

Binding Theory, Control, and *pro*

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Prelude

The topic of the current chapter is the Binding Theory, i.e. the set of conditions on the co-occurrence of different types of NPs, both overt and covert. The chapter begins with an introduction to the paradigm the canonical version of the Binding Theory was based on and a discussion of the evolution of the binding principles. This discussion is followed by a detailed examination of several binding-theoretic phenomena which require modifications to the version of the Binding Theory in Chomsky (1981). Among these are long-distance anaphors which raise the important question of whether the notion of *governing category* needs to be parametrized and, if yes, how this is best done. The chapter presents a number of different approaches to this topic some of which treat anaphor binding in terms of movement while others do not. Discussed as well are logophors and the special descriptive problems they pose as well as a peculiar anti-anaphor.

We also find a discussion of the status of the disjoint reference principles, in particular whether principle C of the binding theory might be dropped from the grammar in favor of a treatment of the phenomena it is supposed to cover by pragmatic principles. The arguments for and against both views are compared.

The final section of the chapter contains a detailed presentation of the relationship between binding theory and empty categories, in particular the treatment of PRO and *pro*, the two pronominal empty categories whose main function it is to serve as the subjects of non-tensed and tensed clausal structures. Different approaches to the licensing of each of these elements are discussed.

A discussion of the relationship between binding theory and traces concludes the chapter.

1 Introduction

Binding Theory is the subtheory of Government and Binding Theory which deals with indexing relationships between nominal expressions.¹ We will begin our examination of it by looking in a very sketchy way at some of the properties of these elements which it attempts to account

for, and establishing some basic concepts and definitions. We will then proceed to a more detailed consideration of a number of core problems to which investigators of these properties have addressed themselves. Consider the examples in (1).

- (1a) *I hurt himself
 (1b) He_i hurt himself_i

English has a set of nominal elements, including reflexives like *himself*, which are referentially dependent on an antecedent in the same sentence, which they must match in such grammatical features as number and gender. (1a) is ill-formed because the sentence contains no such antecedent. (1b), on the other hand, is well-formed, because there is an antecedent – the pronoun *he*. We understand the reflexive to corefer with *he* here, and we represent this by assigning them identical indices.² Reflexives and similar elements, such as reciprocals, which are required to be coindexed with antecedents in this way are known collectively as *anaphors*.

There are restrictions on the admissible structural relationships between anaphors and their antecedents. The first of these has to do with the relative position of the two elements within the syntactic tree. Compare (2a) with the ill-formed (2b):

- (2a) John and Mary_i [_{VP} saw each other's_i children]
 (2b) *Each other's_i children [_{VP} saw John and Mary_i]

These examples show that, while a subject phrase is a suitable antecedent for an anaphoric element contained within the object of the verb (in this instance, a reciprocal), the object is not a suitable antecedent for an anaphor contained in the subject phrase. This asymmetry in the anaphor-antecedent relationship can be captured by claiming that anaphors must be c-commanded by their antecedents, where *c-command* is defined as in (3):

- (3) α c-commands β iff α does not dominate β and every phrase γ dominating α also dominates β .

This c-command requirement is satisfied in (2a), but not in (2b), where the VP dominates the intended antecedent but not the anaphor. Thus, anaphors appear to have to be coindexed with c-commanding antecedents. We will say that an element α which is coindexed with a c-commanding element β is *bound* by β .³

Other restrictions on the binding relation between anaphors and

antecedents have to do with *locality*. Anaphors have to be bound within specific syntactic domains. So, for example, while an English reflexive may be bound to the subject of its own clause, as in (4a), it may not be bound to the subject of a higher clause, across the subject of its own clause, as seen in (4b):

- (4a) She thinks [_D he_i hurt himself_i]
 (4b) *He_i thinks [_D she hurt himself_i]

In (4a), the anaphor is bound within its *local domain*, D, and therefore satisfies the locality requirement. In (4b), on the other hand, the intended antecedent occurs outside the local domain of that anaphor, and therefore the locality requirement is not satisfied.

A quite different type of behavior is exhibited by elements like *she*, *her*. Unlike anaphors, these elements do not have to be bound, as shown in (5a). They can be bound, as in (5b), but, as (5c) shows, only by a binder outside of their local domains. The relationship between a pronoun and a c-commanding nominal within the same local domain, as in (5c), is one of obligatory *disjoint reference*.

- (5a) I_i like her_k
 (5b) She_i thinks [_D I like her_i]
 (5c) *She_i likes her_i.

These properties are captured by claiming that these elements represent a second type of nominal element, *pronouns*, which must be *free* in their local domain, where *free* means "not bound."⁴ (These local domains are sometimes known as domains of *opacity*, since they are "opaque" to the processes of anaphor binding and disjoint reference interpretation of pronouns.)⁵

Full noun phrases like *the man in the hat* – that is, those headed by lexical nouns – exhibit yet a third type of behavior. Like pronouns, they require no antecedents within the sentence. Unlike pronouns, they may not be coindexed with any c-commanding argument, no matter how distant.⁶ Compare (6) with (5b):

- (6) *He_i thinks [_D I like [the man in the hat]_i]

Corresponding to these three types of nominals, it has been assumed since Chomsky (1980) that Binding Theory contains three Principles – one for anaphors, one for pronouns and one for *Referring Expressions* – which determine in each case which indexings are allowed and which are prohibited. The latter category, along with full NPs ("names") like

the one in (6), also includes the variables left behind by *wh*-movement. The assumption that these share with names the property of having to be free in all domains allows us to derive the so-called *strong crossover* effect in (7a) from Binding Theory.⁷

(7a) *The man who_i she thinks he_i believes [I like $[\text{vb}]_i$] is over there
Cf.

(7b) The man who_i $[\text{vb}]_i$ thinks she believes [I like him_i] is over there
(7a) is ill-formed on the interpretation under which he_i and the relative pronoun corefer. This can be accounted for if we assume that the trace left behind by *wh*-movement has the same status for Binding Theory as a full NP. (7a) is then out for the same reason as (6) – because an R-expression is coindexed with a c-commanding nominal. Note, however, that this requires a modification of our claims about referring expressions; they cannot be required to be free with respect to all c-commanding elements. (7a) becomes good if the pronoun and the variable are differently indexed, even though the variable is still coindexed with a c-commanding antecedent, the relative pronoun *who*. (Cf. the well-formed (7b).) There is a difference in the status of the relative pronoun and the subject pronoun he_i in (7a), though: the former, but not the latter, is in an A-bar position. Therefore, we could get the right result (and in fact insure that *wh*-movement is a movement to A-bar positions) by restricting our binding principles to *A-Binding*.⁸ With this modification, our Binding Theory may be stated schematically as in (8):

- (8) Principle A An anaphor must be A-bound within its local domain D.
Principle B A pronoun must be A-free within its local domain D.
Principle C An R-expression must be A-free.⁹

Against the background of this rudimentary sketch of the basic concepts of Binding Theory, we can now turn to a systematic consideration of the central issues which have been a concern to investigators working in this area. It should be noted from the outset that the relevant literature is by now very extensive, and it is impossible to do any more than give a cursory survey of it here. For expository purposes, we can identify a number of central problems which emerge repeatedly in that literature.

The first problem is the *domain problem* – the problem of the proper definition of the local domain D in (8). This question has probably been the focus of the largest amount of attention in the literature on Binding Theory. It is made the more interesting by the fact that there is at least

the appearance of considerable cross-linguistic variation in the domains in which anaphors must be bound and pronouns must be free. In Chinese, for example, the equivalent of the ungrammatical English (4b) is well-formed, as we will see. One of the current hot topics in Binding Theory is whether the definition of local domain must be assumed to be parameterized in order to accommodate this variation, or whether there is an invariant definition, with apparent variation arising from interaction between binding and other grammatical operations, e.g. abstract movement. Section 2 examines the domain problem. 2.1 briefly traces the development of the characterization of local domains for binding. Section 2.2 reviews a number of recent approaches to the phenomenon of apparent “long-distance” binding and cross-linguistic variation in binding domains (the *variation problem*). This discussion also touches tangentially on two problems fairly closely related to the domain problem. These are the *level problem* – the problem of the level(s) of representation at which binding principles hold¹⁰ – and the *antedependent problem*. At issue in the latter is the proper characterization of the fact that while some languages, like English, allow non-subjects to antecede anaphors, many other languages, including Gothic, for example, allow only subjects as binders. This is illustrated by the examples in (9).

- (9) gub_i haubeip ina_k in $\text{sis}_{i,k}$
(John 13:32)
God}_i *glorifies* *him}_k* in *self}_{i,k}*

As we will see below, Gothic also differs from English with respect to the domain in which anaphors must be bound. Under some accounts, these two differences are claimed to be linked.

Aspects of the *classification problem* – the problem of the number of different types of nominals the theory must account for, and how they fit under the principles of Binding Theory – are considered at various points in this study. Suppose we take as our starting point the assumption that the three principles in (8) correctly and exhaustively partition nominal expressions with respect to their referential properties – that is, that every nominal may be characterized as either an anaphor, a pronoun or an R-expression. There are three possible ways in which this initial assumption might be modified, and each of these has been proposed in individual cases. First, it has been envisioned since early in the development of Binding Theory that a single element may simultaneously fall under more than one principle. Chomsky (1981) uses this assumption to derive the distribution of the null pronominal PRO – in particular, the fact that it is restricted to ungoverned positions. According to Chomsky, this is because PRO is subject to both Principle

A and Principle B.¹¹ The conflicting requirements of these two principles can be satisfied (vacuously) only when PRO occurs in contexts not satisfying the definition of D. Given the definition for local domain which he adopts, this requirement is satisfied only in ungoverned contexts. Similarly, in his theory of *Generalized Binding*, Aoun (1985) claims that *wh*-traces fall under both Principle A and Principle C. These two cases are discussed in section 5, which consists of some brief, primarily bibliographical remarks on the question of how the principles of the Binding Theory apply to various types of empty categories. The possibility that an element may fall under more than one principle also arises in connection with the overt elements discussed in section 3. The converse possibility – that there are nominal elements which have no status at all with respect to Binding Principles – is discussed briefly in section 5.2.2 in connection with traces.

