chomsky (1980) the Tensed-S condition is replaced by the Nominative Island Constraint (NIC):

- (26) A nominative anaphor cannot be free in S' (=CP)

The NIC not only excludes examples as in (27a), but also instances of NP-movement as in (27b), under the assumption that NP-traces are anaphors subject to condition A, and even instances of WH-movement, under the assumption that WH-traces are (A'-)anaphors.

- (27) a. \*John<sub>i</sub> expected [ that himself<sub>i</sub> would win ]  
 b. \*John<sub>i</sub> seems [ that e<sub>i</sub> would win ]  
 c. \*Who<sub>i</sub> do you think [ e<sub>i</sub> that e<sub>i</sub> saw Bill ]

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<sup>7</sup> See Anagnostopoulou & Everaert (1999) for criticism of that position.

Chomsky (1981) takes the position that Binding Theory as outlined in (5) generalizes over empty categories and lexical categories, subsuming the effects of the Specified Subject Condition and the Nominative Island Constraint. Lexical elements are partitioned by means of two features, <± Anaphor> and <± Pronominal>, resulting in the cross-classification in (28):

(28)	<+Anaphor,-Pronominal>:	reflexives, reciprocals	NP-trace;
	<+Anaphor,+Pronominal>:	-	PRO;
	<-Anaphor,-Pronominal>:	R-expressions	WH-trace;
	<-Anaphor,+Pronominal>:	pronouns	pro.

Alongside pure pronominals ([+pronominal, -anaphoric]) and pure anaphors ([-pronominal, +anaphoric]), this classification characterizes as a third category the R-expressions [-pronominal, -anaphoric]. The existence of a fourth category *PRO* is predicted, [+pronominal, +anaphoric], whose distribution is limited to those positions where no governing category can be assigned if no binding condition conflict is to be invoked. In other words, *PRO* is limited to ungoverned positions such as the subject position of control infinitives, the so-called *PRO-theorem* (Chomsky (1981, 1982)).

Clearly, in the nonderivational approaches under discussion there are no empty categories in the sense of (28). In Pollard & Sag the four-way classification is rejected and reduced to a three-way classification: nonpronominal (R-expression), anaphoric (anaphor) and personal-pronominal (pronoun).<sup>8</sup> In HPSG and LFG the *PRO-theorem* is rejected, there is no NP-movement, and therefore NP-traces. For LFG this follows from the Economy of Expression principle which states that all syntactic phrase structure nodes are optional and are not used unless required by independent principles. Because of these differences potential similarities between anaphoric dependencies and filler-gap constructions are not straightforwardly accounted for. Consequently, the Binding Theories become, to a certain extent, incomparable because their empirical domains differ.

### 3.2 C-command

As mentioned above, HPSG and LFG reject that binding theory is configurationally sensitive. So, in both frameworks it is argued that the c-command restriction on the antecedent anaphor relation should be abandoned.<sup>9</sup> In their view the c-command restriction is better replaced by the concept of

<sup>8</sup> In HPSG the status of WH-traces/gaps is also different (Pollard & Sag 1994: 252).

<sup>9</sup> In Jackendoff (1990, 1992) it is argued that the relation between an anaphor and its antecedent should not be treated as a coindexation relation in syntactic structure. He tries to show that syntactic Binding Theory can be just as well formulated at Conceptual Structure (CS), thus replacing the notion c-command with the notion ‘CS-superiority’. This notion is defined over CS as defined by Jackendoff, i.e. a hierarchically structured semantic representation. Jackendoff concludes that “when the syntax-semantics mapping is straightforward, asymmetrical c-command more or less mimics the effects of cs-superiority”. In other words, CS is structured in such a way that the main effects of c-command are mirrored in CS. However, Jackendoff claims that in cases in which the syntax-semantics mapping is non-canonical, cs-superiority is superior to c-command:

(i) \*[Bill and his wife]<sub>i</sub> worry themselves<sub>i</sub>

The conceptual structure of (i) is given in (ii) where *Bill and his wife* are represented at conceptual structure as ‘properties of Bill and his wife’ and    is the variable bound by the subject, and replaced by a reflexive in syntax.

o-command/syntactic rank, which both are broadly similar to the hierarchies of grammatical relation in relational grammar (Pollard & Sag 1994:24). Reinhart & Reuland (1993) seem to abandon c-command. Their binding conditions do not refer to the notion c-command any more. However, in their view, the antecedent and the anaphor must form a chain (at least in the relevant cases) and since chain-formation crucially includes the concept of c-commanding chain members the result is still that anaphors must be c-commanded by their antecedent.

