SUBJECTLESS BINDING DOMAINS*

A proposal by Bresnan that binding domains for pronouns should not contain subjects is incorporated into the binding theory of Chomsky (1986a). Coupled with BT-compatibility, this predicts non-complementary distribution in any subjectless category. The article focuses on examining the predictions for PPs as subjectless binding domains, as seen in examples like *John, looked behind himself,*. Bresnan’s insight that only PPs with “semantic content” function as binding domains is predicted by using results in theta-theory in conjunction with defining CFC in terms of theta-role assignment, as in Freidin (1986) and Giorgi (1987). Subjectless VPs and NPs are discussed, as well as the effect of Specificity on binding domains.

0. INTRODUCTION

A long-standing problem in English syntax, dating back to at least Lees and Klima (1963), is that pronouns within certain PPs can be bound to antecedents which are “too close” to them, as in (1):

(1) John, put the book in front of him.

This problem has been discussed extensively in the literature, cf. Lakoff (1968), Chomsky (1965, 1981), Bresnan (1987), Kuno (1987), Wilkins (1988) and Zribi-Hertz (1989). In this paper I will propose a modification to the binding theory of Chomsky (1986a) (*Knowledge of Language*, henceforth ‘KL’), from which facts like (1) and other connected phenomena will follow directly. The effect of the modification is to incorporate the following proposal by Bresnan (1987) (see also Sells (1985, 174)) into the KL binding theory:

(2) Binding domains for pronouns need not contain subjects

The result of this proposal is that facts like (1) are predicted by the KL-theory, and a wider range of non-complementary distribution between anaphors and pronouns is correctly predicted. I will give evidence for this mainly in English, but also draw on data from Norwegian.

The idea that the reference to “subject” should be removed from the KL binding theory is not new; Johnson (1987) argues that there should

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be no reference to this notion for the purposes of computing binding domains for anaphors. This article focuses on the consequences this has for the distribution of pronominals and for non-complementary distribution between anaphors and pronouns.

1. The Binding Theory

Since I will be modifying an aspect of the KL binding theory, I will begin by introducing the basic elements of that theory.

1.1. BT-compatibility

Central to the KL-theory is the notion of BT-compatibility, which takes over the function of the classical Conditions A and B of Chomsky (1981). This theory can be informally stated as follows (adapted from KL, 169–172):

(3)a. An anaphor or pronoun must meet its binding requirement in the smallest binding domain D which contains a BT-compatible indexing.

b. An indexing I is BT-compatible for an anaphor if the anaphor is bound under I, and BT-compatible for a pronoun if the pronoun is free under I.

c. A binding domain D for α is the minimal CFC containing α, a governor for α and a subject.

d. A CFC is the domain in which all GFs associated with a head are realized.

The binding requirement of an anaphor is that it be bound, and the binding requirement for a pronoun is that it be free. The definitions in (3) replace the accessible SUBJECT condition (Chomsky 1981) and the Specified Subject Condition, but not the Tensed S Condition (Chomsky
To demonstrate how (3a–d) works with some examples, consider the structure in (4):

Suppose \( \delta \) is an anaphor. (3a) says that it must meet its binding requirement – namely that of being bound – in the minimal domain \( D \) containing a BT-compatible indexing. Both \( S \) and \( NP^1 \) in (4) qualify as domain \( D \)'s, and both contain BT-compatible indexings, namely the indexings under which \( i = k \) and \( j = k \), respectively. (3a) simply states a minimality requirement: The actual binding of the anaphor must take place in the smallest domain containing a BT-compatible indexing. Since \( NP^1 \) is smaller than \( S \) ("small" is here meant in the intuitive sense, i.e. \( x \) is smaller than \( y \) if \( y \) contains \( x \)), \( \delta \) must be bound in \( NP^1 \). This explains why the string *John likes Bill's pictures of himself*, which can be analyzed as in (4), can only be interpreted with *himself* referring to *Bill*.

If \( \delta \) is a pronoun, (3a) says that it must meet its binding requirement – that of being free – in the minimal domain that contains a BT-compatible indexing for the pronoun. Again, both \( NP^1 \) and \( S \) may contain such indexing, namely any indexing under which \( i \neq k \) and \( j \neq k \) respectively.

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1 Accessible SUBJECT is defined as in (ii), using the auxiliary well-formedness condition (i) (from Chomsky 1981, 212):

(i) \( \gamma \ldots \delta \ldots \), where \( \gamma \) and \( \delta \) bear the same index.

(ii) \( \alpha \) is accessible to \( \beta \) if and only if \( \beta \) is in the c-command domain of \( \alpha \) and assignment to \( \beta \) of the index of \( \alpha \) does not violate (i).

The Specified Subject Condition and the Tensed S Condition (Chomsky 1973) as it applies to A-binding basically says that an anaphor cannot be bound across a "subject" and a tensed S boundary.
(3a) says that the actual domain in which the pronoun must meet its requirement of freeness must be the smallest such domain, and since $\text{NP}^1$ is smaller than $\text{S}$, the pronoun must meet its binding requirement in $\text{NP}^1$, i.e. $\delta$ need only to be free in $\text{NP}^1$. Note that it therefore can be indexed with the higher subject, such that $i = k$, even though this indexing is not $\text{BT}$-compatible, because as long as $\delta$ meets its requirement in the smallest domain containing a $\text{BT}$-compatible indexing, condition B (the second clause of (3b)) is satisfied. This is the case under indexing $i = k$, since inside $\text{NP}^1$, $\delta$ is not bound under that indexing. This explains why in *John likes Bill's pictures of him*, *him* may not be coreferential with *Bill*, but can be coreferential with *John*.

The $\text{BT}$-compatibility algorithm is designed to predict non-complementary distribution in the cases discussed by Huang (1983), in particular where the anaphor or pronoun is in the possessor position in $\text{NP}$. Such cases are illustrated below:

(5)a.  
\[ [\text{s They}_i \text{ like } [\text{NP their}_i \text{ pictures}]] \]

b.  
\[ [\text{s They}_i \text{ like } [\text{NP each other}_i \text{'s pictures}]] \]

Huang’s solution to the non-complementarity problem in (5) was to remove the ACCESSIBILITY REQUIREMENT on SUBJECTs for pronouns (but not anaphors), so that pronouns and anaphors have different binding domain definitions. The result for (5) is that the domain for the pronoun is $\text{NP}$ but the domain for the anaphor is $\text{S}$. The $\text{KL}$-theory is designed to make the same prediction, but without specifying different domains for pronouns and anaphors directly. Instead, the domain definition is kept constant, and the difference is achieved as a result of the $\text{BT}$-compatibility algorithm in (3). It works as follows: In (5a), *their* is a pronoun, so it must be free in the minimal domain containing a $\text{BT}$-compatible indexing. The pronoun in the possessive position cannot be bound inside the $\text{NP}$, since nothing could $c$-command the pronoun in that $\text{NP}$. Hence, for any indexing, that indexing is $\text{BT}$-compatible inside $\text{NP}$ for a pronoun in the possessive position. This means that the pronoun will satisfy its binding requirement inside the $\text{NP}$ under any indexing, and in particular under the indexing $I$ in (5a). Hence it can be coreferential with the matrix subject in (5a).

Consider next the anaphor. For the same reason that the pronoun is always free inside $\text{NP}$, the anaphor could never be bound inside $\text{NP}$: There is no potential antecedent inside the $\text{NP}$ for the anaphor in the "subject" position. This means that even though the $\text{NP}$ is a domain $\text{D}$ for the anaphor as well as the pronoun, the anaphor need not meet its binding requirement inside $\text{NP}$, since $\text{NP}$ could not, in principle, contain
any indexing BT-compatible with the anaphor. The smallest domain $D$ containing a BT-compatible indexing for the anaphor is $S$. Hence, each other must be bound inside $S$, since $S$ is the smallest domain where the anaphor could possibly meet its binding requirement. In other words, $S$ is the domain in which the anaphor must meet its binding requirement, and the NP is the domain in which the pronoun must meet its binding requirement. This is how the BT-compatibility algorithm predicts the non-complementary distribution in (5).

I will occasionally refer to this process of the anaphor seeking an antecedent outside its minimal CFC as domain extension. In the next section the effect on the BT-compatibility algorithm of removing the subject requirement will be discussed.

1.2. The Subject Requirement

The proposal is to revise the binding theory by removing the subject requirement from the domain definition. In other words, (3c) should be replaced by (6):

(6) A binding domain $D$ for $\alpha$ is the minimal CFC containing $\alpha$ and a governor for $\alpha$.

Huang (1983) noted that the requirements on what can be an accessible SUBJECT are basically the same as the requirements on what can be a potential binder. Whereas it is obvious why an anaphor must have a binder in its domain, since it must be bound in that domain, it does not make similar sense for a pronoun. Why should a pronoun, which needs to be free, require a potential binder in its domain? Huang concluded that it was conceptually unmotivated to require an accessible SUBJECT for the pronoun, and then showed that it was empirically unmotivated as well: Removing the accessibility requirement on subjects predicts the non-complementarity observed in (5), as well as a wider range of non-complementarity in Chinese. KL, adopting this reasoning, works Huang's insight into the binding theory with the BT-compatibility algorithm.

