

## CAN MINIMALISM MEET BINDING THEORY?\*

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### 1.0 INTRODUCTION

Chomsky (1993) proposed a Minimalist Program for generative syntax. This Minimalist program diverges from the Principles and Parameters theory in some fundamental ways, some of which are:

- S-structure and D-structure are eliminated as levels of representation.
- Representational conditions on wellformedness operate only at the so-called "interface" levels PF and LF
- Phrase-structure building and movement operations are instances of generalized transformations
- Among a set of possible (converging) derivations for a sentence the most economical one blocks all other derivations
- Movement is driven by the need for checking of morphological features.

It must be emphasized, though, that this minimalist framework as of yet is a research program, not a full-blown theory. Many constructions and problems that have received a fairly neat analysis in the Principles and Parameter approach are open for investigation again, and there is a great amount of problems and open questions that need to be addressed.

Among the issues that need to be dealt with is how to formulate what is known in GB as "Binding Theory" within the Minimalist Program, and this will be the topic of this paper. In the first section I want to show that Chomsky's view on the role of Binding Theory in the minimalist framework as expressed in Chomsky (1993) leads to problems. In the second section I present a tentative general approach to Binding Theory within the Minimalist Program, employing the mechanism of FORM CHAIN, and conditions on chains and on economy of representation.

### 2.0 CHOMSKY'S VERSION OF THE BINDING THEORY IN THE MINIMALIST PROGRAM

At the end of Chomsky (1993) there is a short passage on Binding Theory, and its place in the Minimalist Program. Chomsky claims that Binding Theory should only hold at LF, a necessary consequence of the Minimalist approach and its lack of any level of representation corresponding to D-Structure or S-Structure. Chomsky presents what he calls a "very simple interpretive version of Binding Theory" (Chomsky 1993:43):

- A. If alpha is an anaphor, interpret it as coreferential with a c-commanding phrase in D
- B. If alpha is a pronominal, interpret it as disjoint from every c-commanding phrase in D
- C. If alpha is an R-expression, interpret it as disjoint from every c-commanding phrase

He further comments that condition A may be dispensable under a movement theory of anaphors, and that "all indexing could be abandoned" (Chomsky 1993:43).

In my opinion each of these assertions is questionable, and in the remainder of this section I will present some problems with this approach.

Consider first the fact that Binding theory is reduced to an "interpretive" mechanism. Interpretive mechanisms in the Minimalist approach should operate on the level of LF, that is, right at the conceptual-intentional interface. Interpretive operations are not syntactic in nature, they presumably operate on the output of syntax. They may refer to syntactic structure present at the interface level, and they should not vary cross-linguistically. The formulation of the first two of the three binding principles in Chomsky (1993) contains a "domain D," that is left unspecified. If

Binding Theory is interpretive in nature, this domain D has to be uniform cross-linguistically. This in itself is not a problem: much recent research in Binding Theory has focused on eliminating the need of language-specific domain formulations such as those in Manzini & Wexler (1987). It should be noted, however, that it is suspicious to augment interpretive operations with syntactic locality restrictions. This introduces a fair amount of redundancy: locality plays a central role in the computational system and possibly in conditions on syntactic objects like chains. Syntactic locality in the Minimalist Program is at least in part derivable from economy of derivation and representation. If syntactic locality is also part of interpretive operations, where it is not related to syntactic computation, the relation between locality and economy becomes unclear. In other words, syntactic locality should be a property of the computational system, but not of post-syntactic interpretive mechanisms.

Turning next to a movement analysis of anaphors, another problem - long noted in the literature - emerges. Anaphor movement, which relates the anaphor to its antecedent by movement to a position close to the antecedent (either adjunction to a maximal functional projection or to a functional head) has been argued for in much of the literature on Binding Theory such as Lebeaux (1983, 1984), Pica (1987, 1991), Battistella (1988), Cole/Hermon/Sung (1990), Hestvik (1993), Cole/Sung (1994), to name just some. Anaphor movement analyses face one immediate problem, though: Both long-distance and local anaphors are remarkably immune to movement islands such as adjunct islands, subject islands and coordinated structures as shown in (1)-(8) from English, Icelandic and Chinese:

**English:**

the anaphor is in an adjunct island

- (1) John saw a snake near himself (OK for some speakers, questionable for others)

the anaphor is in a coordinated structure:

- (2) John washed the cat and himself

the anaphor is in a subject island:

- (3) John and Mary think that each other's cars are junk

**Icelandic long distance anaphors:** (Thrainsson (1991)):

the anaphor is in an adjunct island:

- (4) Jóni sagði [að hanni yrði glaður [ef þú hjálpaðir sér]]  
John said that he would be glad if you helped self

the anaphor is in a relative clause island:

- (5) Jóni segir [að þú hafir barið konuna [sem hafi svikið sig]]  
John says that you hit the woman that betrayed self

the anaphor is in a complex NP-island:

- (6) Jóni segir [að María trúir ekki [þeirri fullyrðingu [að konan hafi svikið sig]]]  
John says that Mary believes not that claim that the woman has betrayed self

**Chinese long distance anaphors:** (Cole & Sung (1994)):

the anaphor is in a relative clause island:

- (7) Lisi<sub>i</sub> kanjian [neige taoyan ziji<sub>j</sub> de ren]  
Lisi see that dislike self REL person  
'Lisi saw the person who dislikes self'

the anaphor is in an adjunct island:

- (8) Zhangsan<sub>i</sub> shuo [ruguo Lisi piping ziji<sub>j</sub>] ta jiu bu qu  
Zhangsan say if Lisi criticize self he then not go  
'Zhangsan said that if Lisi criticized self, then he won't go'

If anaphor-movement is modeled after overt clitic-movement, as is often claimed, this fact is unexpected, because clitic-movement never escapes these movement islands as illustrated in (9)-(12) with examples from Spanish:

clitic-movement out of an adjunct island:

- (9) \*Pablo lo<sub>i</sub> quiere dormir [sin leer t<sub>j</sub>]  
Pablo it<sub>i</sub>-wants sleep without to read t<sub>j</sub>

clitic-movement out of a relative clause island:

- (10) \*Pablo lo<sub>i</sub> quiere ver [el hombre que conoció t<sub>j</sub>]  
Pablo him<sub>i</sub>-wants see the man who knows t<sub>j</sub>

clitic-movement out of a complex NP island:

- (11) \*Pablo los<sub>i</sub> quiere explicar [la creencia de que Juan vio t<sub>j</sub>]  
Pablo them<sub>i</sub>-wants explain the belief that John saw t<sub>j</sub>

clitic-movement out of a coordinate structure:

- (12) \*Pablo lo<sub>i</sub> quiere [comprar t<sub>j</sub> y dar un paseo]  
Pablo it<sub>i</sub>-wants to buy t<sub>j</sub> and take a stroll

Finally, the claim that the abandoning of indices under an interpretive conception of Binding Theory is a welcome result is not too clear. Chomsky (1993:49), in a footnote, offers the following assessment:

*A theoretical apparatus that takes indices seriously as entities, allowing them to figure in operations (percolation, matching, etc.), is questionable on more general grounds. Indices are basically the expression of a relationship, not entities in their own right. They should be replaceable without loss by a structural account of the relation they annotate.*

If indices are not part of a syntactic representation, it is expected that no genuinely syntactic constraints hold on the distribution of indices in a structure. The evidence for just such syntactic constraints on the distribution of indices seems to be very strong, though, as Fiengo & May (1994) have argued. In their framework, indices are taken to be a crucial part of a syntactic structure, playing both a distinct semantic and syntactic role. In particular Fiengo & May's Dependency Theory cannot be recast as an interpretive mechanism, but is syntactic in its very essence.

To summarize: Chomsky's conception of Binding Theory as an interpretive mechanism faces conceptual problems. If the interpretive mechanism refers to local syntactic domains, locality is duplicated in syntax and interpretation, and hence cannot be inherently linked to economy or properties of the computational system. The anaphor movement analysis espoused in the Minimalist Program faces serious empirical problems due to the insensitivity of anaphor movement to movement islands. The elimination of indices from syntactic representations, finally, poses both empirical and conceptual problems.