Second, it is possible that the inventory of principles in (8) is insufficiently rich, and does not provide an exhaustive typology of nominal types. Suggestions along these lines are mentioned in 2.2.2 and subsequent sections, and in section 3. Finally, section 4 reviews some proposals that (8) can be reduced through the elimination of one or more of the principles requiring disjoint reference, since disjoint reference effects are claimed to be derivable in a more general way.

Due to lack of space, virtually no mention will be made of the *acquisition problem* – the problem of how native speakers acquire their knowledge of the binding properties of individual nominal elements. It is probable that more attention has been paid to this aspect of syntactic acquisition than any other, making even the sketchiest review of the relevant literature impossible in the present chapter.

2 Specific Problems in Binding Theory

2.1 The Evolution of Binding Principles

By way of introducing our discussion of local domains, it will be useful perhaps to illustrate some of the behavior of anaphors and pronouns in English, a language in which these elements appear to observe fairly restricted domain conditions. The basic cases are listed in (10).

- (10a) They_i helped *each other*/**them*.
 (10b) They_i expected [*each other*/**them*, to win]
 (10c) They_i expected [me to help *them*/**each other*.]

- (10d) They_i expected [**each other*/*they*, would win]
 (10e) They_i expected [I would help **each other*/*them*.]
 (10f) They_i read [books about *each other*/*?*them*.]
 (10g) They_i read [Mary's books about **each other*/*them*.]
 (10h) They_i sold [*their*/*each other*'s, books]
 (10i) They_i put the books [beside *them*/*each other*.]
 (10j) They_i thought that [[books about *each other*/*them*.] would be on sale]

We observe that in the first several examples, proximate pronouns and anaphors (reciprocals, in the present case) are in complementary distribution: where an anaphor can be coindexed with the subject, a pronoun cannot be, and vice versa. This near complementarity led to the view in early work that the domains for Principle A (the domains in which anaphors must be bound) and the domains for Principle B (the domains in which pronouns must be free) are identical. A consideration of the rest of the paradigm, however, shows that complementary distribution does not hold throughout. We will return to the question of whether this observation requires us to abandon the assumption of identical domain specifications.

Contrasting (10f) and (10g), we see that the subject of the containing clause can count as a local binder for an anaphor occurring in complement position within a noun phrase if the noun phrase has no subject, but not if the noun phrase has a subject. Furthermore, an anaphor occurring in subject position of an infinitive clause can be locally bound to the subject of the main clause, as in (10b), but the object of an infinitive clause cannot be bound to the subject of the main clause, across the presence of a closer c-commanding subject appears to define a local domain, D, for the anaphor; an anaphor c-commanded by a subject cannot be bound to a higher subject. This role of subjects in defining domains for anaphor binding has been recognized since Chomsky (1973), and I follow the terminology of that work in referring to this as the *Specified Subject Condition* (SSC) case, as is still done in much recent work.

- (11) D (in (8)) = the c-command domain of a subject NP (the SSC case).

(11) by itself, however, does not provide a completely adequate characterization of local domains. If we replace the infinitive complement of (10b) with a finite complement, as in (10d), we see that an anaphor embedded subject position can no longer be bound to the higher clause subject, even though the higher clause is the minimal domain-satisfying

definition (11). A further locality requirement must be assumed, therefore, to cover this case. There are at least three differences between (10b) and (10d) to which their difference with respect to binding might be linked. The verb in (10d) is inflected for both agreement and tense, while the one in (10b) is not. Moreover, the subject of the complement clause in (10d) is in a context of nominative Case assignment, while the one in (10b) is not. Chomsky (1973) proposed that tense is the relevant factor here, and formulated a *Tensed S Condition* (TSC), which prevented anaphors from being bound across the boundaries of tensed clauses.¹² In the terms of our Binding Theory in (8), then, we arrive at the following two-part definition of local domains:

(12a) D = the c-command domain of tense (the TSC case).

(12b) D = the c-command domain of a subject NP (the SSC case).

This characterization goes a fair way toward accounting for the paradigm in (10). In the one instance, (10b), in which an anaphor occurs within an embedded clause but is not c-commanded by either tense or a subject within that clause, it is allowed to be bound by an antecedent in the higher clause.

There are some problems with this account, however. First, in (10e), the anaphor is free within the c-command domain of both the subject and the tense of the embedded clause, yet this example does not exhibit the additive effect in relative ill-formedness that one might expect to result from the violation of two independent conditions. Second, a characterization of local domains like (12) would predict, contrary to fact, that the version of (10j) with the reciprocal should be ill-formed, since that reciprocal is free in the c-command domain of the tense of the embedded clause. Chomsky (1980) proposes an alternative characterization of local domains which addresses both of these problems. This version keeps the SSC essentially as in (12b), but rejects the TSC in favor of a quite different principle, the *Nominative Island Condition* (NIC), which prevents a nominative anaphor from being free within the minimal clause containing it.

(12'a) A nominative anaphor may not be free in S' (the NIC)

(12'b') (=12b)

The NIC duplicates the effect of the TSC in the one case, (10d), in which that principle does not overlap with the SSC. Under this account, the anaphor is excluded in (10d) because, as a nominative anaphor, it cannot be free in its clause. Unlike the TSC, however, the NIC does not overlap with the SSC in the case of (10e): the anaphor is ruled out here

by the SSC alone, since it is not nominative, hence not covered by the NIC. Finally, the version of (10j) with the anaphor is correctly predicted to be well-formed under this account. The anaphor is neither nominative nor c-commanded by the subject of the embedded clause (since it is contained within that subject). Hence, nothing prevents it from being free in the embedded clause.

Both of these models of Binding Theory, the SSC/TSC model and the SSC/NIC model, have more or less direct successors in later work. The idea of the former that finite clauses and the c-command domain of subject nominals are the two binding domains is continued in a general way in the LGB model of Chomsky (1981), for instance, in which the *Governing Category* (=local domain) for an anaphor or pronoun is characterized as the domain of an *accessible SUBJECT*, as defined in (13a):¹³

(13a) β is a Governing Category for α iff β is the minimal category containing α , a governor for α , and a SUBJECT accessible to α .¹⁴

(13b) SUBJECT = AGR where present, a subject NP otherwise.

(13c) α is accessible to β iff α is in the c-command domain of β and the assignment to α of the index of β would not violate (13d).

(13d) $*[\delta \dots \gamma \dots]$, where δ and γ bear the same index.

This characterization of local domains differs from the one in (12) in three basic ways. First, it takes AGR(reement), rather than Tense, to be the component of "finiteness" responsible for the PIC effect – a claim for which there seems to be substantial cross-linguistic evidence.¹⁵ This in turn makes possible a partial conflation of the two clauses of (12), by means of the notion SUBJECT defined in (13b). While this notion is defined disjunctively, the two elements which are potential SUBJECTS are not unrelated. AGR(reement) is a label for the features of INFL licensed by subject-aux agreement, and these phi-features are shared with the coindexed subject NP through the agreement relationship. We may therefore conceive of SUBJECT as the highest, or most prominent, occurrence of subject features in a phrase, where AGR, as the head of the phrase, counts as more prominent when present. Collapsing the two parts of the definition of local domain in this way eliminates the theoretically undesirable overlap between the two provisions of (12) with respect to example (10e). Only AGR constitutes a SUBJECT within the lower clause, given the disjunctive definition in (13b), and this example therefore involves only a single violation of the locality requirement on anaphor binding.

Finally, (13) differs from (12) in including the *accessibility provision* (13c). This provision is introduced to address the class of facts represented by (10j). Here, AGR c-commands the anaphor (satisfying half

of the definition of accessibility). However, AGR is related by subject agreement to the phrase containing the anaphor. If we assume that subject agreement involves coindexation, then coindexation between the anaphor and AGR as well would result in the prohibited *i-within-i* configuration in (13d), in which a phrase and a non-head constituent contained within it share the same index.¹⁶ Thus, the AGR of the embedded clause fails to satisfy the second half of the accessibility provision. It is therefore not an accessible SUBJECT, and the anaphor is allowed to be free within its domain. AGR in the main clause is accessible to the anaphor, however, and it must be bound within that domain.¹⁷

Note, however, that (10f) is one of the contexts in which the usual complementarity between pronouns and anaphors breaks down.

(10j) They_i thought that [[books about *each other*/*them*]_i would be on sale]

Either the pronoun or the reciprocal can be used to refer back to the subject. Another such context is the position of the possessor in (10h) (repeated).

(10h) They_i sold [*their*/*each other*'s_i books]

In both of these, the indexing possibilities indicate that the main clause must count as the local domain for the anaphor, since it need not be bound in any smaller domain, but that the bracketed constituent must be the local domain for the pronoun, since it need not be free in any larger domain. Huang (1983) observes comparable instances of non-complementary distribution in Chinese, and points out that they can be accommodated by assuming that only anaphors, not pronouns, require the presence of an *accessible* SUBJECT. In (10j), the embedded clause contains a SUBJECT (AGR), but that SUBJECT is not accessible to the italicized position, because of the *i-within-i* provision. Under Huang's modification, the embedded clause counts as a GC for the pronoun, but not for the anaphor. Similarly, in (10h), the NP contains a SUBJECT, but it is not accessible to the italicized position.¹⁸ Thus, the NP is a GC for the pronoun, but not for the anaphor, and non-complementarity in these contexts is accommodated.