However, if it is unmotivated to require that a pronoun should have an accessible SUBJECT in its domain, then, by the same reasoning, it should also be unmotivated to require that a pronoun should have any kind of subject in its domain. Hence, taking Huang's reasoning to its full logical consequence provides a conceptual argument for the proposal in (6).

In both Huang's theory and in Chomsky's, a simple subject requirement is kept for the binding domains of both anaphors and pronouns:
Because a governing category must have a subject, it can only be S, or NP with a subject...

If \( a \) is the object or the object of a PP complement of a verb, then \( \text{MGC}(a) \) is the minimal S containing \( a \) since \( a \) is governed by the verb or preposition and S has a subject. (KL, p. 169.)

Note that it is necessary to add this requirement as a stipulation, because the notion ‘CFC’ does not entail that a subject is present. This is particularly clear in the case of PPs, as is obvious from Chomsky’s quote, since a PP is a Complete Functional Complex without a subject: It has only one GF, namely the prepositional object. A VP, on the other hand, typically realizes one of its GFs outside its maximal projection, and hence is not a CFC on its own. Thus, in a structure like *John likes him*, the minimal CFC containing the pronoun is the entire clause, and not the VP. Hence, for VPs the subject requirement usually follows independently (see Section 4.1 for more discussion about VPs).

The inclusion of a subject requirement for anaphors is redundant, since the requirement of a potential binder in itself usually ensures that a subject is present (although cf. Section 4.3 for a possible problem for this view). But the empirical consequences for pronouns of including a subject requirement were not explored either in Huang (1983) or KL. In particular, they only discussed cases where the pronoun itself is the subject in its domain, such as (7):

\[
(7) \quad \text{John}_i \text{ likes } [\text{NP his}_i \text{ picture}]
\]

In (7), the domain for the pronoun is the NP, since this domain contains the pronoun, its governor (N) and a subject (the pronoun itself). Hence, in this particular configuration, requiring that the domain of the pronoun must contain a subject has no empirical consequence.

The next section explores the consequences of the subject requirement for pronouns in other configurations, and the discussion will show that removing this requirement for pronouns correctly predicts facts that would otherwise be counterexamples to a theory that includes the requirement.

1.3. Predictions of a Subjectless Domain Definition

Focusing on pronouns now, removing the subject requirement will have a consequence only for pronouns that are not themselves subjects. Consider the schematic structure in (8):
For $\alpha$ a pronoun, if the XP is a CFC, then it meets all the requirements for being a domain $D$ for $\alpha$ according to the revised domain definition in (6). According to the standard definition (3c), it does not, since the XP does not contain a subject, and $S$ is the smallest domain $D$ containing $\alpha$. Note furthermore that it is predicted, everything else being equal, that if $\alpha$ is an anaphor, then the minimal domain containing a BT-compatible indexing for $\alpha$ will be $S$, since XP cannot contain a BT-compatible indexing, there being no other c-commanding NP inside XP. Hence, for $\alpha$ an anaphor it must meet its binding requirement in $S$, not XP. In other words, the revised domain definition predicts that anaphors and pronouns should be in non-complementary distribution in this context.

Testing this prediction is not straightforward, given the controversy surrounding the nature of subjects and which categories have and which do not have them. The main focus of the rest of this article is to explore the predictions for XP = PP in the schema (8). I will then conclude by briefly discussing some possible predictions for other choices of XP.

2. PPs as Subjectless Binding Domains

PP is probably the category which most uncontroversially lacks a subject. Suppose PP = XP in the schema (8):
The PP is a CFC, since all the GFs associated with its head are realized inside it. Hence the minimal CFC containing $\alpha$ and its governor is the PP (but the minimal CFC containing $\alpha$, its governor and a subject is S). If $\alpha$ is a pronoun, then it is free in the PP under any indexing (and in particular under indexing with the subject of the clause), and therefore satisfies its binding requirement according to binding theory. If $\alpha$ is an anaphor, on the other hand, it must meet its binding requirement in the minimal CFC containing a BT-compatible indexing, which is S. Hence the subjectless binding theory predicts non-complementary distribution in structures of type (9).

This provides the solution to the Lees-Klima problem. Consider the following sentences with intransitive verbs taking locative PP complements:

(10)a. John$_i$ looked around him$_i$/himself$_i$
b. John$_i$ glanced behind/around him$_i$/himself$_i$
c. In the tunnel, John$_i$ searched above him$_i$/himself$_i$ and below him$_i$/himself$_i$ for an opening

The analysis is that the pronoun satisfies condition B in the PP, and the anaphor in the S, hence the non-complementarity.

The predictions are similarly borne out with verbs that take NP and PP complements, i.e. verbs in the put-class:

(11)a. John$_i$ piled newspapers in front of him$_i$/himself$_i$
b. The host$_i$ placed Mary next to him$_i$/himself$_i$
c. John$_i$ pulled the blanket over him$_i$/himself$_i$
d. The boy$_i$ pushed the girl away from him$_i$/himself$_i$
(11)e.  John, put the picture behind him, himself
f.  John, put the sword down in front of him, himself
g.  The children, drew circles around them, themselves

Similarly, we can have binding from the pronoun in the PP to a non-subject, as in (12a–d): 2

(12)a.  John put Bill, in front of a picture of him, himself
b.  John placed Mary, next to a picture of her, herself
c.  John pulled Mary, away from a picture of her, herself
d.  John pushed Bill, towards the picture of him, himself

The explanations of (12) thus parallel those of (10) and (11): The pronoun may be free in the PP, but the anaphor must be bound in S by a subject or an object, resulting in the non-complementary distribution.

Note that the non-complementary distribution in these PPs is predicted by exactly the same mechanism that predicts non-complementary distribution in the possessive position in NPs in (5), namely the BT-compatibility algorithm. Thus we have a unified explanation of non-complementary distribution of anaphors and pronouns in NPs and PPs.

2.1.  Adjunct PPs

Consider again our schematic structure, but now with the PP as an adjunct to the VP:

(13)

\[
\begin{array}{c}
S \\
\big/\big/ \\
NP \\
\big/\big/ \\
VP \\
\big/\big/ \\
PP \\
\big/\big/ \\
\alpha \\
\end{array}
\]

I have added a picture of in these cases to improve the pragmatics of the examples. This does not alter the conditions of the "experiment", since we know that indefinite NPs do not count as domains for condition B anyway, cf. the ungrammaticality of *John, found a picture of him,. I also assume with Williams (1985) that there is no PRO subject in NP.
As it stands, the theory predicts that there should be no difference between adjunct and argument PPs when it comes to binding: If a pronoun is contained in the PP, it doesn’t matter whether the latter is an adjunct or argument. The PP will still be a CFC and binding domain for the pronoun. The same goes for anaphors: Domain extension should apply in this case as well as in the argument-PP case. Since the anaphor cannot be bound in the PP, it must look for the next higher CFC with a potential binder in it, which is the S. Hence non-complementary distribution is predicted in the case of adjunct PPs as well.

Whereas it is correct that pronouns can satisfy condition B inside adjunct PPs, the prediction for anaphors is not matched by the data. Consider first the following sentences with adjunct PPs containing pronominals (I use optionality as a criterion for non-argument status of the PPs, following Grimshaw 1990):

(14)a. John found a dollar bill in front of him,
b. John left Mary behind him,
c. John located the treasure right beneath him,
d. John dropped his glasses in front of him,
e. John met Bill in front of a statue of him,
f. John sent his mother-in-law away from him,
g. John directed the cart towards him,
h. John guided the missile over him,

Similarly, we can here also have binding to a non-subject, as expected ((15f) is due to J. Maling (personal communication); (15g) is from Bresnan 1987):

(15)a. John found Mary next to a picture of her,
b. John located the treasure right beneath a picture of it,
c. John met Larry in front of a statue of him,
d. John directed Bill towards a picture of him,
e. I only think about John near him,
f. I never say nasty things about my friends near them,
g. The councillor didn’t talk to the students near them,

Contrary to prediction, however, anaphors in adjunct PPs cannot be readily bound to the subject of the sentence:

(16)a. ??John found a dollar bill in front of himself,
b. ??John left Mary behind himself,
c. ??John located the treasure right beneath himself,
d. ??John dropped his glasses in front of himself,
(16)e. ??John, met Bill in front of a statue of himself,
   f. ??John, sent his mother-in-law away from himself,
   g. ??John, guided the missile over himself.