In many cases, such as (24) the frameworks make the same predictions:<sup>10</sup>

(24) \*John<sub>i</sub>'s mother saw himself<sub>i</sub>

There are, however, cases where the predictions diverge. Observe the examples in (25):

- (25) a. Mary talked to John<sub>i</sub> about himself<sub>i</sub>  
 b. \*Mary talked about himself<sub>i</sub> to John<sub>i</sub>  
 c. \*Mary talked to himself<sub>i</sub> about John<sub>n</sub>  
 d. \*Mary talked about John<sub>n</sub> to himself<sub>i</sub>

In (25) *John* does not c-command *himself* - under the assumption that the prepositions interfere, in itself not a necessary conclusion – which would account for (25b-d) but not for (25a), which is fully grammatical. In HPSG/LFG c-command doesn't play a role. If one would take *to*-phrases as less oblique than *about*-phrases, which means that the *to*-phrase o-commands/outranks the *about*-phrase, this would rightly predict the (un)grammaticality of (25a,c-d).<sup>11</sup> What would be left unexplained is (25b) where linear order, apparently, plays a role. Within LFG this could, in principle, be accounted for making use of the correspondence mapping between c-structure and f-

(ii) [CAUSE ([PROPERTIES [BILL & WIFE] \_], [BE ([\_], [WORRIED]])])]

As is clear from (ii) the antecedent of the reflexive is too deeply embedded to result in the required CS-superiority. The sentence is, therefore, ungrammatical even though the antecedent does c-command the reflexive in syntax (i).

<sup>10</sup> Note, however, that in HPSG, the reflexive in (24) is an exempt anaphor. The reflexive is not locally o-commanded, and thus the antecedent of the reflexive is not determined by the binding theory, but by other nonsyntactic factors.

<sup>11</sup> There is a long tradition of accounts which tries to reduce the c-command requirement of the binding conditions to a thematic hierarchy constraint, either directly or indirectly. The examples in (24) might also be excluded by the rule complex in (i):

- (i) a. For \_ the antecedent of \_, \_ an anaphor, \_ should be higher on the thematic hierarchy than \_  
 b. Agent > Experiencer > Goal/Source/Location/Benefactor > Theme

Pollard & Sag (1994) admit that the empirical difference between (i) and o-command is relatively small. They give two examples which might seem problematic for a thematic approach:

- (ii) a. John<sub>i</sub> was given a book by himself<sub>i</sub>  
 b. I sold the slave<sub>i</sub> to himself<sub>i</sub>

Dalrymple (1993) shows how a case like (iia) might follow from a thematic approach.

As far as I can see thematic hierarchy analyses are not less successful than c-command approaches (cf. Anagnostopoulou & Everaert 1997). Observe that Broekhuis (1994) manages to present a substantial portion of the results of the LGB-version of Binding Theory in nonconfigurational terms. Although he does this does for expository reasons, it is still revealing that it can be done.



structure (f-precedence; Bresnan 2000:195)

The corresponding pronominal examples are interesting

- (26) a. \*Mary<sub>i</sub> talked to John<sub>i</sub> about him<sub>i</sub>  
b. \*Mary talked about him<sub>i</sub> to John<sub>i</sub>  
c. \*Mary talked to him<sub>i</sub> about John<sub>i</sub>  
d. \*Mary talked about John<sub>i</sub> to him<sub>i</sub>

In the LGB-version of the Binding Theory, again under the assumption that the prepositions interfere for c-command, all examples are, wrongly, predicted to be grammatical. In the HPSG/LFG-version of the Binding theories, however, it is possible to account for their ungrammaticality. (26a,b) are excluded by binding condition B - the pronoun is locally o-bound by the less oblique to-phrase/the pronoun OBJ is bound by the less prominent OBL, while (26c,d) are excluded by binding condition C.