This insight is incorporated into the version of Binding Theory presented in Chomsky (1986b), though in a rather different way, which avoids stipulating different domains for the two types of elements in the individual binding principles themselves. Chomsky (1986b, 169)

proposes that the local domain for a pronoun or an anaphor is its minimal Governing Category, where the definition of Governing Category is reformulated as in (14):

(14) A Governing Category for α is a maximal projection containing both a subject and a lexical category governing α (hence, containing α).¹⁹

Note that (14) contains no reference to AGR (it specifies subject, not SUBJECT), and no Accessibility provision. The effect of the latter is incorporated into the account by assuming that a particular convention is observed in evaluating potential local domains for binding. In order for a phrase β to constitute a Governing Category for some element α , (a) it must satisfy the definition in (14), and (b) there must be some possible indexing of elements within β on which the relevant Binding Principle could be satisfied for α within β . That is, there must be some possible assignment of indices which is *BT-Compatible* with α in β . Consider the case of (10h). The bracketed NP satisfies (14) for both of the italicized elements, since it contains a subject, and a lexical governor for those elements (the head N). For the pronoun, moreover, there is a possible indexing on which the relevant Binding Principle, Principle B, can be satisfied within NP. In fact, any indexing will suffice. The pronoun is not c-commanded by any prospective binder within NP, and will therefore be free within NP no matter what indices are assigned. The BT-Compatible requirement is therefore satisfied, and NP counts as a GC for the pronoun. For the anaphor, however, the computation leads to a different result: since there is no possible binder for the anaphor within NP, there is no possibility that Principle A could be satisfied for that anaphor within NP – i.e., there is no possible BT-compatible indexing for that anaphor within NP, and NP therefore does not count as a GC for the anaphor. The asymmetry between pronouns and anaphors in (10h) is predicted. The “accessible subject” requirement reduces to a “potential binder” requirement (at least for most cases), and this in turn permits the elimination of a certain redundancy in the model. The two components of the definition of accessibility – c-command and non-violation of the *i-within-i* provision – are also requirements on binders. An NP must c-command an anaphor in order to bind it, and it must be coindexed with it in a legal way (cf. note 16).

Consider next how the “NIC”-case, (10d), is treated under this account.

(10d) They_i expected [_{NP} each other_i / they_i AGR_i would win]

For the pronoun, there is no problem here: the bracketed phrase has a governor for the pronoun, and a subject, and the BT-Compatibility requirement is satisfied since there is a possible indexing on which the pronoun is free in that domain. By the same token, a problem does arise with the anaphor in (10d). Since it is not c-commanded by any potential binder within the embedded clause which could allow potential satisfaction of Principle A, the BT-Compatibility Requirement is not satisfied within that clause, which should therefore not constitute a GC for the anaphor, just as the NP in (10h) does not. Rather, the matrix clause should be the relevant GC, and the version of (10d) with the anaphor would be predicted, incorrectly, to be good.

Chomsky considers the possibility that it is AGR in (10d) which serves as a potential binder for the anaphor, thereby satisfying the BT-Compatibility requirement within the lower clause, but rejects this as somewhat artificial. IF AGR can't be an actual binder for an anaphor, there is no reason to assume that it can count as a potential binder for purposes of BT-compatibility. Chomsky proposes instead that the version of (10d) with the anaphor is not ill-formed with respect to BT at all. Rather, we can derive its ill-formedness from the theory of Government, under certain assumptions about LF movement. In particular, suppose that anaphors raise at LF, and are adjoined to a higher INFL node. An S-structure (SS) string like (15a) will then correspond to an LF string like (15b). (Chomsky, and, preceding him, Lebeaux (1983), note that this makes the LF structure of such English sentences resemble their SS counterparts in French, where clitic movement of the reflexive to INFL takes place in the syntax.)

- (15a) John INFL hurt himself
- (15b) John himself-INFL hurt _{t_i}

Since the trace left by the hypothesized LF movement is subject to the ECP, it must be properly governed. The position of subject of IP is not a properly governed position. The inadmissibility of the reflexive in (15c, d) is then simply a particular case of the general ECP-based prohibition against extraction from nominative subject position which is also in evidence in the "that-trace" effect illustrated in (15e):²⁰

- (15c) *John INFL thought that he_i would win
- (15d) John he_iself-INFL thought that _{t_i} would win
- (15e) *Who do you think that _{t_i} would win

The resulting theory of binding is similar in spirit to the SSC/NIC model, in that it eliminates a special role for AGR, and divides responsibility for restricting the distribution of anaphors between a principle requiring that they be bound in the domain of the subject and a principle excluding them from nominative positions. The latter, though, is no longer a part of Binding Theory, but of Government Theory. (Others have attempted a reduction in the opposite direction – i.e. the derivation of the *that*-trace effect from Principle A of the Binding Theory, as we will see in the discussion of Generalized Binding in section 5.2.)

The characterization of local domains in this model is quite basic: a GC for an anaphor or a pronoun α must contain a governor for α , and a subject. Asymmetries in distribution between the two result from the BT-Compatibility computation. However, still more minimal formulations can be envisioned. Consider first the role of subject in this characterization. Hestvik (1990, 269) points out that the SSC effect for anaphors in such cases as (10f) and (10g) (repeated) follows, without stipulation, from BT-Compatibility; the bracketed NP can count as a GC for the pronoun only in (10g), not in (10f), even if the specification of a subject is omitted, since only in (10g) is there a potential binder within NP, allowing satisfaction of BT-Compatibility:

- (10f) They_i read [_{NP} books about each other_i]
- (10g) *They_i read [_{NP} Mary's books about each other_i]

For pronouns, the force of the specification that GCs contain a subject is to insure that NP and S (or DP and IP, under more recent views of phrase structure) are the two possible GCs, since these are the two maximal phrases which may have subjects. Pronouns occurring within phrases of these types, but not within VPs or APs, for example, may satisfy Principle B within those phrases, and may therefore be bound outside of them, as seen in (16).

- (16a) They_i sold [_{DP} their_i pictures]
- (16b) They_i said [_{IP} they_i were sick]
- (16c) *They_i [_{VP} saw them_i]
- (16d) *They_i were [_{AP} proud of them_i]

In fact, however, it is not clear that the empirical generalization is quite correct. In English (and in several other languages), locative and directional PPs also apparently constitute GCs for pronouns, since pronouns they contain may be bound to arguments outside, as in (16e):

(16e) They_i put the books [_{PP} beside them_i].

The pronoun here is not required to be free in any domain larger than the PP, yet the PP has at least no apparent subject. Nor does the correct solution seem to be to posit a covert subject (i.e. PRO) controlled by the books, since anaphors may also appear in this context, and be bound by the clausal subject, as in (16f):

(16f) They_i put the books [_{PP} beside each other_i].

Thus, it appears reasonable to look for some other property than the presence or absence of a subject to distinguish those maximal phrases (e.g. DP, IP, and some PPs) which function as GCs for pronouns from those (e.g. VP and AP) which don't. One likely property is the following: VPs like the one in (16c) take an external argument, the clausal subject, to which their head Vs assign a theta-role. Heads of IPs and DPs, on the other hand, do not assign a theta-role to an argument outside their maximal projections. Similarly, the preposition in (16e) (arguably) assigns no external theta-role, but discharges its sole theta-role to its object. Hestvik (1990, 271ff) claims accordingly that the GC for an element α is the minimal " θ -Domain" containing it, where a theta-domain is the smallest domain in which all of the theta-roles associated with some independent θ -assigning head are discharged. (See Freidin (1986) for a similar proposal for pronouns.) In (16a, b) the pronoun is required to be free only in DP or IP respectively, because all of the theta-roles associated with the theta-assigner in those domains (N and V respectively) are discharged within those phrases.²¹ In (16e), the pronoun is required to be free only in PP, since the sole theta-role assigned by P, the θ -assigning head in that domain, is discharged within PP. (PPs headed by prepositions like the one in (16g), with purely grammatical functions, are not independent theta-role assigners, and therefore do not define theta-domains.)

(16g) *They_i looked [_{PP} at them_i].

On the other hand, in (16c), it is not sufficient that the pronoun be free in VP, since VP does not contain all the θ -roles assigned by V, the theta-assigner for the relevant theta-domain.

GCs for anaphors are similarly characterized in terms of θ -domains, but considerations of BT-Compatibility once again produce some overlap. For instance, while the PP in (16f) is the minimal θ -domain containing the anaphor, it contains no possible binder for that anaphor, and therefore does not qualify as a GC.²²

2.2 Long-Distance Binding

2.2.1 The Problem

Reflexives, reciprocals and pronouns in English appear to observe relatively restricted local domains, relative to some other languages. For example, the SSC effect for anaphors illustrated for English by example (10c) appears not to hold for reflexives in Icelandic, Danish, Gothic, or Russian, as shown in (17a–d).

- (17a) Pétur_i bað Jens um að raka sig_i.
Peter_i asked Jens to shave himself.
(Thráinsson (1987))
- (17b) at Peter_i bað Anne_k om [PRO]_k at ringe til sig_i.
that Peter_i asked Ann (for) to ring to self.
(Vikner (1985))²³
- (17c) þal-*ei* ni wilðedun [_S mik þiudanon ufar sis_i / (*im_i)]
who, not they-wanted me to-rule over selves / *them;
"who didn't want me to rule over them"
(Luke 19:27)
- (17d) On_i ne razrešæet mne proizvodit' opyty nad soboj_i.
He, not permitted me to-perform experiments on self.
(Rappaport (1986))

In each of these cases, the reflexive is bound across the subject of the infinitival complement clause. (In general, this is possible only for reflexives: reciprocals do not admit this type of long-distance binding.) Other languages appear to allow reflexive binding of a yet more non-local sort, as in the Icelandic and Italian examples in (18), where a reflexive has been bound across the boundary of a finite (subjunctive) clause, in apparent violation of the TSC (as well as the SSC).

- (18a) Jón sagði að ég hefði svikið sig_i.
John_i said that I had betrayed self_i.
(Thráinsson (1987))
- (18b) Gianni pensava che quella casa appartenesse ancora
alla propria famiglia
to self_i, family
(Giorgi (1983–4, 316))

Additional restrictions obtain in these cases of apparent long-distance (LD) binding, some of which will be discussed below.