### 3.0 TOWARDS AN ALTERNATIVE: MAKING USE OF THE MINIMALIST MACHINERY

In the second section I have argued that a movement account of anaphors faces serious problems since the alleged anaphor-movement can cross barriers that are impenetrable for all other kinds of movement. In the Minimalist Program, however, a mechanism already exists that could be utilized to form dependencies without movement: FORM CHAIN. FORM CHAIN is introduced in Chomsky (1993) to solve a problem with two conflicting notions of economy: the notion of fewest steps and the notion of shortest steps. If as few steps as possible are used in a derivation, the steps will necessarily be longer and if the steps are made as short as possible there will necessarily be more steps. To resolve this conflict, Chomsky suggests to treat successive movement as one

monolithic operation FORM CHAIN. FORM CHAIN moves an element successively and creates a chain all in one step, so that the issue of fewest steps does not arise.

I will suggest that FORM CHAIN can operate independently of movement, and that it can be used to form local binding dependencies. As a consequence, binding restrictions can possibly be reduced to conditions on non-movement chains.

I will turn now to arguments in favor of FORM CHAIN as a mechanism independent of movement. The first argument revolves around resumptive pronouns. If FORM CHAIN is linked exclusively to the movement operation, as Chomsky suggests, we would not expect any chain relations to exist between overt elements. This, however, does not seem to be correct: Resumptive pronouns can occupy the base-position of an extracted operator in many languages. (see (Engdahl (1985)) for Swedish, Sells (1984) for Swedish and Hebrew, Shlonsky (1992) on Hebrew and Palestinian Arabic etc.). An example from Swedish is given in (13):

- (13) Vilket ord<sub>i</sub> visste ingen hur det<sub>j</sub> stavas?  
which word knew nobody how it is-spelled?

The chain between the wh-operator and the resumptive pronoun cannot be the result of movement, since the base-position of the wh-phrase is occupied by the resumptive pronoun. It is unclear how under the copy theory of movement the original copy of the wh-phrase could be changed into a resumptive pronoun.

Besides the resumptive pronoun argument, there are also arguments from partial wh-movement constructions in German (Gamon (to appear)) and from the mechanics of successive cyclic wh-movement (Zwart (1993b)) in favor of a conception of FORM CHAIN as a mechanism that operates independently of movement. For limitations of space I won't go into those arguments here.

I conclude, then, that FORM CHAIN does operate independently of movement, and in what follows I will try to explore the possible relevance of FORM CHAIN for restrictions on binding relations.

If FORM CHAIN is the relevant operation behind the formation of binding dependencies, we, of course, expect restrictions on binding to be similar or identical to restrictions on other chains. I will focus now on two conditions on chains, namely uniformity and locality. Consider uniformity first: In Chomsky (1994:18) the following condition is imposed on chains:

- (14) *A chain is uniform with regard to phrase structure status*

where "phrase structure status" refers to the distinction between heads and maximal projections. Heads are defined as categories which are not a projection at all, and maximal projections as categories that do not project any further (Chomsky (1994:10)).

It is interesting in this context that the same uniformity condition has been argued to hold for binding relations: Progovac (1992) suggests a notion of "Relativized SUBJECT" to account for the differences in binding requirements between morphologically complex local and simplex long-distance anaphors. She claims that  $X^0$ -anaphors (that is, morphologically simplex anaphors) have to be bound to an  $X^0$ -antecedent, and that morphologically complex anaphors need XP-antecedents. While the internal structure of anaphors has to be worked out in detail to substantiate an adaptation of this proposal in terms of uniformity, it seems at least suspicious that uniformity of chains and uniformity of binding relations should exist side-by-side, without being linked in some way. If FORM CHAIN is the mechanism that is responsible for establishing the link between an anaphoric element and its antecedent, on the other hand, uniformity is expected to be a property of binding relations. Uniformity can then be viewed as a general restriction on dependencies across a syntactic structure.

Consider locality next. This is, of course, a vast topic, and what I will try to achieve in this paper is only to give some plausibility arguments that chain locality and binding locality may be related. The discussion about locality as applied to binding and movement and a possible unification has been going on for a long time. Attempts at a unification of these constraints have ranged from Aoun's Generalized Binding (1985) and Koster's Domains and Dynasties approach (Koster (1987)) to Manzini's Locality Theory (Manzini (1992)).