The same appears to be true with binding to object:

(17)a. ??John found Mary next to a picture of herself;
   b. ??John located the treasure right beneath a picture of itself;
   c. ??John met Larry in front of a statue of himself;

The solution to this problem clearly lies in the adjunct versus argument status of the PPs. But the ungrammaticality of (16) and (17) is not predicted by the binding theory, since nothing blocks domain extension in these cases. These facts can be explained by another feature of the KL binding theory. Consider the following ungrammatical structure:

(18) *John thinks [CP himself is OK]

In the binding theory of Chomsky (1981), (18) is ungrammatical because the theory demands that the anaphor be bound inside the embedded clause, which contains AGR, a putative accessible SUBJECT. In the KL-theory, the assumption that AGR can be a potential binder for the anaphor in subject position has been dropped. This means that the Tensed S effect on binding is not explained by the binding theory: Even though the embedded clause is a CFC containing the anaphor and its governor, there is in principle no indexing in the embedded clause under which the anaphor could be bound. Hence its domain must be extended to the next higher CFC in which it can be bound, which is the higher clause. This is exactly the same mechanism for domain extension in the NP cases illustrated in (5). The crucial point here is that nothing blocks domain extension in (18), and condition A is satisfied. Instead, Chomsky (1986a), drawing on Lebeaux (1983), proposes that the ungrammaticality of (18) is due to LF-movement: The anaphor must raise to INFL of the higher clause at LF, resulting in an ECP-violation, under the assumption that the trace of the anaphor must be lexically governed. Note that in order to make this work, it must be the case that the trace must be both lexically governed and antecedent governed, since the initial trace of the anaphor would be antecedent governed by an intermediate trace in SpecCP in the LF-derivation of (18). I will assume this as the following ad hoc principle:

(19) Traces of LF-raised anaphors must be both antecedent governed and lexically governed.
The ECP account in conjunction with (19) leads to a solution to the problem of why anaphors in adjuncts seem deviant. Since they independently have to raise at LF out of the PPs, such movement will result in ECP-violations: The trace of the anaphor will fail to be antecedent governed, even though it is lexically governed, because the adjunct PP, not being theta-marked, will constitute a barrier for anything inside it (cf. Chomsky 1986b), schematically illustrated below:

(20)

```
  IP
   \  /  \\
  NP_i  I'
    \   /  \\
     I   VP
       \   /  \\
        I   V'
         \ /  \\
          PP  barrier
               /  \\
              P  e_i
```

The difference between extraction from adjunct and argument PPs is well-known, and can be illustrated with Wh-movement. Extraction from argument PPs is possible:

(21)a. Who did John put Bill behind t
    b. Who did John pull Bill away from t
    c. Who did John draw a circle around t

Extraction out of adjunct PPs, on the other hand, is deviant:

(22)a. *Who did John leave Mary behind t
    b. *What did John locate the treasure right beneath t
    c. *What did John meet Bill in front of t

In other words, just as the ungrammatical anaphor binding in (18) is ruled out by the ECP, I propose that the adjunct cases (16–17) are given the same type of explanation.

2.2. Solving Wilkins’ (1988) Puzzle

The current analysis provides a solution to another puzzle, discussed by Wilkins (1988, 194). Wilkins notes the contrast between the following two
constructions (she puts a question mark in front of the pronoun in (23b); I mark similar cases as fully grammatical here, as in (11) above):

(23) (= 3a, 3c in Wilkins 1988):
   a. Ben$_i$ saw a snake near him$_i$/\textasciigrave{h}imself$_i$
   b. Ben$_i$ put the blanket over \?him$_i$/\textasciigrave{h}imself$_i$

The puzzle is why there is a contrast. The answer becomes apparent once the structural difference between (23a) and (23b) is viewed in light of the current proposal. First, the grammaticality of (23b) with an anaphor is a result of the PP being an argument, and the grammaticality of (23b) with a pronoun follows from the subjectless binding domain definition proposed here.

The PP in (23a) is not an argument of the verb, and hence must be interpreted as a VP-adjunct or a modifier of the nominal. If the PP is interpreted as a VP-modifier (in the somewhat unnatural reading that the “seeing” took place near Ben), the LF-movement of the anaphor will lead to ungrammaticality, as in the adjunct cases discussed above. The PP in (23b) is an argument however, so LF-movement satisfies the ECP, thereby explaining the contrast. If the PP in (23a) is interpreted as a modifier of the NP, anaphor binding will also result in ungrammaticality because, as argued by Johnson (1987), the modified NP \textit{the snake} functions as a potential binder. The structure of the NP in (23a) with anaphor would be:

(24) \[
\begin{array}{c}
\text{NP'} \\
\text{NP} \\
\text{the snake} \\
\text{p} \\
\text{near} \\
\text{PP} \\
\text{NP} \\
\text{himself}
\end{array}
\]

There is an NP c-commanding the anaphor within the CFC NP'. Hence there is a BT-compatible indexing inside NP' (i.e. with \textit{the snake} coindexed with \textit{himself}), and the anaphor can therefore not be bound from outside NP'. In other words, the paradigm in (23) is explained in a principled way and no longer presents a puzzle for binding theory.
2.3. Evidence from Norwegian for PP as Binding Domain

Further evidence for the way in which locative and directional PPs behave as binding domains comes from the distribution of anaphors in Norwegian. Norwegian has two kinds of anaphors, compound and monomorphic (cf. Hellan 1988 for a detailed exposition of the system; cf. also Sells (1985, 175-178) for a discussion of Norwegian anaphors and pronouns in LFG). The compound anaphor is constructed by compounding a personal pronoun with the form selv, as for example in ham selv ‘himself’ and dem selv ‘themselves,’ or by compounding seg with selv to yield seg selv, which is used for 3rd person antecedents only. The monomorphic anaphor is seg, an invariant form for person, number, and gender.

For the purposes of the following discussion, the compound anaphor can be assumed to have basically the same distribution as the English anaphor, in the sense that it is subject to the SSC. That is, Norwegian and English compound anaphors must be bound in a local domain. (An additional difference between English and Norwegian compound anaphors is that the latter displays subject- and anti-subject orientation properties inside the local domain, as is discussed in Vikner (1985), Hellan (1988), and Hestvik (1990a), but this is irrelevant to the following argument.)

Seg on the other hand, is different. The particular property of seg that is of interest here is that it cannot be locally bound (cf. Hellan (1980, 1988), Taraldsen (1983), Vikner (1985), Hestvik (1990a)). The generalization can be stated as follows:

(25) seg is an anaphor that must be free in its minimal binding domain, but it must be bound within the smallest tensed S containing it.

Consider the following data, illustrating this generalization, as well as illustrating that the compound anaphor must be bound in contexts where seg must be free:

(26) No local binding

a. John, foraktet seg selv/*seg,  
   ‘John hates himself/REFL’

b. John, bilde av seg selv/*seg,  
   ‘John’s picture of himself/REFL’

Nevertheless, seg is clearly an anaphor, since it must be bound within a local domain, as illustrated by the ungrammatical cases below:
(27)a.  *Johnₐ hater segᵢ
   'John hates REFL'

b.  *[Johnₐ far] hater segᵢ
   'John’s father hates REFL'

Furthermore, it may be bound across a Specified Subject, and in these cases, the compound anaphor cannot be used. (28d) illustrates the TSC effect ((28a and (28b) are drawn from (13c,d) in Hellan (1988, 104)):

(28)  Long-distance/non-local binding:
   a.  Johnₐ bad [ts oss snakke om segᵢ/*seg selvᵢ]
       ‘John asked us to photograph REFL/himself’

   b.  Johnₐ bad [ts oss forakte segᵢ/*seg selvᵢ]
       ‘John asked us (to) despise REFL/himself’

   c.  Johnₐ likte [NP Marits bilde av segᵢ/*seg selvᵢ]
       ‘John liked Mary’s picture of REFL/himself’

   d.  Johnₐ bad om [s’ at Marit fotograferte *segᵢ/*seg selvᵢ]
       ‘John asked (about) that Mary photographed REFL/himself’

These facts all fit the generalization that the element seg must be free in its minimal binding domain, i.e. the minimal CFC containing it and its governor, but must still be bound within the domain of [+Tense] (cf. (28d)). Furthermore, the cases of local binding above where seg must be free are all cases where seg selv must be bound. The important point here is that seg and the compound anaphors are in complementary distribution in categories that contain a subject.³

Roughly, the special property of seg can be captured if this element is an overt pronominal anaphor subject to both condition A and B, and

³ Certain other cases of seg as in John barberte seg ‘John shaved’ can be shown to be expletive markers of inherent reflexive verbs, and hence not subject to the generalization (25), which applies only to arguments receiving a theta-role in the syntax (cf. Hellan 1988). There are two types of inherent reflexive verbs: one type which exists only in its reflexive form, and another which is a result of a detransitivization operation. Since the detransitivized version also will have a transitive version where the full argument can be realized as a reflexive, what results is apparent non-complementarity:

(i)  John, vasket seg, (detransitivized reflexive verb)
(ii) John, vasket seg selv, (transitive verb with reflexive argument)

Various tests show that (i) is really an intransitive verbs (see Vikner (1985), Taraldsen (1983), Hestvik (1990a)). The point here is that (i) and (ii) do not exhibit real non-complementarity, because seg in (i) is not a syntactic argument.
which satisfies condition B in its minimal domain, and condition A in a higher domain (see Hestvik 1990a for a more detailed analysis in terms of LF-movement).

The subjectless binding domain theory now makes a prediction. Suppose seg is contained inside a locative/directional PP. Since such a PP is a minimal binding domain, this theory predicts that seg may satisfy its requirement of being free in this PP, and that it therefore can be bound to the higher subject in a structure like (29):

\[(29) \quad S \rightarrow BT-A \text{ domain} \]

\[
\begin{array}{c}
NP_i \\
\text{VP} \\
V \\
PP \rightarrow BT-B \text{ domain} \\
P \\
NP_i \\
\text{seg}
\end{array}
\]

In other words, the requirement on seg that it be “not too locally bound” can be satisfied by being in such a PP. On the other hand, if binding domains must contain subjects, then the binding of seg in (29) should be as impossible as the cases in (26).