Apparent LD binding of reflexives is also possible in Chinese, Japanese and Korean, as illustrated in (19).

- (19a) Zhangsan, renwei Lisi hai-le ziji,
Zhangsan, thought Lisi hurt-Asp self,
(Huang and Tang (1991))
- (19b) John-wa [Bill-ga zibun-o nikunde iru]-to omoite iru
John-Top Bill-Nom self-Acc hates that thinks
"John, thinks that Bill hates him,"
(Manzini and Wexler ((1987))
- (19c) John-in Bill-i Mary-ka [Tom-iy caki, tæhan
John-Top Bill-Nm Mary-Nm Tom's self toward
thæto]-lil silhahantako sængkakhantako mimita
attitude-Acc hates thinks believes
(Yang (1983))
"John, believes that Bill thinks that Mary hates Tom's attitude
toward self,"

It is not immediately clear whether to classify these with (17) or (18). In each case, the clauses across whose boundaries the reflexive is bound here are finite, as evidenced by the fact that they have overt subjects (which are identifiably nominative in some of these languages). However, these languages systematically lack morphological realizations of AGR(eement), and the examples in (19) may therefore be classified with the cases in (17), if the component of finiteness relevant to binding is the presence of AGR. It is perhaps significant that LD reflexives occur with a high degree of frequency in languages lacking agreement morphology (cf. Progovac (1991)).

Apparent LD application of Principle B – cases in which a pronoun is apparently required to be free in a domain larger than the minimal GC/CFC containing it – is less frequent across languages, and more restricted. While Danish and Russian as well as Icelandic and Gothic allow long binding of complement reflexives to the matrix subject, across infinitive clause boundaries, as in (17), only Icelandic and Gothic, not Danish or Russian, require pronouns in such positions to be free with respect to the matrix clause subject. This is illustrated in (20).

- (20a) Pétur, bað Jens að raka hann, (Thráinsson (1987))
Peter, asked Jens to shave him,
(20b) Þai-ei ni wildedun [s mik þiudanon ufar sis./(*im,)]
who, not they-wanted me to-rule over selves/*them,
"who didn't want me to rule over them"
(Luke 19:27)
- (20c) at Susan, bað Anne_k om [PRO_k at ringe til hende,]
that Susan, asked Anne (for) to ring to self,
(Vikner (1985))

- (20d) Student, poprosil reportera vziať svoj, ego, stakan
The student, asked the reporter to take self's/his, glass
(Yokoyama (1980))

None of the languages in (19) has long-distance disjoint reference for pronouns either. In all of them, pronouns must be free only in their minimal GCs/CFCs. That is, languages which have long-distance Principle B effects appear to be a relatively small subset of those allowing LD binding of reflexives.

I am also aware of no clear cases in which Principle B observes a domain larger than the minimal finite clause containing it. That is, there seem to be no instances of LD disjoint reference operating across the boundaries of subjunctive clauses, analogous to (18).

The question of how this phenomenon of apparent LD binding is to be reconciled with a restrictive theory of locality for anaphors and pronouns is surely the most extensively discussed question in Binding Theory.²⁴ Primarily at issue is the following question: does the observed variation require the assumption that the definition of local domain is parameterized, and that individual languages may choose different values, or does it result from interaction between an invariant definition of local domains and independent differences in the grammars involved? If the former, how are the individual values of the parameter to be characterized, what is the relation among them, and how do language learners arrive at the appropriate value of the parameter for their own language? The literature on this *variation problem* is far too voluminous to be accorded more than superficial treatment here. This section will therefore limit itself to cataloguing (rather uncritically) the main approaches which have been suggested. The reader is referred to the works cited for detailed discussion.

There have been three major types of approach to the variation problem. The first involves the proposal that the characterization of binding domains is simply parameterized – underspecified in certain ways by UG – and that different values may be chosen for individual languages (or, in the view of some investigators, individual lexical items within languages). Such an approach is advocated, e.g. in Yang (1983), Harbert (1986, 1991), Koster (1987a), Manzini and Wexler (1987), and much other work. As an illustration, consider the five-valued definition of Governing Category in (21), from Manzini and Wexler (1987):

- (21) (= M&W 29)
γ is a governing category for α iff γ is the minimal category that contains α and a governor for α and

- (a) can have a subject, or, for α =anaphor, has a subject β , $\beta \neq \alpha$;
 or
 (b) has an INFL; or
 (c) has a Tense; or
 (d) has a "referential" Tense; or
 (e) has a "root" Tense
 (if, for α anaphoric, the subject β' ($\beta' \neq \alpha$) of γ , and of every
 category dominating α and not γ , is accessible to γ).

The English reflexive observes value (21a), according to Manzini and Wexler. It must therefore be bound in the domain of an accessible subject. The Danish reflexive *sig*, on the other hand, observes domain (21c); it must be bound in the minimal tense domain, but may be free in the domain of the subject of an infinitive clause. Icelandic reflexives, as in (18a), are claimed to observe domain (21d). Adopting an analysis originating with Anderson (1982a), Manzini and Wexler propose that such reflexives may be bound across the boundary of a subjunctive complement clause because those clauses, though containing tense marking, have "anaphoric," not "referential" tense; they are dependent on the main clause for their tense interpretation.³⁵ Finally, the Japanese reflexive *zibun* in (19b) observes value (21e) and therefore need be bound only in the root clause.

This type of approach to the variation problem identifies the definition of local domains as the locus of variation. Since variation results directly from different choices for local domains for anaphors and pronouns, it is not predicted to correlate with other syntactic differences between the languages in question. The fact that a grammar assigns a particular local domain to a particular anaphor is not predicted to follow from other properties of that grammar (nor in any general way from other properties of the anaphor in question).³⁶ This, however, is contrary to the general expectation that different choices in parameter values should have widespread effects throughout the grammar. See Hermon (1990).

Two other approaches to the variation problem have gained currency in the past few years. The first of these, to be discussed in section 2.2.2, involves the view that the problem is in part simply a result of the misclassification of non-anaphors as anaphors. A more restricted definition of local domains can be maintained if the forms in, e.g., (18a) are not anaphors in the sense of the Binding Theory. The second approach, to be discussed in section 2.2.3, maintains an invariant characterization of binding domains by relocating variation to other parts of the grammar. A very prominent line of inquiry in this category holds that apparent long-distance binding is in fact the product of abstract

movement of the anaphor into a higher domain, followed by local binding. Some anaphors exhibit apparent long-distance binding because they are subject to successive cyclic movement at LF. Others do not exhibit apparent LD binding because they do not admit such LF movement, or are more restricted in their possibilities for movement. These differences in turn, are claimed to follow from independent differences, either in the forms of the anaphors themselves (for example, whether they are eligible for head-movement), or in other aspects of the grammars involved.

2.2.2 A Fourth Type of Nominal Element?

It is likely that not all members of the traditional category of reflexive pronouns are to be considered anaphors in the sense of the Binding Theory, and therefore that not every observation about the behavior of reflexives need be accommodated by the Binding Theory. So, for example, (22) would clearly seem to involve a non-anaphoric use of the reflexive, since there is no c-commanding antecedent.³⁷

- (22) This paper was written by Ann and myself

However, the boundary between anaphors and non-anaphoric reflexives is not fixed in any pretheoretical way. There is no pretheoretical way of knowing, for example, that the elements involved in the type of non-local binding discussed in the preceding section are anaphors. Some investigators have responded to the problem posed by such cases by claiming that they are in fact not anaphors subject to Principle A, but belong to a different category, subject to a different principle. Anderson (1982a, 17) distinguishes between anaphors, which must be bound in their Governing Categories, and reflexive pronouns, which must be bound in the domain of the subject of an (independently) Tensed S. The Icelandic reflexive in (17a, 18a) is of the latter type. Its failure to observe the SSC in (17a) follows, as does its failure to be bound in the subjunctive complement in (18a), given the assumptions about tense dependencies mentioned above.³⁸

Along similar lines, Giorgi (1983-4) classifies anaphors into two types - [+B(inding) T(theory)] anaphors - those subject to Principle A, and therefore required to be bound in their GCs - and [-BT] anaphors, including the Italian *proprio* and the Icelandic long-distance *sig*, which are not required to be bound in their GCs. [-BT] anaphors are subject to an independent binding condition - presumably also a part of Binding Theory - which requires that they be bound within the P-domains of their antecedents. α is in the P-Domain of β if it is (contained in) a

coargument of β (and β is the thematically most prominent argument in the relevant thematic domain).³⁹ The P-Domain requirement is intended in part to capture an interesting restriction on LD anaphors in at least some languages, which we may illustrate with Icelandic data. While a reflexive in a subjunctive complement clause can be bound "long distance" to the higher clause subject, as in (18a), a reflexive in a subjunctive adverbial clause cannot, as shown in (23a).

- (23a) *Jón, væri glaður ef María kyssti sig,
John, would be glad if Mary kissed self,
(Thráinsson (1976a))

This follows because the adverbial clause, as a non-argument, is not in the P-domain of the main clause subject. Strikingly, however, when the whole sentence in (23a) is further embedded as a subjunctive complement of a verb, as in (23b), the subject of the topmost clause (though still not the subject of the intermediate clause) is a possible binder for the reflexive in the adverbial clause.

- (23b) Jón, sagði að hann væri glaður ef María kyssti sig,
John, said that he would be glad if Mary kissed self,
(Thráinsson (1976a))

According to Giorgi, this is because the reflexive is now within the P-domain of that topmost subject, being contained in one of its coarguments (the object complement).