Two remarks should be made with respect to this construction. Firstly, Chomsky (1981) discusses an approach in which the verb *talk* and the preposition *to* are reanalyzed as one verb, resulting in a phrase structure in which *John* in (25a) c-commands the reflexive. He shows that such an analysis is not straightforward, but the examples in (27) show that it should not immediately be discarded.

- (27) a. Who<sub>i</sub> did Mary talk to e<sub>i</sub> about himself<sub>i</sub>  
b. \*[To whom<sub>i</sub>]<sub>j</sub> did John talk e<sub>j</sub> about himself<sub>i</sub>

Secondly, the argument status of the *about*-phrase might be relevant. Recall that the binding conditions in the Reflexivity framework crucially refer to the argument positions of the predicate. Reinhart & Reuland (1993:715) suggest that in an example like (28) the *with*-phrase, but not the *about*-phrase is an argument of the verb.

- (28) a. We talked with Lucie<sub>i</sub> about herself<sub>i</sub>  
b. \*We talked about Lucie<sub>i</sub> with herself<sub>i</sub>  
c. We talked with Lucie<sub>i</sub> about her<sub>i</sub>  
d. Can you talk with Lucie<sub>i</sub> about myself<sub>i</sub>?

If the *about*-phrase is an adjunct in (28), and (25-26), it means that the predicate is not reflexive, and in the cases where the reflexive is part of the *about*-phrase, also not reflexive-marked. In such cases the reflexive is logophoric (cf. 28d).<sup>12</sup> This would mean that in (25a,b) the predicate is neither reflexive. nor reflexive-marked. The (un) grammaticality of the examples should, therefore, follow from other principles of grammar. In (25c,d) the predicate is not reflexive, but since the *to*-phrase contains a reflexive, it is reflexive-marked. This will result in a violation of binding condition (19a). Such an analysis also means that none of the examples in (26) is excluded by the binding theory.

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<sup>12</sup> One could say that what Reinhart & Reuland call logophor is equivalent to what Pollard & Sag call an exempt anaphor.

### 3.3 Complementary distribution

An important feature of Binding Theory is that it is able to account for the fact that pronouns and reflexives are in complementary distribution (Jackendoff 1972), as discussed above. Given a certain position, anaphors and pronouns have the same interpretative domain. In Huang (1983) it was suggested, however, that this generalization ought to be abandoned and that distinct domains of interpretation ought to be assigned to anaphors and pronominals. This position is further developed in Chomsky (1986) on the basis of examples such as in (29):

- (29) a. They<sub>i</sub> saw [each other<sub>i</sub>'s friends]  
b. They<sub>i</sub> saw [their<sub>i</sub> friends]

This is one of the most salient cases of noncomplementarity of anaphors and pronominals in English. To account for this noncomplementarity Chomsky introduces the notions BT-compatible (30) and Complete Functional Complex (31) which, roughly speaking, replace the notions Accessible Subject and governing category.

- (30) *Complete Functional Complex (CFC)*:  $\beta$  is a CFC if all the grammatical functions compatible with a head dominated by  $\beta$  are contained in  $\beta$   
(31) *BT-compatible*: Indexing I is BT-compatible with  $(\_, \beta)$  if: (i)  $\_$  is an anaphor and is bound in  $\beta$  under I, or (ii)  $\_$  is a pronominal and is free in  $\beta$  under I

On the basis of these notions, the binding conditions are now redefined as in (32):

- (32) a. For some domain  $\beta$  and an anaphor  $\_$ ,  $\_$  must be bound in  $\beta$ , where  $\beta$  is the least CFC containing  $\_$ , a governor of  $\_$ , for which there exists an indexing I BT-compatible with  $(\_, \beta)$   
b. For some domain  $\beta$  and a pronominal  $\_$ ,  $\_$  must be free in  $\beta$ , where  $\beta$  is the least CF containing  $\_$ , a governor of  $\_$ , for which there exists an indexing I BT-compatible with  $(\_, \beta)$

Let us first take a look at (29a). Both the noun phrase containing the reciprocal and the root sentence are complete functional complexes, but only for the whole sentence do we find a BT-compatible indexing for the anaphor with respect to its antecedent. For the possessive pronoun in (30b) this is the reverse. It is precisely the noun phrase CFC that satisfies the requirement that the pronominal has a BT-compatible indexing. It means that the binding domain of an element depends on its status as an anaphor/pronominal.