Furthermore, it is predicted that in the situation depicted in (29), there should be non-complementary distribution between seg and the compound anaphor. The compound anaphor, like English himelf, needs to be bound in its minimal domain under condition A. The PP does not qualify as such a domain, and hence the actual domain must be extended to S in (29), where condition A can be satisfied. The predictions that seg can be bound to the subject in a structure like (29), and that it should be in non-complementary distribution with the compound anaphor are matched by the data in (30) (see also Maling (1986) for similar data in Icelandic).

\[(30)a. \quad \text{John}_i \text{ satte Marit foran seg}_i/\text{seg selv}_i \]
\[\quad \text{‘John put Mary in front of REFL/himself’}\]

\[b. \quad \text{John}_i \text{ dyttet vognen foran seg}_i/\text{seg selv}_i \]
\[\quad \text{‘John pushed the wagon before REFL/himself’}\]
(30)c. John, skjøv Marit vekk seg/seg selv,
   ‘John pushed Mary away from REFL/himself’

d. John, satte Marit over seg/seg selv,
   ‘John valued Mary over REFL/himself’ (Lit. “place higher than”)

e. John, kikket rundt/foran seg/seg selv,
   ‘John looked around/in front of REFL/himself’

f. John, følte bak seg/seg selv,
   ‘John probed behind REFL/himself’

g. John, kledde på seg/seg selv,
   ‘John clothed on REFL/himself’ (Lit.: “dressed”)

h. John, tegnet en sirkel rundt seg/seg selv,
   ‘John drew a circle around REFL/himself’

In other words, the non-complementarity between seg and seg selv is predicted by exactly the same mechanism that predicts non-complementarity between pronouns and anaphors in the same context in English.4

4 This analysis is arguably counter-evidence to Hellan’s (1988, 104) claim that seg is in complementary distribution with the compound anaphors in Norwegian.

Note that pronouns are not in non-complementary distribution with seg and seg selv in the context of locative PPs, cf. (i):

(i) John, kikket [bak seg/seg selv/*him],
   ‘John looked behind REFL/himself/him’

But this fact is due to the independent property of Norwegian pronouns being anti-subject oriented. This property, first discussed for Danish by Vikner (1985), can briefly be described as follows: A pronominal which is anti-subject oriented must, in addition to being free in its binding domain, also be disjoint from the subject of the clause containing it (unless the pronominal itself is the subject). This property therefore obscures the effect of having subjectless binding domains in Norwegian: In (i), the pronoun satisfies the requirement that it must be free in its binding domain, but violates the additional requirement that it cannot be bound to a subject in its own clause. However, under coindexation with a more distant subject, non-complementarity is reinstated, as expected:

(ii) John, bad Per kikke bak ham/segl,
   ‘John asked Peter to look behind him/REFL’

The anti-subject orientation effect also obscures the effect of having an NP as binding domain for a possessive pronoun, cf. the difference between Norwegian and English below:

(iii)a. John, likes [his, car]

b. *John, liker [hans, bil]
   ‘John likes his car’
2.4. Other Proposals

Note that the mechanism predicting non-complementarity in a sentence like (31) is independent of the fact that there is an NP intervening between the subject of the sentence and the PP.

(31) John put [NP the blanket] [PP over him]

Some researchers have attempted to explain why the pronoun can be bound to the subject by exploiting the intuition that there is a kind of predication relationship holding between the PP and the direct object. For example, Lees and Klima (1963) suggested a small-clause-like representation for cases like (31), illustrated here with Lees and Klima’s example [= (13) in L&K]:

(32) The men found [s a smokescreen around them]

In current models, this proposal could be translated into one where the NP and the PP form a “small clause”, which would function as a binding domain. The matrix subject would then be outside the small clause, and there would be no condition B violation. However, this analysis fails to account for the possibility of an anaphor in these structures. Other arguments against this analysis have been presented in Chomsky (1981, 291) and Koster (1987, 334).

However, Wilkins (1988, 198) revives the idea of Lees and Klima in a slightly modified form. Her proposal is that there is an optional secondary predication relationship between the direct object NP the blanket and the PP in (31). When the secondary predication relationship applies, the NP and the PP create an opaque domain, admitting the pronoun, but ruling out the anaphor (cf. 33a). On the other hand, when there is no predication relationship, the anaphor is allowed but the pronoun ruled out, cf. (33b):

In both cases the pronoun satisfies condition B, but the Norwegian pronoun also violates its anti-subject orientation requirement, blurring the effect of the binding domain. The difference between the domain requirements and the anti-subject requirement can be seen if a direct object is added in the clause. Coindexation with this NP is possible:

(iv) John fortalte Per om [hans bil] 'John told Peter about his car'

Most accounts in the literature of the anti-subject orientation effect analyse this effect as a requirement that comes on top of the binding domain requirements of the pronoun. For example, see Vikner (1985), who proposes a difference between “binder requirements” and “domain requirements”, and Manzini and Wexler (1987, 431), who propose a “proper antecedent requirement” (but see Hestvik (1990b) for an alternative explanation in terms of LF-movement).
(33)a. John put the book [\text{pp behind him/*himself,}]  
\text{predication} 

b. John put the book [\text{pp behind *him/*himself,}]  
\text{(no predication)} 

However, this would lead to the expectation that speakers should interpret the sentence with the pronoun as containing a predication upon the direct object, but when the anaphor is used, one should not interpret the PP as predicative. But no such difference in interpretation seems to be detectable, contrary to expectation.

Also, this solution would not generalize to the cases with intransitive verbs (as in John looked behind him), since there there is no NP for the PP to be predicated of.

A possible analysis along these lines for intransitives would be to postulate a PRO intervening between the verb and the PP, perhaps as in (34):

(34) John looked [SC PRO [\text{pp behind him}]]

But as correctly pointed out by Koster (1987, 334), if this PRO is construed as the “subject” of the predicative PP, in order to get a predication relationship that would create an opaque domain, a PRO-theorem violation ensues. The reason, Koster points out, is that PRO (under a small clause analysis) would be governed by the verb, violating the PRO-theorem. Furthermore, even if the PRO were ungoverned (perhaps as a specifier of the PP), it would have to be controlled by John, but then the binding relation between PRO and him would violate condition B. A PRO-solution therefore seems untenable. On the other hand, the subjectless binding domain theory explains the facts by simply removing what is a stipulation in the theory anyway, namely the subject requirement.  

5 It is often claimed that in the cases discussed here, the sentence with the pronoun and the sentence with the anaphor have slightly different interpretations. For example, Kuno (1987, 66) observes that (ia) implies that the blanket is covering the whole person, but in (ib) it may be the case that the blanket is only covering part of the person:

(i)a. John pulled the blanket over himself  
b. John pulled the blanket over him

Other researchers have observed that there are “point-of-view” differences between the pronoun and the anaphor case. Whereas there might be such differences, this should not necessarily be taken as the direct cause of the non-complementarity.
3. PPs That Are Not Binding Domains

As is well-known, the peculiar binding phenomena observed with PPs hold only for PPs headed by locative and temporal prepositions. In other PPs, condition B can not be satisfied for pronouns, and in these cases complementary distribution is restored. This is illustrated briefly below:

(36)a. John talked about *him/himself,
b. John sent a letter to *him/himself,
c. John always relies on *him/himself.

If a PP is always a CFC, the theory as it stands predicts that condition B should be satisfiable in the PPs in (36). Clearly, this is not the correct prediction for these sentences. In this section a proposal will be made to explain the difference between the PPs discussed above and those exemplified in (36), which relies on the assumption that prepositions of the latter type do not assign their own theta-roles.

3.1. An Argument Structure Solution

The solution draws on another proposal by Bresnan (1987), namely that the PPs in (36) do not qualify as binding domains in the first place, independently of whether binding domain is defined with subject or not. Bresnan proposed that PPs differ independently in terms of whether they have argument structure or not, and that the PPs exemplified in (36) belong to the type without argument structure. PPs that allow “locally bound pronouns” on the other hand, have argument structure. The definition of binding domain is then formulated so that it can access this difference. In Bresnan’s theory, Binding Theory applies to representations at the level of f-structure. A pronominal must be free in its minimal nucleus, and an anaphor must be bound in its minimal complete nucleus. Nucleus is defined as the f-structure representation of a predicate and its arguments, and a complete nucleus is an f-structure with a SUBJ function. A PP with argument structure will therefore have its own nucleus and the prepositional object will satisfy condition B in it. A PP without argument structure has no f-structure of its own, and the binding domain of the prepositional object will then be the f-structure containing the OBJ-function of the PP.

I will here follow Bresnan in relating the binding domain differences between the two PP-types to their argument structure properties, but implement the idea within the KL Binding Theory. The basic machinery
for making the $KL$ theory sensitive to this difference is already present in that theory.