Giorgi proposes that the P-domain requirement is a default requirement, which holds for [+BT] anaphors too, when these are contextually exempted from Principle A by virtue of not having a GC. Thus, an English reciprocal contained in the subject of an embedded complement clause can be bound to the matrix subject – a coargument of that clause – as in (23c), but a reciprocal contained in the subject of an adjunct clause may not be so bound, as in (23d):

- (23c) They believe that pictures of each other are on sale
(23d) ??They will arrive before pictures of each other are put on sale

2.2.3 Logophors

Possible empirical support for treating some instances of long-distance reflexives as representatives of a nominal type distinct from local anaphors, rather than simply classifying them as anaphors and assuming a multivalued characterization of local domain, is provided by the

fact that they differ from local anaphors not only in allowing binding within larger domains, but also in requirements imposed on their antecedents. It has been demonstrated by Sigurðsson (1986) and Thráinsson (1991) for Icelandic and by Kameyama (1984) for Japanese that the long-distance reflexives in fact need not be bound by a c-commanding binder at all, but may pick up their reference from a discourse antecedent as in (24), where the reflexive does not refer to Maria or Olaf but to the individual whose thoughts are being reported, or from a non-c-commanding antecedent.⁴⁰

- (24a) María, var alltaf svo andstyggileg. Þegar Ólafur_k kæmi, segði hún sér_k áreiðanlega að fara
"Maria was always so nasty. When Olaf_k came she would certainly tell herself_k to leave"
(Thráinsson (1991))

In view of this, it is not clear that they are anaphors in the sense of Principle A after all. The investigators in question identify them instead as *logophors* – members of a class of elements described in detail for Ewe, a Niger–Congo language, by Clements (1975). Ewe has forms distinct from both the strict reflexives and the personal pronouns of that language which are used "to distinguish reference to the individual whose speech, thoughts, or feelings are reported or reflected in a given linguistic context, from reference to other individuals" (1975, 141). Clements notes that constraints on coreference with these forms seem to involve primarily such discourse notions as point of view, rather than syntactic requirements such as c-command. Thus, the logophor *ye* can, for some speakers, be anteceded by *Kofi* in (24b) but not by *Komi*, even though the latter is a c-commanding subject, while the former doesn't c-command the logophor at all. This is because *Kofi*, not *Komi*, is the individual whose speech is being reported.

- (24b) kóm_k xɔ agbalé tso kofi, gbɔ be wò-a-va me kpe
Kwami receive letter from Kofi side that Pro-T-come cast block
na yè_{l/x}
for LOG
"Kwami got a letter from Kofi, saying that he should cast some blocks for him."

Similarly, he points out (1975, 170) that (as is the case with Japanese and Icelandic reflexives) the discourse antecedents for these logophors need not even co-occur with them in the same sentence, but may appear several sentences earlier in the discourse. Thus, the antecedence

requirements of Ewe logophors appear at least not to belong to the syntactic theory of binding at all, but to the discourse component.

It has been recognized for a long time that the occurrence of long-distance reflexives in Japanese and Icelandic is also linked to point-of-view considerations of this type (cf. Oshima (1979) and Thráinsson (1976a)), and identifying them as logophors, rather than anaphors, provides a basis for accounting for a number of their properties. We have already observed that they may have discourse antecedents and (in the case of Japanese, at least) non-c-commanding antecedents. Further, as Maling (1984) notes, the striking contrast between (23a) and (23b) can be derived from the assumption that the reflexive here is a logophor. Only in the acceptable (23b) does it "refer back" to the source of the reported speech, as required. Sigurðsson (1986) argues further that the apparent requirement that the complement clauses in Icelandic be in the subjunctive (for those dialects in which that condition holds) can also be accounted for under the logophoric analysis. Subjunctive is the mood used in indirect reporting of speech and beliefs to indicate that the speaker is not assuming responsibility for the truth of the report, but reporting it from the viewpoint of the source of that speech or belief. It therefore reflects a semantic, rather than a syntactic condition. (For detailed discussion of the rather complex semantics of logophors, see Sigurðsson (1986), Sells (1987).) If instances of long-distance anaphora like the ones illustrated in (18) involve logophors, not anaphors, then the variation problem is potentially reduced. Some investigators, including Reinhart and Reuland (1989), Hestvik (1990) propose that only local binding within CFCs and (apparent) binding into infinitival complements fall within the domain of Binding Theory. All instances of apparent binding across the boundaries of finite clauses involve logophors.

If the antecedence requirements for these forms are in fact discourse requirements, rather than following from the syntactic Binding Theory, then it remains to be determined what their status is with respect to Binding Theory. Assuming that the three principles of Binding Theory exhaustively partition nominals, the only possibility would appear to be that they are pronouns. If they were anaphors, then they would be syntactically bound, and the discourse antecedent possibility would be ruled out. If they were R-expressions, then they would disallow c-commanding argument antecedents. In fact, the conclusion that they are pronouns finds some potential support in Japanese. According to McCawley (1972), sentences like (25), in which *zibun* is bound in a local domain, are marginal or ungrammatical. (Katada (1991) also finds such sentences less than well-formed, but assigns them only a question mark).

- (25) *Yazuka_i-ga zibun_i-o korosita
gangster-Nom self-Acc killed

This is as would be predicted by Principle B if *zibun* were a logophoric pronoun. Such sentences are well-formed in Icelandic, however, where we would have to conclude (as does Maling (1984)) that the logophoric pronoun is homophonous with a local, anaphoric reflexive.

The study of the behavior of logophors is in its early stages, as might be expected of an element so recently identified, and there are still a number of outstanding problems in their analysis. In particular, if the conditions imposed on their antecedents are not a part of the theory of syntax but of the theory of discourse, then we would expect them to be expressed exclusively in terms of the notions appropriate to that theory, and not in terms of syntactic notions. It is not clear that this is true in all cases. In some of these languages there are facts which suggest that the relation between logophoric pronouns and their antecedents must satisfy certain structural conditions when the latter do occur in the same sentence, and some investigators (e.g. Clements (1975), Maling (1984)) have posited that logophors have undergone a partial "grammaticization" in these languages.³¹ Therefore, it is not clear at this point that the antecedence requirements of these forms can be claimed to fall wholly outside of the syntactic theory of binding. Two recent accounts, Enç (1989) and Koopman and Sportiche (1989), attempt to derive the referential properties of logophors primarily from a syntactic Binding Theory, under the assumption that they are operator-bound anaphors.

2.2.4 Core and Non-Core Anaphora

Standard versions of the Binding Theory have assumed that constructions like the one in (26a) are to be accommodated as core cases of anaphor binding – that both here and in (26b) the reflexive is bound in its local domain.

- (26a) They_i bought [those pictures of themselves]_i.
 (26b) They_i hurt themselves_i.

However, Bouchard (1982) and Lebeaux (1983, 1984–5) have pointed out that "picture-noun reflexives" like the one in (26a) seem to have properties which are different from those of still more local reflexives like (26b), involving the syntactic requirements imposed on the binder. As (27a) shows, the former but not the latter admit *split antecedents*.

- (27a) John_i showed Mary_k these pictures of themselves_[i, k]
 (27b) *John_i told Mary_k about themselves_i

Moreover, as (28) shows, the former, but not the latter, allow non-c-commanding antecedents:

- (28a) John_i's campaign required that pictures of himself_i be placed all over town
 (28b) *John_i's campaign exhausted himself_i (Lebeaux (1984-5))

They also differ with respect to their interpretation in VP-ellipsis contexts, where core anaphors allow only a *sloppy identity* interpretation, while non-core anaphors also allow a *strict identity* reading. These contrasts have been variously interpreted. If uniqueness of antecedents and c-command are conditions on anaphor binding, then they would seem to indicate that picture-noun reflexives are not strict anaphors after all. This is the position taken by Bouchard (1982). Bouchard proposes that the local domain for anaphors is the minimal maximal projection containing it, and claims that reflexives such as the one in (26a) which are bound in larger domains are "false anaphors," in fact belonging to the category of pronouns. If they are not anaphors, it remains to be explained why they nonetheless require an antecedent, since that requirement can no longer follow from Principle A. Reinhart and Reuland (1989), adopting a position similar to Bouchard's, answer this question by identifying them as logophors, of the type discussed in the preceding section, or, more accurately, as logophoric uses of the reflexive. When an anaphor is an argument of a syntactically saturated predicate, it must be bound within the theta domain of that predicate, as in (26b).³² Where it is not the argument of such a predicate, as in (26a) the reflexive need not be bound, but may pick up reference as a logophor in case the language in question allows logophoric use of reflexives. The relaxation of the strict c-command and other requirements characteristic of local binding are due to the fact that no syntactic binding is involved.

A second approach, advocated in Lebeaux (1984-5), assumes that both types of reflexives in (26) are anaphors, and that therefore the c-command and uniqueness-of-antecedent requirements are not a part of the definition of binding. To satisfy Principle A, anaphors are only required to be referentially dependent within their local domain – not necessarily coindexed with a unique, c-commanding antecedent. The stricter requirements in evidence in (27b), (28b) are due to Predication Theory: when the minimal maximal phrase containing an anaphor is a predicate predicated of the antecedent of the reflexive, as is the case in

(26b), then the anaphor is not only bound, but "bound by predication," and, in addition to satisfying Principle A, it must satisfy the stricter requirements of predication coindexing. These include c-command and uniqueness of antecedent. On the other hand, when not contained within such a predicate, as in (26a), an anaphor must meet only the less restrictive coindexation requirement imposed by Binding Theory.

The reader is referred to Hestvik (1990) for further interesting discussion of the contrast between *core* and *non-core binding*. The characterization of core domain in Bouchard (1982) differs from that in Hestvik (1990) and Reinhart and Reuland (1989). Bouchard characterizes it in terms of government, while Hestvik and Reinhart and Reuland characterize it in terms of θ -grids. The two approaches make different predictions about the status of binding in the ECM case in (29):

- (29) They believed [themselves to have won]

Bouchard would predict that this is an instance of core binding. The reflexive is bound in the matrix clause – the domain containing its governor. However, the other accounts would predict, all other things being equal, that it is an instance of non-core-binding, since the embedded IP is the complete theta-domain defined by the embedded verb. Reinhart and Reuland negate this result by claiming that the matrix and the embedded predicates in such constructions are amalgamated into a complex predicate, of which the ECM subject is an argument. Hestvik (1990, 222), on the other hand, accepts the result, and presents an argument based on VP-ellipsis interpretation that (29) does involve non-core binding.