Bresnan proposes to incorporate this binding asymmetry between anaphors and pronouns (Bresnan 2000: 219). The fact that, contrary to (29a), (33) is ungrammatical follows from English having a morphological gap in the case paradigm for reflexive pronouns.<sup>13</sup>

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<sup>13</sup> A similar restriction will have to be invoked in a Principles and Parameters Binding Theory.

(33) \*Mary<sub>i</sub> admires herself<sub>i</sub>'s mother

Pollard & Sag (1994:257) reject such an approach. They argue that an anaphor in this position not being locally o-commanded, is an exempt anaphor. For this reason cases like (34) where the reciprocal is long-distance bound are expected:

(34) [John and Mary]<sub>i</sub> knew that the journal had rejected each other<sub>i</sub>'s papers

However, one could raise the question whether the (English) reciprocal is ever an anaphor in the sense intended in the Binding Theory.<sup>14</sup> Note that, for instance, in the analysis of reciprocal constructions in Heim, Lasnik & May (1991), the condition A restriction on reciprocals has to be stipulated. (Cf. Everaert 2000).

### 3.4 Governor of

Another structural restriction in the P&P version of the Binding Theory, reference to the governor of the anaphor/pronominal, is necessary to distinguish between (35a) and (35b):

- (35) a. John<sub>i</sub> believes himself<sub>i</sub> to kiss Mary  
b. \*John<sub>i</sub> believes himself<sub>i</sub> kisses Mary

In (35a) the governor of the anaphor is *believe* and, therefore, the matrix sentence is the governing domain of the anaphor, while in (35b) the anaphor is not governed by the matrix verb but by a functional head (let us say INFL) in the embedded clause. Under the standard notion of governing category (6) this means that the antecedent *John* is outside the governing category, rightly predicting the ungrammaticality of (35b).<sup>15</sup> However, under the relativized formulation of the Binding Theory in (32), only the matrix clause will count as a governing category since it contains a potential antecedent.<sup>16</sup> This means that (35b) is not excluded by the binding conditions itself but should be excluded by some other principle of grammar. Chomsky suggests that anaphors have to move at LF to satisfy the locality restrictions on the agreement relation between the anaphor and its antecedent (cf. Lebeaux 1983). Such a movement will leave a trace which in (35b) is not properly governed, and, therefore, violates the ECP. Given the parallel between anaphoric dependencies and movement phenomena (WH-movement, NP-movement) discussed in section 3.1, this is a natural step to take.

A similar line of reasoning is followed by Reinhart & Reuland (1993). To explain that, we must first be a little bit more precise about the Reflexivity conditions. As formulated, binding condition (19a) applies to *syntactic* predicates while binding condition (19b) applies to *semantic* predicates, as

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<sup>14</sup> As far as I can recollect Riny Huybregts suggested this to me, as early as 1980.

<sup>15</sup> But see also footnote 4

<sup>16</sup> To account for (35a) the notion 'a governor of' is strictly speaking not necessary. It is the ungrammaticality of (i) that necessitates its presence in the definition (32):

(i) \*John believes him to kiss Mary

defined in (36):

- (36) a. The *syntactic predicate* formed of (a head) P is P, all its syntactic arguments and an external argument of P (subject)  
b. The *semantic predicate* formed of P is P and all its arguments at the relevant level.  
c. The *syntactic arguments* of P are the projections assigned  $\theta$ -role or Case by P

In (35a) the reflexive is a syntactic argument of the matrix verb *believe* since it is assigned case by it and it is a syntactic argument of the embedded verb *kiss* since it is assigned a theta-role by it. This means that binding condition A is satisfied w.r.t. the matrix predicate but, contrary to fact, violated w.r.t. the embedded predicate. The latter problem is solved by a complex predicate analysis which is not crucial for the discussion here. What is important is that (35a) illustrates that Reflexivity also makes use of notions that are equivalent to the P&P notion ‘a governor of’.

It is interesting to see what Reflexivity has to say about the ungrammaticality of (35b). This example is straightforwardly excluded by condition A (19a). The embedded predicate is reflexive marked because *himself* is a reflexive marker, but the predicate is not reflexive. This means that there is no need for an LF-movement analysis to derive its ungrammaticality.