Drawing on Giorgi (1987) and Freidin (1986), Complete Functional Complex is redefined as follows:

\[(37) \quad \gamma \text{ is a complete functional complex iff it is the domain in which all theta-roles pertaining to the head of } \gamma \text{ are realized in A-positions.}\]

Bresnan's proposal about argument structure can straightforwardly be translated into the current framework in terms of theta-role assignment, and the definition of CFC in terms of theta-roles will then differentiate between the PP-types. For details regarding the theta-assignment properties of PPs, I will follow Marantz (1984) and Baker (1988). Marantz and Baker argued that UG distinguishes between three different modes of theta-role assignment in PPs: (i) a P assigns its own theta-role to its object, (ii) a P assigns a theta-role for the category that the PP itself is a complement of (i.e. it assigns a theta-role for the V in a $[V [P \text{ NP}]$ structure), and (iii) the P does not assign a theta-role at all. With CFC defined in terms of theta-role assignment, these three configurations of theta-assignment partition PPs into two classes: PPs that are CFCs and PPs that are not.

(38) represents case (i), in which the preposition assigns its own independent theta-role to its prepositional object:

\[(38a)\]
To give an example, consider the PP \textit{on the table}. It can be an argument, as in \textit{John put the book on the table}, in which case it receives a theta-role from the verb (38a), or it can be an adjunct (38b), as in the NP \textit{the book on the table}. In the latter case the PP does not get a theta-role, but the theta-role that the P assigns to its prepositional object is the same in both cases. Verbs that take PPs as arguments are for example \textit{put}, \textit{push}, \textit{pull}, \textit{draw}, \textit{place}, \textit{pile}. Verbs that take adjunct PP modifiers are \textit{find}, \textit{leave}, \textit{locate}, \textit{meet}, \textit{rest}, \textit{send}, \textit{direct}, \textit{drive}, \textit{guide}, \textit{roll}, \textit{slide}.

With CFC defined in terms of theta-role assignment, the minimal CFC of the prepositional object in (38) will always be the PP itself: The prepositional object receives its theta-role from the P, and the CFC projected by the P is the PP. To give an example, consider the locative preposition \textit{behind}. Suppose it has the argument structure represented in (39):

\[
(39) \quad \text{behind} (\theta)
\]

(39) means that the preposition has one internal theta-role to assign. Consider example (40): By definition (37), \textit{behind} projects a CFC, and by definition (6) the PP constitutes a binding domain for its prepositional object. The next higher CFC is that projected by the verb, namely S:

\[
(40) \quad [s_{=\text{CFC}^2} \text{John, put the book } [p_{\text{P=\text{CFC}^2}} \text{behind him}] \rightarrow \text{minimal binding domain for } \text{him}]
\]

Since the PP is the minimal domain for the pronoun, it satisfies condition B under the indicated indexing. Note that in the case of locative/directional PPs, the definition of CFC in (37) gives the same result as the GF-definition (3d). The empirical consequence of (37) is only seen in the other two types of PPs, to which I now turn.

Type (ii), according to Marantz (1984), is where the P assigns a theta-role, but the P itself does not have argument structure. This can be analyzed as the verb assigning its theta-role to the P or the PP, which
again assigns it to the prepositional object. In other words, this is a case of “transfer” of the verb’s theta-role:

\[(41)\]

\[
\begin{array}{c}
\text{S} \\
\text{NP} \\
\text{VP} \\
\text{V} \\
\text{PP} \\
\text{P} \\
\text{NP} \\
\theta
\end{array}
\]

In this case there is really no distinction between the PP and the prepositional object in terms of what receives the theta-role from the verb. An example of this type is the PP complement of *give*. The prepositional object NP satisfies an argument in the argument structure of the verb, but the assignment of the theta-role is done by the preposition. So even though the preposition technically “assigns” the theta-role, the theta-role ultimately comes from the verb.

Consider now how the binding domain of the prepositional object is computed in such a case (see (42)). Since the theta-role of the prepositional object comes from the verb, the prepositional object will be part of the CFC projected by the verb, namely S. S is therefore the only CFC for the prepositional object in (42):

\[(42)\] \[S_{=\text{CFC(him)}} \text{ John } [v_{P} \text{ gave the book } [p_{P} \text{ to him}]]\]

Since the minimal CFC is S, the pronoun cannot satisfy condition B in the PP but must satisfy it in S, and hence must be disjoint from the subject *John*. Thus the difference between dative PPs and locative PPs is explained.

The same prediction holds for the third type of PP. In this case, the preposition does not assign a theta-role at all, but simply functions as a Case-marker. The verb assigns the theta-role directly to the prepositional object. Baker (1988) calls this *direct* theta-role assignment, as opposed to the *indirect* theta-role assignment of (41). He argues that benefactive PPs have the theta-structure in (41) above and instrumental PPs the theta-structure in (43):
I propose that this is also the nature of theta-role assignment in PPs where the head of the PP is selected by the verb. A prototypical example is the verb *rely* and its PP complement:  

(44) John relies [PP on him]

In (44) the choice of preposition is not predictable from the lexical semantics of the verb, and the PP is, as a result of this, not compositionally

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6 Selection of PP heads is widespread in English; the following list gives some examples (partly compiled from Quirk and Greenbaum 1973):

(i)a. abide by
b. call on, comment on, depend on, lecture on, live on, reflect on, rely on, insist on
c. care for, long for, pay for, pray for, ask for, vote for/against
d. curse at, look at, marvel at, ponder at, scoff at, stare at, gaze at, glance at,
e. cope with, deal with, meddle with, part with, tinker with, agree with, experiment with
f. indulge in, invest in, trust in, believe in
g. approve of
h. deviate from, learn from
i. learn about, moralize about, boast about, brag about, complain about, write about, read about,
j. listen to, object to, refer to, adhere to, belong to,

There are also more complex cases of PPs that are selected (iia), and there are PPs selected across an NP argument as in (iib):

(ii)a. put up with, stand up for, check up on, break in on, look in on, get away with, walk out on, look forward to, look down on, look up to
b. charge NP with, congratulate NP on, convince NP of, deprive NP of, inform NP of, remind NP of, rob NP of, sentence NP to, treat NP to, compare NP to.

See Hestvik (1990a) for a definition of selection in this sense.
interpreted. (This may be why the preposition does not assign a theta-role: its normal semantic force is lost as a result of selection.)

In all cases where the $P$ is selected by the head, the PP never functions as a binding domain. This is predicted because the theta-role of the prepositional object comes from the verb, and the minimal CFC of the prepositional object is therefore that projected by the verb, namely $S$. As a consequence, the prepositional object, if a pronoun, must be free in $S$:

$$\text{John relies on him}$$

In other words, direct and indirect theta-role assignment in PPs have the same effect on binding domain computation: in neither case is the PP a binding domain.

This analysis raises another question, namely whether there is independent evidence that PPs differ in the way just proposed. That is, the theory would be falsified if it could be shown that there are theta-assigning prepositions that do not induce condition B domains. Although developing a full theory of PPs and theta-theory is outside the scope of this paper, the remainder of this section illustrates some independent facts which suggest that PPs do indeed differ in the way proposed, and that the differences correlate with the binding theory differences.

3.1.1. The Dative Alternation

Verbs with non-CFC PP complements may undergo dative alternation:

(46)a. John gave a book to Bill
     b. John gave Bill a book

On the other hand, verbs with CFC-PP complements cannot dative alternate:

(47)a. John put the book on the table
     b. *John put the table the book

This difference is expected under the analysis in the previous section. Since the PP itself is not an argument of the verb in (46a), its disappearance does not violate the Theta-criterion. Furthermore, the NP $Bill$, being an argument of the verb, can be still be assigned its theta-role in the configuration (46b). Since the GOAL theta-role can be assigned to $Bill$ in (46b), it is clear that the preposition is not necessary for the GOAL-role to be assigned.

On the other hand, (47) is a double theta-criterion violation under the theory proposed here: $Put$ has no appropriate receiver for its locative
theta-role, so it cannot be assigned. Furthermore, the NP *the table* is not assigned a theta-role.7

3.1.2. *Pseudopassives*

It has been proposed in the literature that preposition stranding in English passives (pseudopassives) involves a process of verb-preposition reanalysis (Bresnan 1982, Hornstein and Weinberg 1984). This would mean that there really is no preposition stranding, since the structure of a typical case would be as in (48):

(48) This bed, has been \([VP \ [slept \ in] \ ti]\)

Hornstein and Weinberg (1981) argue that the reanalysis rule requires that the verb and the preposition form a “natural predicate”. This intuitive notion is characterizable in the current theory in the following way: a verb and preposition form a natural predicate if they assign a theta-role together, and do not form a natural predicate if they assign distinct theta-roles. The expectation (pointed out to me by J. Grimshaw) is that the following perfect correlation should hold: all verbs that take non-CFC PPs can undergo pseudopassive (modulo the adjacency requirement, cf. Bresnan 1982), and verbs that take CFC-PPs cannot undergo pseudopassive. This correlation holds. Compare the grammatical (49), which contains non-CFC PPs, with the ungrammatical (50), which contains CFC-PPs:

(49)a. John was relied on
   b. John was looked at
   c. John was talked about

(50)a. *John was sat near
   b. *Bill was looked over
   c. *The table was searched behind

In (50) there can be no V-P reanalysis because the verb and the preposition assign distinct theta-roles. But in (49) reanalysis may apply, under the theory proposed here, since the P does not assign its own theta-role.