2.2.5 Anaphors and LF-Movement

As we have seen, the idea that anaphors raise to higher positions (in particular, to INFL) was advanced by Lebeaux (1983) and Chomsky (1986b) to account for certain restrictions on anaphors in specifier positions, including the NIC case for reflexives. It was proposed that such abstract anaphor movement leaves traces which are subject to the ECP, and are therefore precluded from occurring in non-properly governed positions. Another effect of such movement, however, is that it reduces the distance between the anaphor and potential antecedents in higher domains. This raises the possibility that some apparent instances of long-distance binding might be reinterpreted as local binding, under the assumption that locality between the anaphor and the binder is established by such abstract movement.

The first to explore this possibility was apparently Pica (1987), and

the idea has been extended by a number of investigators. Pica started out from two observations about the typological properties of anaphors which may be long-distance bound – i.e. bound in apparent violation of the SSC. First, they seem in general to be subject-oriented – that is, they do not allow object antecedents (a fact also noted in Giorgi (1983–4), Chomsky (1986b)). Second, as noted, they tend to be monomorphemic. So, for example, the Danish reflexive *sig*, which can be bound across the subjects of infinitive clauses, as in (30a), is morphologically simple, and allows only subject antecedents, as shown in (30b).

(30a) Peter_i hørte [Anne_k omtale sig_i]
Peter_i heard Anne_k mention self_i
(Vikner (1985))

(30b) *Jeg fortæller Hans_i om sig_i
I tell Hans_i about self_i.
(Pica (1987))

(Interestingly, *sig* also cannot be bound to a subject within its own clause either, as seen in (30c):

(30c) *Peter_i fortalte Michael_k om sig_i
Peter_i told Michael_k about self_i.

Possible accounts for this disjoint reference property will be taken up in section 3.1.)

On the other hand, the reciprocal of Danish is bimorphemic, allows object antecedents, as in (30d), and does not allow binding in violation of the SSC.

(30d) Jeg fortæller dem_i om hinanden_k
I tell them_i about each other_k.

Similarly, Danish has a compound reflexive, consisting of *sig* plus the morpheme *selv*, which does not admit long-distance binding, as seen in (30e).³³

(30e) *Peter_i bad Michael_k om [PRO_k at barbere sig_i selv_i]
Peter_i asked Michael_k to shave self_i

Pica proposes an account for this apparent clustering of properties along the following lines: all anaphors, he claims, raise at LF. The landing site for this movement, however, is dictated by the internal structure of the anaphor. He claims that *sig* and similar monomorphemic

anaphors can be viewed as X⁰'s directly dominated by X^{max}, and proposes (note 5) that a maximal phrase exhaustively dominating its lexical head is able to assume the status of its head – i.e. to move by head-to-head movement. Thus, reflexives of this type can raise to an INFL adjunction position, by head-to-head movement, and in fact must do so in order to be interpreted.³⁴ The subject-orientation of these anaphors is partially accounted for by this assumption: only subjects are possible binders for them because, having moved to INFL they are now c-commanded only by [Spec I], the subject position – not by object NPs within VP.

On the other hand, morphologically complex anaphors, like the Danish reciprocal and the compound reflexive are viewed as phrasal – as XP anaphors. As such, they are unable to undergo head-to-head movement. When moved, they can only adjoin to the phrase containing them. This accounts for the fact that they are not necessarily subject-oriented, since after adjunction to VP (or PP) the reciprocal in (30d), for example, is still c-commanded by the object NP, given an appropriately modified definition of c-command.

Pica also proposes that the observed restriction of LD binding to "simple" reflexives can be derived under this account as well, in the following way: X⁰ anaphors, having been moved to the INFL of an embedded clause, are still in the domain of the subject of that clause, which is therefore their only possible binder.³⁵ However, if the C⁰ position governing the embedded IP is empty – a condition satisfied just in case the embedded clause is subjunctive or infinitival – then the X⁰ reflexive can continue to move up by head-to-head movement from I to C. This step removes it from the domain of the embedded subject, and makes it accessible to other potential binders. These do not include the object of the matrix clause, however; since the X⁰ anaphor must be interpreted in INFL, it cannot stop in C⁰, but must continue to move, into the matrix I⁰ (by way of adjunction to the matrix verb), where it is c-commanded only by the matrix subject. The derivation involved is represented schematically in (31):

(31) [NP_i REFL_i-I⁰ V⁰ NP_j] [C⁰ NP_k I⁰ t_j]

From this it follows that long-distance binding is possible only out of subjunctive or infinitive clauses (since only these have empty C⁰s), that long-distance anaphors are subject-oriented, and that long-distance binding is possible only for X⁰ anaphors. No similar escape route from embedded CPs is allowed for XP anaphors.

Pica notes, however, that there are anaphors meeting all of the criteria for X⁰ anaphors which nonetheless do not allow long-distance binding. So, for example, the reflexive *se* of the Romance languages

is subject-oriented, monomorphemic and, in fact, undergoes overt adjunction to INFL in the syntax, yet it cannot be long-bound. Like all X^0 anaphors, according to Pica, it undergoes head-movement to the lower clause INFL. However, further movement to C^0 – the crucial step for long-distance binding – is not available, Pica speculates, because it is only possible for elements which are in some sense “pronominal” as well as anaphoric. *Se* does not qualify, and is therefore only locally bound. Pica claims that this explains why long-distance anaphors, like the Danish *sig*, exhibit such non-core properties as strict identity interpretation under VP-ellipsis, which Pica identifies as pronominal properties.

Numerous investigators have pursued Pica’s suggestion that apparent long-distance binding can be reduced to local binding in the wake of LF movement. See the references in section 2.2.6, for example. A particularly systematic and detailed development of these ideas is found in Hestvik (1990). Hestvik claims that XP-anaphors move to the Specifier position of their governors, rather than adjoining to the projections of those governors. From this assumption, the SSC effect observed by such anaphors, illustrated in (10g) (repeated) is accounted for directly: these anaphors cannot move out of the containing phrase, and therefore out of the domain of the subject of that phrase, since the subject, as a specifier, blocks movement.³⁶

(10g) They_i read [Mary’s books about *each other_i/them_i].

He also points out that the assumption of LF movement of anaphors obviates the need for extending the local domain for anaphors beyond the minimal CFC by means of such provisions as the Accessibility condition or the BT-Compatibility provision. Suppose that the domain of an anaphor (or pronoun) is simply the minimal CFC containing it. In (10h) (repeated), the pronoun satisfies Principle B in situ, and therefore need not move farther. The anaphor cannot satisfy Principle A at S-Structure, since there is no possible binder in its minimal CFC. However, at LF, it can raise to a higher Spec – the Spec of VP, where it can be locally bound to the clausal subject. If anaphors can undergo abstract movement in this way, and be bound after movement, the BT-Compatibility computation is no longer needed.

(10h) They_i sold [their_i/each other’s_i books]

Hestvik points out that the LF movement analysis can be extended to cover cross-linguistic differences in disjoint reference domains for

pronouns, as well. Consider the contrast between English and Norwegian illustrated in (32):

(32a) John_i likes [his_i toys]
(Hestvik (1990))

(32b) *John_i liker [hans_i leker]

In (32a), the pronoun, since free in the minimal CFC containing it, can corefer with the clausal subject. In the Norwegian example (32b), however, *hans* cannot corefer with *John*. This can be explained, according to Hestvik, if we take *hans* (unlike *his*) to be an X^0 pronoun which obligatorily raises to INFL at LF. Such movement has the effect of extending the domain in which it must be free, since after movement it is no longer separated from the clausal subject by a CFC boundary. This will also account for the “anti-subject” orientation exhibited by long-distance *hans*. As (32c) shows, *hans* need only be disjoint in reference with the subject, not the object, of the containing clause.

(32c) John_i fortalte Ola_k om [hans_{-i/k} kone]
John_i told Ola_k about his_{-i/k} wife

Having raised to INFL, *hans* is only c-commanded by the subject, not the object, and therefore only coindexing with the subject will result in illicit binding of the pronoun within its domain.

Note, however, that *his* and *hans* do not differ in terms of their morphological structure. Both are monomorphemic. Therefore, as Hestvik points out, extending the XP/ X^0 typology to these cases will require the identification of different criteria for distinguishing the two types. Hestvik proposes that XP pronouns and anaphors are *pro*-XPs – pronouns exhaustively and directly dominated by an XP node, which lacks internal structure, while X^0 pronouns are X^0 elements which head XP phrases. The contrast is represented in (33):

(33a) [_{XP} he]

(33b) [_{XP} [_{X⁰} han]]]

While the Norwegian pronoun is available to X^0 movement, since there is an X^0 level of structure, X^0 movement cannot apply to the English pronoun in (33a) in principle, since there is no X^0 on which it could operate. Hestvik supports this claim of different internal structure for the two types of pronouns by noting that the English pronoun, but not the Norwegian one, strongly resists modification, as shown in (34):

(34a) Han med røtt hatt

(34b) ??He with the red hat

Given the absence of internal structure in (33a), there is no place for such modifiers. There is an apparent problem with the account offered by Hestvik for long-distance disjoint reference, however. As we have noted, the pronoun in (32c) need not be disjoint in reference with the object, because it is not c-commanded by the object after LF movement to INFL. The question arises whether in some constructions disjoint reference with higher subjects might not similarly be avoided by "jumping over" the subject in question, so that it no longer c-commands the pronoun at LF. Such a case might arise in a structure like (35), for example, where all of the INFL's are infinitival.

(35) [NP_i INFL₁ ... [NP_j INFL₂ ... [NP_k INFL₃ ... pron ...]]]