In HPSG/LFG the example in (35a) is straightforwardly accounted if we analyze *believe* in such a way that *himself* in (35a) is in its subcategorization domain, i.e. the primary object of *believe* (Pollard & Sag (1994:118). With respect to (35b) the two approaches are slightly different. Since Bresnan (2000), following Dalrymple (1993), incorporates the binding domain extension discussed in section 3.3., the binding domain of the reflexive in (35b) will be the matrix sentence, predicting (35b) to be grammatical, contrary to fact. Bresnan argues that (35b) is excluded because English has no nominative anaphor. Pollard & Sag (1994) take a somewhat different line of argumentation. The reflexive in subject position is not locally  $\theta$ -commanded, and, therefore, exempt from the binding conditions. This leaves the possibility of ‘logophoric interpretation’ (to borrow a term from Reinhart & Reuland), were it not that English doesn’t have a nominative reflexive.

There is another set of examples, involving *for-to* infinitives (and gerunds), which are relevant for the present discussion. Observe the examples in (37) (from Chomsky (1973, 1976, 1981, 1986)):

- (37) a. \*John<sub>i</sub> much preferred for himself<sub>i</sub> to be the candidate  
b. \*John<sub>i</sub> wanted himself<sub>i</sub> to be a contender  
c. \*/\_They<sub>i</sub> were quite happy for each other<sub>i</sub> to win  
d. They<sub>i</sub> would prefer for each other<sub>i</sub> to win

In the case of *for-to* infinitives judgements don't seem to be very clear. The reflexive seems to be generally excluded but judgements vary in the case of the reciprocal. Under a Binding Theory incorporating (32) these examples are predicted to be grammatical. The matrix clause is the minimal domain containing the reflexive/reciprocal, their governors, *prefer*, *want* and *be happy*, and potential antecedents, *John* and *they* respectively. The fact that these examples are ungrammatical must, thus, follow from some other principle of grammar: for instance, that reflexives move at LF, and reciprocals do not (Lebeaux 1983). If the anaphors in (37) are not excluded by the binding theory per

se, this would rightly predict that the ungrammaticality of the examples in (38):<sup>17</sup> (from Chomsky (1977; 1981))

- (38) a. \*They<sub>i</sub> want very much for them<sub>i</sub> to win  
b. \*John<sub>i</sub> would prefer for him<sub>i</sub> to win

In the examples in (37) morphological restrictions play no role, and, therefore, the ungrammaticality of (37a,b) appears to be a problem for a HPSG/LFG analysis. However, the question is how robust these facts are. In Pollard & Sag (1994) evidence is given that one should not define binding domains in such a way as to make the binding of the anaphor in (37) obligatory:

- (39) John and Mary 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.

In the examples in (39) the reflexive must bear contrastive stress, but given this restriction the examples are much better than similar examples in (37).

Reinhart & Reuland (1993) too, have doubt that “any theory should be modified just to accommodate this type of case” (= (37)). They too observe that (i) the reflexive in such cases bears contrastive stress, and should thus be treated as a logophor, and that (ii) the Avoid Pronoun principle might interfere (cf. Chomsky 1981).

#### 4 Summary

The BT as formulated in (5-7) has been very influential in generative research, and its core features haven't changed much since its introduction. As can be observed, the LFG/HPSG-versions of the Binding Theory are not so much different as one might have thought. Comparing the Principles and Parameters Binding Theory with its HPSG/LFG equivalent, and restricting ourselves to a core set of English examples, shows that all Binding Theories need additional assumptions to cover the empirical domain. The Reflexivity version of the Binding theory is, in a sense, a departure of both the Principles & Parameter- and the HPSG/LFG-version of the Binding Theory. A more substantial comparison, on the basis of a cross-linguistic dataset, will have to show what the different binding theories are really worth.

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<sup>17</sup> Kayne (1984) shows that verbal gerunds seem to (partly) confirm this picture:

- (i) a. ??We<sub>i</sub>'re very much against each other<sub>i</sub> being drafted  
b. \*John<sub>i</sub> is counting on himself<sub>i</sub> leaving tomorrow  
c. ??They<sub>i</sub> would appreciate each other<sub>i</sub> going to bed  
d. \*John<sub>i</sub> is in favour of him<sub>i</sub> being sold as a slave

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