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7 As pointed out by an anonymous reviewer, not all non-CFC PPs undergo the dative alternation. However, this does not affect the argument, namely that non-CFC PPs may undergo dative alternation, whereas CFC PPs never undergo dative alternation. In other words, being a non-CFC PP is a necessary but not a sufficient condition for undergoing the dative alternation. That there are additional conditions not related to theta-role differences is well-known, cf. the notorious issue (first discussed in Baker (1979)) of *why* give but not *donate* allows the dative alternation.
3.1.3. **Proforms**

Another correlation supporting the hypothesized distinction is that PPs that are CFCs may be replaced by PP pro-forms, whereas non-CFC PPs may not. For a verb like *put*, all it cares about is that it can assign its locative theta-role to an appropriate recipient, and not whether the PP has any internal arguments. Hence pro-forms or intransitive prepositions, to follow Jackendoff (1973), can be used. The examples are Jackendoff’s ((2b,c), p. 346):

(51)a. Irving put the books [on the shelf]/there/away
   b. Sheila put the clothes [in the closet]/inside/on
   c. John threw the ball [to Bill]/there/away

On the other hand, verbs taking non-CFC PPs do not allow proforms or intransitive PPs: 8

(52)a. John relied [on Bill]/*/there/*/away
   b. John gave it [to Bill]/*/there

The fact that non-CFC PPs cannot be replaced by pro-forms is explainable under the current hypothesis: they are not independent semantic units. The real argument of the verb is the prepositional object, and replacing the PP with a PP pro-form would not leave the appropriate category for the verb to assign its role to.

A similar argument can be made from question formation. A CFC-PP can be replaced by a single pro-form under question formation:

(53)a. Where did he put it t
   b. Where did he look t

However, the non-CFC type PP cannot be substituted by a single Wh-word:

(54)a. *Who did he speak
   b. *Who did he talk

---

8 Some cases of non-CFC PPs seem seem to allow substitution with *away*:

(i)a. John talked about Bill/John talked away
   b. John gave it to Bill/John gave it away

But it is easy to show that *away* doesn’t satisfy an argument of the verb since the “real” PP may cooccur with it:

(ii)a. John talked away about Bill
   b. John gave it away to Bill
3.1.3. Selectional Restrictions

A verb may impose selectional restrictions on the prepositional object in precisely the class of PPs that are not binding domains for pronouns, whereas in PPs that are condition B domains, the verb may not do this:

(55)a. John gave the book to the boy/the institution/*the rock
b. John put the book on the table/the boy/the rock

The verb can impose selectional restrictions on the prepositional object in (55a), but not in (55b). The only thing the verb cares about in (55b) is that the PP carries the meaning of a location. If, as is commonly assumed, a verb can only impose selectional restrictions on its arguments, this is evidence that the prepositional object in a non-CFC PP is an argument of the verb, whereas the prepositional object in CFC PP is not.

There are other facts suggesting that the non-CFC PPs are like functional categories, whereas CFC-PPs are lexical categories. For example, Friederici (1981, 1982) reports that Broca's aphasics differentiate between the two PP classes just as they differentiate between function-words and content words. Hale and Keyser (1988) argue that lexical incorporation possibilities are sensitive to a similar distinction in PPs. At any rate, there are several differences between PPs that argue that a distinction should be made, and the proposal here is that the distinction is in terms of theta-role assignment.

4. Other Subjectless Domains

Everything else being equal, we would expect there to be more subjectless binding domains than just PPs. This section discusses NPs, VPs, and APs, and argue that the subjectless binding domain theory makes the right predictions also in these cases. However, the predictions are much harder to verify here, due to many more interfering properties and phenomena at work in these categories, making the effect of the subjectless binding domain theory harder to see.

4.1. VPs and APs

Under the traditional analysis of VPs where the Agent theta-role is assigned external to the VP, the CFC projected by a verb (or a predicative AP complement of a copula) will be S (see also Giorgi 1987 for discussion on this point). Therefore, an object of a verb will have as its minimal domain the clause, even though it is contained in a maximal projection
not containing the subject. Hence, the pronoun in structures like (58) must be disjoint from the matrix subject:

(58)a. *John\(_i\) \([vP \text{ likes him}_i]\)

b. *John\(_i\) is \([AP \text{ proud of him}_i]\)

Under the "VP-internal subject hypothesis", (see Kitagawa 1986, Sportiche 1988, Koopman and Sportiche 1989), the subject is base-generated under VP and raised to SpecIP at S-structure, as in the derivation below:

(59)a. \([IP \, e \, [vP \, \text{John hit Bill}]]\)

b. \([IP \, \text{John}_i \, [vP \, e_i \text{ hit Bill}]]\)

Note that the definition of CFC in (37) still works correctly here, independently of whether the SpecIP position is analyzed as an A- or A'-position. Consider (60):

(60) \([\text{te John}_i \, [VP \, e_i \text{ hit him}_i]]\)

The pronoun cannot be coindexed with the raised subject since that would make it coindexed with the trace of the subject. The binding relation between the subject trace and the pronoun would then violate condition B. Hence the VP-internal subject hypothesis seems to have no immediate consequence for domain computation under the subjectless binding domain definition.

One problem for the assumption that VP may in principle be a CFC is the following observation by Freidin (1986). Consider a raising verb such as seem. This verb does not assign a theta-role to its subject position. If Complete Functional Complex is defined in terms of theta-role assignment, Freidin observes, then a VP in a raising construction should count as a CFC for its Goal argument, here Bill:

(61) It \([vP \, \text{seems to Bill}]\) that S

However, as Freidin observes (p. 167), this would incorrectly predict that the pronoun in (62) could be coreferential with the raised argument, since it would satisfy condition B in the VP:

(62) *\([S: \, \text{John}_i \, [\text{seems to him}_i \, [S^2 \, t_i \text{ to be happy}]]\)]

This problem would be solved if a subject were always required in a pronominal binding domain. This option is of course not available under the subjectless binding domain theory, which holds that pronominal binding domains never need to contain subjects.

The following is another solution. Recall the definition of CFC in (37), repeated below:
According to (63), $S^1$ is the CFC projected by the embedded verb in (62) at S-structure, even though no theta-role is assigned to the matrix subject position. The reason is that one of the theta-role bearers of the embedded verb is realized in the subject A-position of the matrix verb at S-structure. This suggests a solution to Freidin's problem: According to the definition in (63), the CFC of the verb in the embedded clause is the higher clause, since an argument is realized in an A-position in the higher S. On the other hand, the CFC of the matrix pronoun is the VP:

\[(64) \quad [S = \text{CFC(be happy)}] \text{John,} [\text{VP = CFC(see)}] \text{seems to him} [S \text{ t} \text{ to be happy}]]\]

We can then add a simple constraint to the effect that CFCs cannot be "nested" in the obvious sense, i.e. a CFC cannot be included in another CFC which is projected by a lower head. More precisely, a CFC which is dominated by another CFC' must be c-commanded by the head of CFC'. Since this is not the case in (64), the VP loses its status as CFC for him, and him must pick the higher CFC as its binding domain, predicting disjointness from the raised argument.

Apart from these considerations, a VP may still in principle be a CFC. This would be the case if it could occur in a configuration where there is no other A-position outside the VP available for one of its arguments to move to. One such case could be Romance causative constructions under an analysis where the causative verb takes a bare VP-complement, cf. Rosen (1989) for such an analysis.

Another case comes from Norwegian. Christensen and Taraldsen (1989) argue that a certain quasi-causative construction similar to the English John got it done-type has a VP-complement analysis as in (65) (abstracting away from certain details of their proposal):

\[(65) \quad \text{John} [\text{VP fikk} [\text{VP skrevet brevene}]]\]

\[\text{‘John got written the letters’}\]

(65) can be interpreted as someone else having written the letters, i.e. not necessarily John. Hence, the embedded VP is an independent CFC from that projected by the causative verb. The analysis now predicts that the Norwegian element seg discussed above, if contained in the lower VP, may satisfy its requirement of being free in its local domain inside the embedded VP, and subsequently be bound to the higher subject. Consider
first (66a), which shows that seg cannot be locally bound when it is the object of the verb sende ‘send’. However, when embedded in a causative VP complement, it can be bound to the next higher subject:

(66)a. John, sendte *seg/seg selv, en katalog
   ‘John sent REFL/himself a catalogue’

   b. John, [VP fikk [VP sendt seg/seg selv, en katalog]]
   ‘John got sent REFL a catalogue’

Furthermore, in (66b) there is non-complementary distribution between the two anaphors, as opposed to (66a). In (66a), seg must be free in the clause, and seg selv can be bound in the clause. This is predicted, since in (66b), the VP is a CFC, and hence seg can satisfy condition B in the embedded VP and condition A in the higher VP. At the same time, the embedded VP is not a possible binding domain for seg selv, since this element requires a binder in its domain, and therefore the domain for seg selv must be extended to the matrix S. The non-complementarity is thus predicted.9

9 An anonymous reviewer points out that whereas (65) is ambiguous between a reading where someone else or John is construed as the letter writer, (66b) is disambiguated by the choice of seg vs. seg selv. In particular, if seg is used, the interpretation is that John got someone else to send him a catalogue, whereas if seg selv is used, John sent the catalogue to himself:

(i) John fikk sendt seg en katalog
   ‘John got sent REFL a catalogue’ (Someone else sent the catalogue)

(ii) John fikk sendt seg selv en katalog
    ‘John got sent himself a catalogue’ (The sender is John)