All other things being equal, it would appear that the pronoun could successive-cyclically raise to the highest INFL, INFL₁. It would then be required to be free only with respect to NP_j, since this is the only NP which c-commands it. This result is incorrect, however. In such cases the pronoun may not corefer with NP_j or NP_k, either. To prevent this outcome, Hestvik (1990, 181) suggests that pronouns cannot move successive-cyclically at LF, but only to the first possible landing site, and proposes a possible way of deriving this condition. This, too, however, makes a problematic prediction. In such a case, the pronoun would stop in INFL_j, the lowest functional head in which it can be interpreted. The CFC containing it would be the most deeply embedded clause, and the effect of long-distance disjoint reference of the type found, e.g. in (20a) (repeated) from Icelandic, would be lost:

(20a) Pétur, bað Jens að raka hann, (Þráinsson (1987))

Peter, asked Jens to shave him.

2.2.6 Long-Distance Binding in Chinese

An LF-Movement analysis was independently suggested by Battistella in preliminary versions of the work published as Battistella (1989) for apparent long-distance binding in Chinese, and the idea has subsequently been pursued by a number of investigators, including Cole, Hermon, and Sung (1990), Cole and Sung (1991b), Huang and Tang (1991). The Chinese case has some properties, pointed out in Tang (1985), which make it particularly interesting. As (36a) shows, Chinese

has two reflexives – *ziji* and the compound *ta-ziji*. The latter consists of *ziji* plus the third person pronoun *ta*. *Ta-ziji* can be bound only by the subject of the lower clause. *Ziji*, however, can be bound either by that subject or by the subject of the topmost clause (though interestingly not by the subject of the intermediate clause).

(36a) Zhangsan, yiwei Lisi, zhidao Wangwu, bu xiangxin
Zhangsan think Lisi know Wangwu not believe
ziji_i/ta_i/ta-ziji_k/yi_i
self
 (Battistella (1989))

Significantly, however, as noted by Tang (1985, 1989), for many speakers the possibility of long binding of *ziji* is blocked if any intervening clause has a subject distinct in person from the binder. In (36b), for example, *ziji* cannot be bound to *Zhangsan* because the intermediate clause has a non-third-person subject.

(36b) *Zhangsan, zhidao wo (ni) juede Lisi dui ziji, mei
Zhangsan knows I (you) think Lisi toward self not
xinxin
confidence
 "Zhangsan knows I (you) think that Lisi has no confidence in himself"
 (Tang (1985))

Tang and Battistella point out that the existence of these *Blocking Effects* argues strongly against assuming that *ziji* is simply a long-distance anaphor, i.e. one which observes a very unrestricted value for a hypothesized Governing Categories parameter. It is not clear why a truly long-distance anaphor should be sensitive to the person features of intervening subjects. They propose, rather, that the observed blocking effects are evidence of successive-cyclicity. Tang develops a successive-cyclic reindexing account for these facts. Battistella argues that *ziji* undergoes successive cyclic raising into the matrix clause, followed by local binding to the matrix subject. In Battistella's account, the person features of *ziji* are permanently fixed at D-structure. It is then raised successive-cyclically through INFL-to-INFL movement, leaving traces in each INFL through which it passes. These traces share the person features of *ziji*, since they are a part of the same chain. As nominal features in INFL, the person features of these traces are in turn treated as Agreement features and become involved in abstract agreement between INFL and its Specifier. The blocking effects follow from this.

If an anaphor with third-person features has been raised successively cyclically into the topmost clause, where it can be locally bound by the subject of that clause, then all of the INFL positions through which it has passed contain copies of its person features, and the feature matching required by subject-INFL agreement prevents the subjects of those INFLs from bearing non-third-person features.³⁷ Battistella also notes that the INFL-raising analysis predicts the general subject orientation of *ziji*, as discussed in the previous section. To insure that the binders of LD *ziji* are root subjects, not intermediate subjects, however, he is required to stipulate that INFL-to-INFL movement, if it applies at all, is obligatory.

This line of analysis is pursued in Cole, Hermon, and Sung (1990), and other papers by Cole and Sung (1991a, 1991b) which are concerned with the typological properties of the languages allowing such successive cyclic movement of anaphors.³⁸

Huang and Tang (1991), however, take a somewhat different approach to the LF-movement analysis of *ziji*. In their account, too, locality is established between the reflexive and its antecedent by abstract successive-cyclic movement at LF, but they claim that the movement involved is XP-movement – in particular, adjunction to IP. As noted by Barss (1986), overt IP-adjunction of anaphors (or phrases containing them) in English creates new binding possibilities. Thus, in (37a) but not (37b), *John*, as well as *Bill*, is a possible antecedent for the reflexive.

(37a) John knows that [_{NP} pictures of himself] Bill likes t

(37b) John knows Bill likes [pictures of himself]

The former interpretation is the one of immediate concern here.³⁹ Since the reflexive has been moved out of the domain of the lower subject, the higher subject comes into consideration as a potential binder. Huang and Tang claim that the possibility of binding *ziji* to higher subjects results in essentially the same way, except that the IP-adjunction takes place at LF, and is therefore invisible.

It remains to be established why *himself* in (37b) cannot similarly undergo LF adjunction to IP, giving the appearance of long-distance binding. Huang and Tang claim that it is because *himself*, unlike *ziji*, has overt phi-features (in this case, person and gender). *Ziji* has no inherent person/number features, but depends on its antecedent for those features, as well as its referential features. Huang and Tang exploit this difference in the following way: They claim that an anaphor must be bound at S-Structure with respect to at least some set of features. *Himself* is not dependent on an antecedent for its phi-features; they are an inherent part of its lexical form. It must therefore be bound with

respect to its referential features, in order to satisfy the S-Structure binding requirement. *Ziji*, on the other hand, is dependent on binding for both sets of features. It can therefore satisfy the S-Structure binding requirement by having its phi-features determined at S-Structure, through binding to the local subject. Its referential features remain free to be fixed by binding at LF after successive-cyclic movement. Thus, the crucial difference between *ziji* and *himself* is claimed not to be that one is phrasal and the other is non-phrasal, but rather that one has overt number/person/gender features while the other does not. The claim that the phi-features of *ziji* are fixed by binding at S-Structure also plays a role in the explanation of blocking effects, in Huang's and Tang's analysis.

Cole and Sung have defended the head-movement account against this alternative XP-movement account in two recent papers (1991a, 1991b). Space does not permit us to review the details of the debate here, and the interested reader is referred to those two papers, as well as Huang and Tang (1991).

Katada (1991) has also advanced a successive-cyclic XP-movement analysis for Japanese *zibun*. He notes that Japanese has three "reflexives," each with distinct properties. *Zibun* is subject-oriented, and may be bound long distance. *zibun-zisin* is subject-oriented, but may only be locally bound. *kare-zisin* is non-subject-oriented and locally bound. This system is parallel in its properties to the three-member system *seg, seg selv, ham selv* found in Norwegian, as well as three-member systems found in other languages, and Katada proposes a common account for all of them, based on a distinction between *operator* and *non-operator anaphors*. *Zibun* is an operator anaphor, which must be moved at LF to an A-bar position, assumed to be a VP-adjunction position. Since Katada assumes subadjacency not to apply at LF, and takes lexical government to be sufficient to satisfy the ECP at LF (both controversial assumptions), *zibun* may adjoin directly to any higher VP, resulting in subject-orientation (given an appropriate definition of c-command) and the appearance of long-distance binding. *Kare-zisin* is a non-operator anaphor, which does not move at all, and is therefore locally bound, and not subject oriented. It is suggested that this difference is connected with the fact that *zibun*, but not *kare-zisin*, is invariant, lacking overt phi-features. The *zibun* element of *zibun-zisin* is an operator anaphor and must therefore raise. It can only raise to the lowest VP, though, since (a) its trace is in a non-lexically governed position, and therefore requires antecedent government, and (b) successive-cyclic movement is not allowed at LF. (Local) subject orientation follows from the fact that after VP-adjunction it is not c-commanded by any NP but the local subject.

2.2.7 Some Non-Movement Approaches

As seen in the preceding sections, the prevailing approaches to the variation problem and the locality problem have been (a) the assumption of a multivalued "free-choice" Governing Category parameter, and (b) the assumption of an invariant characterization of Governing Category, coupled with the assumption that locality can be established through abstract movement of the anaphor in some cases. These have not been the only proposals, however. I will mention here a few others.

Progovac (1991) agrees with Battistella and others that only monomorphemic reflexives admit long-distance binding, and she adopts their position that this is connected with the possibility of construing these as X^0 s, while polymorphemic reflexives can only be interpreted as XP's. However, she proposes that certain apparent problems with the movement analysis can be avoided if, instead of attributing different possibilities for movement to the two types of reflexives, we relativize the definition of local domains to the type of anaphor involved. SUBJECT, as defined in (13b) above, has two possible realizations: AGR – an X^0 element – or a subject nominal ([NP, XP]) – a phrasal element. Progovac proposes that the phrasal instance of SUBJECT counts as a potential SUBJECT only for phrasal (XP) anaphors. Thus, no X^0 anaphor should be subject to the SSC effect. Conversely, she argues that AGR, the X^0 instance of SUBJECT should not count as a potential SUBJECT for XP anaphors, but only for X^0 anaphors. The former therefore do not observe the TSC/PIC effect. This assumption makes it possible to eliminate the i-within-i provision.⁴⁰

Everaert (1988) maintains an invariant characterization of local domains, defined in terms of Government Chains. In order to be bound, the anaphor and its binder must be contained in the same Government Chain, where Government Chains may be approximately identified with the G-Projections of Kayne (1983b), with additional licensing and identification requirements between the links in the chain. Phrase structure differences between languages affect the possibility of defining such Government Chains for anaphor/antecedent pairs, yielding the appearance of variation in binding domains.