In the Minimalist Program, locality and economy are two closely linked notions: the shortest steps requirement on movement is derived from the notion of most economical derivation. Relativized Minimality effects in the sense of Rizzi (1990) are seen as consequences of the violation of economy: if there is a potential closer landing site, a more distant landing site cannot be the target of movement. Unfortunately, the exact formulation of "closer landing site" is very much left open in the Minimalist Program, and Chomsky's notion of "Equidistance", which allows two positions to count as equally "close" from the starting point of movement has been shown to be empirically untenable (Zwart (1993a,b)). Despite these deficiencies and the unsettled nature of locality in the Minimalist Program, some results of Binding Theory may be possible to derive:

- subjects function as opacity factors for local binding of morphologically complex anaphors such as English *himself*:  
If the anaphor has to enter a chain relation with an antecedent, it should enter such a relation in the most economical way, that is with the closest possible antecedent. The fact that anaphors in double object constructions can take both object and subject as an antecedent indicates that specifiers within one Extended Projection of a verb count as equidistant.
- Certain types of Agreement or Tense-heads function as opacity factors for long-distance binding of morphologically simplex anaphors such as Icelandic *sig* or Chinese *ziji*:  
If some suggestions in the literature on long-distance binding are correct, these instances of long-distance binding are results of intermediate head-positions being coindexed. Coindexed Tense-heads in Icelandic subjunctives, and coindexed Agreement-heads in Chinese long-distance binding could be argued to extend the equidistance domain for FORM CHAIN of an  $X^0$ -reflexive with an  $X^0$ -antecedent.

To draw an intermediate conclusion at this point: there is some plausibility that restrictions on anaphoric binding can be reduced to uniformity and locality restrictions on chains, the latter being derived from economy.

One problem then is how to deal with "Anti-locality" in Binding Theory, namely Principle B effects. If economy is the driving factor behind locality, what could be made responsible for conditions of the form "if A is coindexed with B, A and B have to be at a certain distance from each other"? Again, the solution can be found in the notion of chains: If chains are obligatorily formed between coindexed elements that stand in a local relation and in a c-command relation to each other, pronouns with local antecedents will form a chain. This chain then violates economy of representation because it is superfluous for interpretation at LF<sup>1</sup>.

To summarize, the reduction of Binding Theory to chain formation in the Minimalist Program has the following advantages:

- The notion of Relativized Subject for binding follows: Binding, like other chain relations is restricted by the Uniformity Condition.  $X^0$ -anaphors can only take  $X^0$ -antecedents, XP-anaphors can only take XP antecedents.
- Locality in anaphoric binding can possibly be reduced to a shortest link condition on chains
- The Antilocality condition on pronominal binding is a result of obligatory chain formation between the pronoun and its local antecedent. The resulting chain violates economy of representation.

The most important questions that need to be answered to make this approach work are:

- what is the correct formulation of minimality and equidistance? In other words, what is the minimalist theory of locality?
- what is the structure of morphologically simplex and morphologically complex anaphors?
- what are the locality restrictions imposed on all chains, and what are the restrictions imposed specifically on movement chains? Note that the arguments against a movement approach to anaphoric binding in the second section of this paper clearly show that binding chains and movement chains cannot be subject to identical locality restrictions. The formal distinction between the two types of chains is easy to capture in the Minimalist framework: Movement chains contain several copies of one and the same element from the numeration, while binding chains contain elements that are distinct in the numeration.
- What is the nature of Principle C? Principle C of standard Binding Theory does not contain any reference to locality, therefore it can hardly be unified with principles A and B under a minimalist approach. One possibility would be to claim that principle C in fact has a different status, (see e.g. Koster (1987), Grodzinsky and Reinhart (1993))<sup>2</sup>.

If this approach proves tenable, however, some important goals can be achieved:

- Anti-Locality restrictions do not exist in grammar. Anti-locality effects are the consequence of formation of superfluous chains.
- There are only two modes in which dependencies can be formed: phrase-structure dependencies are formed by generalized transformations, and chains are formed by FORM CHAIN.
- Binding Theory as an independent module is eliminated.

#### NOTES

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<sup>1</sup> This, of course, needs to be worked out in its technical details. One immediate problem is that under an economy-of-representation approach to illicit chains containing a local antecedent and a non-reflexive pronoun it has to be assumed that indices are not part of the initial numeration. This assumption is necessary because economy conditions chose among converging derivations. If indices are part of the initial numeration, and if these indices force coreference between a non-reflexive pronoun and a local antecedent, there is only one derivation as far as the coindexing/chain formation is concerned, so economy could not possibly rule out that one derivation without alternatives.

<sup>2</sup> Alleged parametrization of principle C as presented in Lasnik (1986) for Thai and Vietnamese remains a problem, then.

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