The implication is that the VP contains an empty PRO subject, which can be either arbitrary or controlled by the matrix subject (as proposed by Christensen and Taraldsen 1989). Choice between seg and seg selv would then be predicted to correlate with a reading in which PRO is either arbitrary or controlled: If PRO is controlled by John, only seg selv could be used, seg resisting local binding. On the other hand, if PRO is arbitrary, only seg can be used since it can be bound across a SSC, but seg selv could not be used, since binding to John would entail binding across a Specified Subject. (66b) would then have the following two representations for controlled vs. arbitrary PRO respectively:

(iii) John, fikk [PROarb sendt seg/*seg selv, en katalog]

(iv) John, fikk [PRO, sendt *seg/*seg selv, en katalog]

If this analysis is correct, then this construction can of course not be used as an example of a VP as subjectless binding domain. On the other hand, the data would provide additional support for the claim that seg cannot be locally bound, and for Christensen and Taraldsen’s analysis of this particular construction.
4.2. NPs as Subjectless Binding Domains

The subjectless binding domain theory is not straightforward to test in NPs, given the controversy over whether NPs have "subjects" or not. In fact, it only makes predictions under theories that assume that NPs never have subjects, such as Williams (1985) and Grimshaw (1990). Suppose this is the right approach. Then the subjectless binding theory directly predicts the non-complementarity in (67):

(67)a. John₁ likes most stories about himself₁
    b. John₁ likes most stories about him₁

If we follow Giorgi (1987) in assuming that both GFs and theta-roles can define CFCs, then the NPs are GF-CFCs in both cases (assuming "stories" doesn't assign a theta-role). Since pronouns do not need subjects, him satisfies condition B inside the NP in (67b), and is free to be coindexed with the higher subject. The anaphor, on the other hand, requires a binder in its minimal domain, and hence its domain must be extended to the next higher CFC containing a subject, namely the clause. Thus the anaphor satisfies condition A in the S. This results in the non-complementary distribution observed in (67).

However, matters are not that straightforward in NPs. The possibility of a pronoun satisfying condition B in an NP is dependent on various poorly understood properties, such as the Specificity effect discussed in Fiengo and Higginbotham (1981) (see also ENC 1991 for a recent analysis of Specificity). Fiengo and Higginbotham noted the contrast between (68a,b) (to be read without stress on the pronoun):

(68)a. *John₁ read books about him₁
    b. John₁ read that book about him₁

The NP in (68a) is non-Specific and the determiner in the NP in (68b) makes it Specific. Specificity seems to take away the possibility for a NP to be a CFC and binding domain.

I will propose that the explanation for the ungrammaticality of (68a) is the following. Suppose that a non-specific NP somehow fails to be a CFC, so that the minimal CFC containing the pronoun in (68a) is not the NP, but the clause. Then the ungrammaticality of (68a) has nothing to do with the presence or absence of subject. Rather, the non-specific NPs fail to be CFCs and condition B domains in the first place, such that the NP is the binding domain for the pronoun in (68a) but S in (68b).

Some independent evidence for the non-CFC status of non-specific NPs comes from strict and sloppy identity interpretation of reflexives in specific
and non-specific NPs. Lebeaux (1985) argued that two types of binding relations should be distinguished: local and non-local binding. Non-local binding is binding from outside the core binding domain, which he defined as the minimal NP or S containing the anaphor and its governor. In the theory proposed here, "NP or S" in the definition of binding domain is replaced by the notion CFC. Local binding can then be defined as binding within the minimal CFC containing the antecedent, the anaphor and its governor, whereas non-local binding can be defined as binding from outside the CFC containing the anaphor and its governor. Lebeaux argued that non-locally bound anaphors allow the strict reading under VP-ellipsis, but that locally bound anaphors only the sloppy reading.

Consider now the fact that binding of an anaphor in a non-specific NP only allows sloppy readings, but binding into a specific NP allows both strict and sloppy readings:

(69)a. John found a picture of himself, and Bill did, too
   (i) Sloppy: Bill found a picture of Bill
   (ii) No strict reading: *Bill found a picture of John

b. John likes the new pictures of himself, and Bill does too
   (i) Sloppy: Bill likes the new pictures of Bill
   (ii) Strict: Bill likes the new pictures of John

This should mean that binding into a non-specific NP is a local binding relation, but binding into a Specific NP would be a non-local binding relation. This is exactly what is predicted under the current proposal. Since non-specific NPs are not CFCs, binding into one from the higher subject constitutes a local binding relation, because the binder and bindee are contained in the same CFC:

(70) \[s=CFC \text{John likes } [NP=CFC \text{ a picture of himself}]\]

local binding relation

On the other hand, if Specific NPs are CFCs, the binding relation is non-local, since it spans two distinct CFCs:

(71) \[s=CFC \text{John likes } [NP=CFC \text{ the new picture of himself}]\]

non-local binding relation

Since pronouns can only be part of non-local binding relations (by Condition B), the impossibility of replacing the anaphor with a pronoun in
(70) and the possibility of replacing the anaphor with a pronoun in (71) is expected, as well as the contrast in (68).

This analysis receives further support from the distribution of the Norwegian element seg discussed above. Recall that this element cannot be locally bound, but must be non-locally bound. If non-specific NPs do not constitute CFCs, then binding from a local subject into a non-specific NP should constitute a case of local binding, but binding into a Specific NP should constitute non-local binding. In other words, seg should be ruled out in a non-specific NP. This prediction is correct, as the contrast in (72) indicates:

(72)a. Johni avviste all kritikken av seg/seg selv,  
'John rejects all the-criticism of himself'

b. Johni avviser vanligvis kritikk av *seg/OK seg selv,  
'John rejects usually criticism of himself'

In (72b), the non-specific case, the binding relation is local, explaining why seg is out. In this case, use of the compound reflexive seg selv is the only option. In (72a), on the other hand, the NP is Specific and a CFC. Hence seg is licit since it is non-locally bound, and seg selv is also possible since the anaphor can (but is not required to be) non-locally bound.

This analysis of non-specific NPs as non-CFCs raises the question of how to define CFC-hood in terms of Specificity. I will leave that question for future research.\textsuperscript{10}

4.3. Distribution of Anaphors and the Subject Requirement

An anonymous reviewer asks, does the removal of the subject requirement really have no consequences for the binding domain computation for anaphors? What would happen in a category without a subject in the usual sense, but with another non-subject c-commanding NP? The reviewer cites (73), where binding between Bill and himself as well as binding between John and the anaphor is possible:

\textsuperscript{10} Another problem in NPs is the contrast between constructions involving negation (i) or negative verbs (ii), as noted by Freidin (1986):

(i)a. *John reads [books about him,]  
b. John doesn't read [books about him,]

(ii)a. *John likes [books about him,]  
b. John dislikes [books about him,]

I have no solution to offer for this.
(73)  \[ S \text{Bill discussed } [_{\text{NP}} \text{a comparison of John to himself}] \]

It should be noted that binding between \textit{John} and \textit{himself} is odd for semantic reasons (a comparison between \textit{x} and \textit{y} requires that \textit{x} and \textit{y} are different entities), but other examples avoiding this problem can be found:

(74)a. Bill heard about [the assignment of John to himself]
   b. Bill was told about [the revelation of John to himself]

Since \textit{John} in these cases may bind the anaphor (which shows that there is a BT-compatible indexing inside the NP), and the NP is presumably a CFC, binding from outside the NP is incorrectly predicted to be impossible by the subjectless version of the \textit{KL} theory. The reviewer concludes that the \textit{KL} theory with the subject requirement proves more adequate in this case.

However, the exact opposite conclusion was reached in Johnson (1987) on the basis of data exhibiting essentially the same property, namely the impossibility of binding out of NP that contains a non-subject c-commanding NP. Johnson compared the binding theory of Chomsky (1981), which closes off binding domains for anaphors by finding a SUBJECT (which includes subjects and AGR), with a \textit{KL}-theory that closes off binding domains by finding a BT-compatible indexing.\textsuperscript{11} Johnson's idea was that certain structures involving modification in NPs could be argued to have the following general form, where XP is a modifier:

(75)  \[ \text{NP}\ast \]
     \[ \text{NP'} \]
     \[ \text{XP} \]
     \[ \ldots \]

If XP contains an anaphor, Johnson argued, then there is a BT-compatible indexing between NP' and the anaphor contained in the XP, since NP' will c-command the anaphor. This would then require the anaphor to be

\textsuperscript{11} Johnson (1987) predates the work reported here with respect to exploring the consequences of dropping the subject requirement. However, that work only analyzed the distribution of anaphors in complex NPs, whereas this article explores the consequences for pronouns primarily in PPs and for non-complementary distribution between anaphors and pronouns in PPs.
bound inside NP*, preventing binding from outside. This, Johnson argued, explains the contrasts between the data sets in (76) and (77) under the analyses indicated, and under the assumption that only NP, not N (or N') can be a potential binder:

(76)  (adapted from (6) & (7) in Johnson (1987))
   a. They, read \([NP* [N [N proofs] that pictures of each other, had been forged]]\)
   b. *They, read \([NP* [NP [N theorems]] that books about each other, explained]]\)

(77)  (adapted from (8) & (9) in Johnson (1987))
   a. They, bought \([NP* [N pictures] of each other,]\)
      They, read \([NP* [N books] about each other]\)
      They, remembered \([NP* [N stories] about each other]\)
   b. ???They, bought \([NP* [NP pictures] near each other,]\)
      ???They, remembered \([NP* [NP pictures] beside each other]\)
      ???They, threw \([NP* [NP pictures] for each other,] away\)

The BT-compatibility approach, Johnson argued, makes the desired distinction between (76a), (77a) and (76b), (77b). If a binding domain were required to contain a subject, on the other hand, neither the NP* in (76b) nor the NP*s in (77b) would be considered binding domains, since the relevant NP inside NP* is not a subject, and the differences in binding possibilities would not be predicted.