3 Some Further Types of Pronominals

3.1 Pronominal Anaphors

As illustrated by the examples in (30), Danish *sig* must be bound. In this respect, it behaves as an anaphor. Significantly, however, its binder

not only may but must occur outside of the minimal CFC/minimal subject domain containing it. In this respect, as Vikner notes, it behaves like a pronoun, since there is a minimal domain in which it must be free. Cross-linguistically, elements exhibiting this seemingly exotic behavior are not infrequent. They have been claimed to occur, for example, in Malayalam (Mohanan (1982)), Greek (Iatridou (1986)), and Dutch (Huybregts (1979)).⁴¹ As noted above, Japanese *zibun* too seems to exhibit obviation behavior within minimal domains for some speakers. The question that arises is what the status of these elements is with respect to the Binding Theory. Some investigators (e.g. Huybregts, Iatridou) have suggested that they represent a distinct category of nominal, to be covered by a separate binding principle. In fact, though, it is not clear that this is necessary, since the properties they exhibit, viz. the requirement that they be bound in some domain and the requirement that they be free in some domain, are after all the definitional properties of anaphors and pronouns respectively. Suppose that they are simply anaphors and pronouns simultaneously. This is of course the status Chomsky (1981) attributed to the element PRO, to insure that it would occur only in ungoverned positions. Since it cannot be both free and bound in the same domain, it can satisfy these conflicting requirements only vacuously, by occurring in a position in which no local domain can be defined for it. On the other hand, if the domains for Principle A and Principle B have variable values, then the possibility arises that a pronominal anaphor could be free in some domain, satisfying the latter, and at the same time bound in a larger domain, satisfying the former under the choice of a less restricted domain. This would describe the behavior of the elements under discussion in this section. As will be seen in section 5.1, such a possibility would have serious consequences for the PRO theorem, however, and it is ruled out under a strict interpretation of the Binding Theory of Chomsky (1986b).

An interesting alternative characterization of these elements is developed in Hestvik (1990). Hestvik proposes that the pronoun/anaphor distinction ($\neq p, \neq a$) should be replaced by a categorization based on the feature [$\pm b$ (ound in local domain)], where the definition of local domain, as noted, is assumed to be invariant. Anaphors are [+b], while pronouns are [-b]. All pronominals are specified for two values for this feature – one for S-Structure and a second for LF. The two specifications, moreover, need not coincide. It is possible for an element to be specified [-b] at S-Structure, for example, but [+b] at LF. Such a specification would characterize pronominal anaphors. An element with these feature values could not have a local binder at S-Structure, so it would have to be free in its local domain. At LF, however, it would have to acquire a local binder through movement into a higher domain.

3.2 The Dogrib Anti-Anaphor

Dogrib, an Athabaskan language of Canada, as described by Saxon (1984 and later work), contains a pronominal form, *ye*, with unusual referential properties. *ye* must be disjoint in reference with a c-commanding clausemate subject, as in (38a), though it may corefer with the subject of a higher clause.

- (38a) John_i ye_e-hk'è ha
John him-3.shoot FUT
 "John is going to shoot him"

With respect to its disjoint reference property, therefore, *ye* behaves like a pronoun. Unlike pronouns, however, it requires the presence of a local c-commanding argument, like *John* in (38a), even though it is not bound by that argument but interpreted as disjoint in reference with it. (38b), in which *ye* occurs without such an "anti-antecedent," is ill-formed:

- (38b) *ye-zha shèeti
his son ate

Therefore, *ye* also resembles anaphors in that it requires the presence of a c-commanding local argument. Enç (1989) argues that we can capture this resemblance only by abandoning the idea that the local antecedence requirement imposed by Principle A is a binding requirement. The local licensing of anaphors, in her view, involves a strictly syntactic relationship, and is independent of any particular semantic content (cf. also C. Roberts (1985) for a similar suggestion). Both reflexives and *ye* are syntactic anaphors, subject to Principle A. Both must therefore be licensed by a local "antecedent" in an argument position. The relationship between the licenser and the anaphor, however, does not involve reference. Coreference properties result from additional specifications with respect to two other features – [$\pm B_e$], which determines whether the form is semantically (A or A-bar) bound, and [$\pm ID$], which determines whether the licenser and the binder of the form are identical. A redundancy rule insures that licensed elements are also [$\pm B_e$]; they must be bound either by an argument in A position or by an operator in A-bar position.¹² Reflexives are specified as A-bound, and, further, as [+ID]. The binder and the local licenser are therefore identical. The fact that the syntactic licenser is also the semantic binder for reflexives follows indirectly from positive specifications for these two features. The Dogrib anti-anaphor, on the other hand, is specified as [+L, +B_A']

-ID]. In (38a), the subject *John* is required as a local licenser for *ye*. *John* is not the binder of *ye*, however, since it is not in an A' position; the binder of *ye* is an empty operator in [Spec C]. This operator, moreover, must be contra-indexed with *John*; otherwise, *ye* would be A-bound by *John*, rather than A'-bound, as required, taking the binder of an element to be the most locally c-commanding element with which it is coindexed. Enç proposes that local disjoint reference requirements ("Principle B effects") arise in this way in general: pronouns which exhibit such effects are A'-bound elements. They count as bound by A'-elements only if not coindexed with more local binders in A-positions, and therefore they must be A-free in the minimal domain containing a possible A'-operator position.

Enç observes that her feature system yields seven non-contradictory possible combinations, and argues that all of these are attested. Pronominal anaphors of the type discussed in the preceding section, as well as logophors, are integrated into this system. The reader is referred to her paper for discussion, as well as arguments for the particular features proposed.

4 Some Notes on the Status of Disjoint Reference Principles

Under Enç's analysis the local disjoint reference property of pronouns is not directly stipulated, but derives instead from the definition of binding. They are A-bar bound, as required, only if their most local binder is in an A-bar position. Other proposals for deriving disjoint reference requirements from independent considerations have been advanced in Reinhart (1986), Burzio (1988) and Fanselow (1989). Reinhart proposes that Principle C can be eliminated from the theory of grammar since its effects are derivable from Grice's Maxim of Manner, requiring utterances to be as explicit as conditions permit. Her claim is that "when syntactically permitted, bound anaphora [construed to include bound pronouns – WEH] is the most explicit way . . . to express coreference," and failure to use it where possible leads to the pragmatic inference that coreference was not intended. Thus, the ill-formedness of (39a, b) in the indicated readings is a matter of pragmatics, rather than grammar.

- (39a) *He_i thinks that John_i is crazy
 (39b) *John_i thinks that John_i is crazy

This proposal is criticized in Lasnik (1991) on a number of grounds, including the observation that Principle C effects hold even in cases where fully equivalent sentences with bound pronouns are not possible, as in the case of the anaphoric epithet in (40a) and cases of overlapping reference like (40b):

- (40a) *John_i thinks I admire the idiot_i.
 (40b) They told John to visit Susan

In (40a), coreference is precluded even though no semantically equivalent bound anaphor can substitute for *the idiot*. In (40b), *they* cannot be understood as including either *John* or *Susan*, even though neither can be replaced by a bound anaphor.

Some of these arguments would seem to apply as well to the more recent attempt by Burzio (1988) to derive disjoint reference effects from a principle of Morphological Economy (ME), requiring that a bound NP be maximally unspecified. Reflexives are claimed to be underlyingly featureless, and therefore less morphologically marked than pronouns.⁴³ ME requires that they, rather than pronouns, be used where the relevant locality principle on reflexives allows. Burzio's proposal is intended in part to capture the observation (also remarked upon by Thráinsson (1976b)) that pronouns are subject to disjoint reference requirements just in case there exists a corresponding reflexive. Thus, the use of the pronoun yields a Principle B violation in (41a), but not in (41b) from Icelandic, which has no distinct reflexive forms in the first or second person.

- (41a) *I like me
 (41b) Eg_i hata mig_i.
 I_i hate me_i
 (Thráinsson (1976b))

Under this proposal, Principle B effects arise only when a less specified alternative than the pronoun (i.e. a reflexive) is available.⁴⁴ Again, however, if disjoint reference requirements followed entirely from this principle, we would expect that bound pronouns should be possible wherever reflexives are prohibited. This appears not to be correct. As Lasnik notes, both reflexives and bound pronouns are excluded in sentences like (42a,b).

- (42a) *We like me / myself
 (42b) *John and Mary like him / himself

Such examples again serve to show that disjoint reference principles cannot simply be viewed as "elsewhere" conditions.

As a further argument against the reduction of Principle C to a pragmatic principle, Lasnik notes that the equivalent of (39b) is well-formed in some languages, including Thai and Vietnamese. If the ill-formedness of this sentence in English is a matter of pragmatics, this would be an unexpected result, given the presumed universal applicability of pragmatic principles. On the other hand, if grammatical principles are involved, it can be accommodated by assuming that the relevant principle is parameterized in the appropriate way.

(39a) remains ill-formed in Thai, and Lasnik proposes on that account that Principle C effects are the result of a complex of two overlapping principles. One of these is the (apparently parameterized) requirement that names be R-free, which rules out English (39b) but not its Thai equivalent. The second is a prohibition against binding of more referential expressions by less referential ones, which rules out (39a) in both languages.

5 Binding Theory and Empty Categories

In a highly modular theory, questions about how to delimit the domain of responsibility of individual subtheories arise as a matter of routine. They have been very much in evidence in connection with the role of Binding Theory in determining the distribution and interpretation of empty categories. The following sections provide a brief outline of selected debates concerning the status of null elements with respect to Binding. Section 5.1 treats the base-generated null arguments PRO and *pro*, and section 5.2 treats traces – empty elements arising through movement.

5.1 Binding Theory and Null Pronominals

5.1.1 PRO

Sentence (43a) contains two verbs – the matrix verb *try* and the embedded verb *win* – each of which assigns a subject theta-role. It follows from the Projection Principle, which requires a one-to-one mapping between arguments and theta-roles at all levels, that both subject positions be occupied by arguments at D-Structure. Since the infinitival subject position is not occupied by an overt argument, we are led to