If the subject requirement were introduced to accommodate cases like (73)–(74), Johnson’s account of (76)–(77) would be lost. Conversely, Johnson’s account of these sentences appears to make the wrong prediction for (73)–(74): Since John may bind the reflexive, it would function as a “Specified Subject” since it is the only potential binder in the CFC, and binding out of the NP should be impossible – contrary to fact.

I conclude that there is evidence both for and against a subject requirement as far as binding domains for anaphors in NPs is concerned, and that there may be consequences of removing the subject requirement with

12 The two first cases in (77b) might also be ruled out independently by the prohibition of LF-movement of anaphors out of adjunct PPs, as discussed in Section 2.1.
respect to anaphors in NPs. However, more research is needed in the area of binding into NP before any firm conclusions can be drawn.  

5. Further Issues

Another question raised by a reviewer is what is gained or lost by implementing Bresnan's ideas in a new framework, and whether the reimplementation makes different predictions from Bresnan's original proposal. As for the first question, obviously what is gained for the KL binding theory is that it can cover facts previously unaccounted for by that theory. No deeper reason is needed to implement ideas from one framework into another. It is worthwhile to modify a theory in an interesting way to extend its empirical coverage - even if that coverage is the same as that of the analysis from which the idea is borrowed.

This leads to the second question: Does the current version of the KL binding theory make different predictions than the LFG binding theory?

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13 The only other category where the situation described here could occur (a category which is a CFC, contains no structural subject, and one NP c-commanding another) would be in a subjectless VP complement with two internal arguments, as sketched in (i):

(i)

![Diagram of (i)]

If such a structure exists, and the two VPs could be shown to constitute separate CFCs, then the prediction of the subjectless binding domain theory would be that John could not bind himself. The theory requiring a subject in the anaphor's domain would make the opposite prediction. I leave this issue for future research.

14 Examples of this abound in the literature. For example, Perlmutter (1978) had the insight that the single argument of certain intransitive verbs behaves like an object, and explained this in Relational Grammar by saying that the subject was an "initial 2" and a "final 1". Burzio developed an analysis where this was expressed by having the subject be base-generated as an object at D-structure, which in turn moves to the subject position in the mapping to S-structure (cf. Burzio 1981/1986). Until recently, Perlmutter's discovery was not analyzable in the LFG framework. However, new developments in LFG have given that theory a way to incorporate unaccusativity by making the appropriate generalizations at the level of a feature system which derives the Grammatical Functions for a given verb (cf. Bresnan and Zaenen 1990).
The two theories make the same predictions with respect to the distribution of pronominals in PPs. This is so because the f-structure notion *nucleus* and the syntactic notion *CFC*, as defined here, are extensionally equivalent. Requiring that a pronominal be free in the nucleus containing it will therefore give the same results as requiring that a pronominal be free in the CFC containing it (and its governor\(^{15}\)).

However, the two theories differ with respect to predictions regarding binding domains for anaphors, and the two binding theories as a whole differ conceptually with respect to how non-complementarity is predicted, as will be discussed below. To see this, recall the discussion in Section 4.3 above. Independently of the unresolved empirical issues, the discussion there illustrates how the LFG binding theory differ from the *KL* theory with the subject requirement removed: The relevant NPs in the NP\(^{*}\)s in (76)–(77) are not SUBJs in LFG (only the subject of a predicate and the POSS function are SUBJ-functions). Therefore, binding of the anaphor from outside NP\(^{*}\) is predicted to be possible, contrary to the predictions of the *KL*-theory. Hence, the LFG binding theory cannot explain the contrasts in Johnson’s data.

A further difference can be illustrated with *seg*. It is well-known that *seg* is subject-oriented (cf. Vikner 1985, Pica 1987, Hellan 1988, Hestvik 1990a). In LFG, this is represented by adding a feature [+sbj] to *seg*, which means that it must be bound to a grammatical subject (cf. Sells 1985, Bresnan 1987). Consider, however, the following data:

\[(78)\quad \text{John liker } [\text{NP mann} \text{en med } [\text{en hund foran seg}]]\]

‘John likes the man with a dog in-front-of REFL’

Clearly the binder of *seg* here is not a SUBJ in the LFG sense. On the other hand, this datum can be adequately dealt with in the current theory, assuming the analysis of *seg* presented earlier, and assuming that the modification structure in (78) is of the kind in (75): First, *seg* satisfies the requirement that it must be free in the PP *foran seg*. It must then be

\(^{15}\) The addition of the governor requirement is relevant to pronominals in ECM-constructions, since this is the only case where the pronominal is governed from outside its CFC. This is necessary to ensure that the pronominal take the matrix clause as its domain in (i) and not the embedded clause, even though the embedded clause is a CFC:

\[(i)\quad [s \text{John believes } [s \text{him to be happy}]]\]

Without the governor requirement, the pronominal would incorrectly be predicted to be able to corefer with the matrix subject. In LFG, the pronoun *him* in (i) is analyzed as linked to a non-thematic OBJ function in the f-structure of *believe*, with the result that the minimal nucleus containing it is that projected by *believe*. In other words, in both theories, the matrix S (or its f-structure correlate) is the domain for the pronoun.
bound (within the tensed clause) in a higher CFC containing a BT-compatible indexing. Since the NP mannenn c-commands seg, the anaphor may satisfy condition A by being bound to this NP. Although further issues arise with respect to how subject orientation should be analyzed in general in this model, this appears to be a case where the binding theory proposed here may prove more adequate than the LFG treatment of seg, which would predict that it could be bound only to the matrix subject in (78), mannenn not being a SUBJ.

Another difference between the KL binding theory and the LFG-theory lies in how non-complementarity is predicted. In LFG, non-complementarity is achieved in general by stipulating that pronominals do not need subjects in their domains, whereas anaphors do (cf. Section 3.1). Hence, a PP (of the right kind) qualifies as the domain in which a pronominal may meet its requirement of being free. An anaphor, on the other hand, must be bound in its minimal complete nucleus. Since the PP is not a complete nucleus (although still a nucleus), it is disqualified as a binding domain for the anaphor, and the larger nucleus corresponding to S must be picked.

In the KL-theory, binding domains are not specified as different for pronominals and anaphors, and there is only one definition of binding domain (modulo the issue of including the subject requirement): the minimal CFC containing the element and its governor. Rather, the difference is built into the BT-compatibility algorithm, which says that an element must meet its binding requirement in the minimal binding domain containing a BT-compatible indexing for that element. This means that the difference in actual binding domains is not absolute, but relativized to the position of the element. As a case in point, a locative PP qualifies as an actual binding domain for a pronoun, since it can satisfy its binding requirement, namely that of being free, in this domain. An anaphor, on the other hand, cannot satisfy its binding requirement in the PP, since there is no potential binder in the PP. Hence, the PP is disqualified as the binding domain within which the anaphor must satisfy its binding requirement, and the S must be picked. As Chomsky (1986a, 170) points out, this explains why the anaphor needs a subject (really: a c-commanding NP) in its domain, rather than leaving it as a stipulation.

6. Conclusions

I have argued that the subject requirement should be removed from the definition of binding domain in the binding theory of Chomsky's Knowledge of Language (1986a). In conjunction with the BT-compatibility algo-
rithm, this predicts a wider range of non-complementary distribution between anaphors and pronouns than the original theory does. The data supporting this approach to binding theory was drawn from the distribution of anaphors and pronouns in locative and directional PPs. The lack of non-complementarity in a subset of PPs was explained by the theta-assignment properties of these PPs in conjunction with Giorgi's definition of CFC in terms of theta-roles. Finally, I also briefly discussed some non-complementarity data from NPs and VPs which also provide evidence for the theory, since the theory says that NPs and VPs in principle may be subjectless binding domains.

The theory proposed here has consequences for the issue of whether condition A and B are simply two sides of the same coin, in the sense that condition B is simply the inverse of condition A. If this were the case, then condition B could be reduced to an Elsewhere Principle, as proposed by Burzio (1989). However, such an account predicts perfect complementary distribution between anaphors and pronouns. As shown here, such perfect non-complementarity would be difficult to maintain in view of the facts. Under the current proposal, the non-complementarity is expected, and condition A and B must be distinct principles of grammar, not reducible to one another.

References

Bresnan, Joan: 1987, LSA Summer Institute class lectures, Stanford University. (Based on unpublished work by Joan Bresnan, Per-Kristian Halvorsen and Joan Maling.)
SUBJECTLESS BINDING DOMAINS


Sells, Peter: 1985, Lectures on Contemporary Syntactic Theories, CLSI, Stanford University.


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