Control and Binding

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CONTENTS

I INTRODUCTION

The history of transformational-generative grammar can be divided into three periods, which can be called "expansion" and "retrenchment" and Government -Binding theory. During the early "expansion" period, a primary concern was the description of grammatical phenomena that seemed to be beyond the reach of pure constituent-structure grammars, and transformations were quite powerful. The theory of grammar countenancing the powerful devices in transformations was correspondingly loose, and consequently failed to provide an adequate solution to the projection problem(Peters (1972), Baker (1979), Chomsky (1965)).

During the retrenchment period, various regularities were extracted from the transformations themselves and were formulated in a more general fashion. Examples are Ross's (1967) "island constraints", Emond's (1970;1976) structure-preserving hypothesis, surface structure constrainst (Perlmutter(1971)), trace theory (Chomsky (1973)),to name but a few. In short, the focus of attention shifted from the construction of relatively complex transformational statements to the construction of a general theory of grammar, restricted as to the devices it employed, which could be ascribed to universal grammar.

Much of the research over the past 20 years within the general outlines of the narrowing the range of possible alternatives consistent with available data concerning certain well-studied languages. Recently, Chomsky has suggested the following in his work;

In the course of this work, there has been a gradual shift of focus from the study of rule systems, which have increasingly been regarded as impoverished (as we would hope to be the case), to the study of systems of principles, which appear to occupy a much more central position in determining the character and variety of possible human language.Chomsky gave lectures on Government-Binding theory at the GLOW conference and workshop held at Scuola Normale

Superiore in Pisa in April 1979. The material was then reworked in the course of lectures at MIT in 1979-1984, where I was a member of visitors. And "Lectures on Government and Binding" was published in 1981, "Some concepts and Consequences of the Theory of Covernment and Binding" in 1982. This article develops a theory of control and binding based on the GB theory, presented in Chomsky, and formerly coreference of other linguistics.

This article is organized as follows. Section I outlines the theoretical background that I will be assuming. Section 2 reviews a mumber of argument bearing on coreference in S. Section 3 presents an overview of the main properties of control and binding that should be accounted for. On the basis of these properties, I propose a number of specific examples.

II **THEORETICAL BACKGROUND**

We can distinguish two perspectives in the study of grammar. From one point of view, these are the various subcomponents of the rule system of grammar. From another point of view, which has become increasingly important in recent years, we can isolate subsystems of principles. Consider, for example, recent versions of EST. The rule system consists of three basic parts:

(1)

(A) Lexicon
(B) Syntax: (I) Base component
　　　　　　　(II) Transformational component
(C) Interpretive components: (I) PF component
　　　　　　　　　　　　　　　(II) LF component [1]

The subsystems of principles include the following:

(2)

　a. X-bar theory
　b. θ-theory
　c. Case theory
　d. Binding theory
　e. Bounding theory
　f. Control theory
　g. Government theroy [2]

The theory I am assuming is the theory of government and binding, as developed by Chomsky and others.

Turning next to the syntactic component of the grammar (1B), consider the base rules. The main base rules are given in (3); all but are standard

1) Noam Chomsky: *Some concepts and Consequences of the Theory of Goverment and Binding* (U. S. A.: MIT Press, 1982, p.9.

2) *Ibid.*, p.6.

(3)

    a. s̄-Comp S

    b. Comp — ± WH

    c. S — NP INFL VP

    d. VP — V NP S'or Head NP S'

    e. INFL — (± tense, ± AGR) (AGR is the (possibly abstract) agreement marker of a finite clause)

I will assume that the elliped portion of (3d) contains the constituents for which the head of the VP is strictly subcategorized.

The expansion of INFL contains (± tense) and (± AGR) as separate parameters and AGR is coindexed with the NP it governs. Nominative Case is assigned to (or checked for) the NP governed by AGR. The D-structures specified by (3) are mapped into S-structures by free application of the rule Move α.

This rule is subject to Subjacency; the gap it leaves is called its Trace. The trace must be c-commanded by the constituent moved, its antecedent. The S-structures are mapped into representations of logical form (LF) by rules assigning scope to quantifiers and coreference between argument expressions not yet determined at S-structure. S-structures are also the input to yet determined at S-structure. S-structures are also the input to a component mapping them into surface sructures; this component will contain (for examples) deletion rules of a limited power, rules like Affix Hopping (which attaches the inflection marker to the right of the verb), and the rules assigning phonetic interpretation.

(4) Empty categories (zero elements)

Recently much energy in linguistic research has been devoted to investigating the properties of zero elements. This is particularly true within the framework known as government and Binding Theory.

Zero elements

    a) PRO, pro

    b) Trace, variables

    The notion "PRO" developed from the study of Equi NP deletion and control, which has the features (+ pronominal, + anaphor). This squib is meant to contribute to the better understanding of the empty category (EC) pro, which has the features (+ pronominal, − anaphor). I will show that- just as PRO can receive an arbitrary interpretation- pro can have the same reading as well, despite the assumption that pro coindexed with Agr (eement) cannot be arbitrary in reference.

The notion "trace" developed from the study of transformational rules. Traces are formed by Move-α, either anaphors or variables depending on whether they are locally A-bound or Ā-bound. We have the following properties of trace and PRO:

    a) trace is governed

    b) the antecedent of trace is not in a θ-position

    c) the antecedent-trace relation satisfies the subjacency condition[3]

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3) Noam Chomsky: *Lectures on Government and Binding* (Holland: Foris, Dordrecht, 1982), p.56.

PRO lacks all of these properties: it is ungoverned; its antecedent (if there is one) has an independent θ-role, as does PRO;the antecedent-PRO relation (where PRO has an antecedent)need not satisfy the subjacency condition. Furthermore, PRO need have no antecedent, while trace always has an antecedent.

Representations must satisfy the Projection Principle and the θ-Criterion. The Projection Principle is stated as follows:

A) Projection principle

Representation at each syntactic level (i.e. LF and D- and S-structure) are projected from the lexicon, in that they observe the subcategorization properties of lexical items.[4]

The θ-criterion can be informally rendered in the following way:

B) θ-Criterion

Each argument bears one and only one θ-role, and each θ-role is assigned to one and only one argument.[5]

It is assumed that an argument is assigned a θ-role by virtue of the θ-position that it or its trace occupies in LF. An expression in argument position and the traces it binds constitutes a chain, which is assigned a θ-role by virtue of the fact that one of its members (namely the trace) occupies a θ-position. Consideration of the θ-criterion suggests a modification of the projection principle.

NPs are subject to the Case Filter, which requires them to have case if they are phonetically realized.

(5) Case Filter

*NP if NP has phonetic content and has no Case.

This Case Filter can be connected with a different formulation of the θ-Criterion, which I will not discuss here. The intuitive idea is that a chain can be assigned a θ-role if one of its members has Case. And PRO stands for an element bearing an independent θ-role. An NP receives its Case from a verb, preposition, or inflection which governs it under conditions to be discussed below:

a) NP is nominative if govered by AGR

b) NP is objective if governed by V with the subcategirization feature: -NP (i.e., transitive)

c) NP is oblique if governed by P

d) NP is genitive in $(NP^{-\bar{X}})$

e) NP is inherently Case-marked as determined by properties of its (-N) governor[6]

The Case assigned under (a)-(d) as "structural Case", and the Case assigned under (e) as "inherent Case."

Theory of Case is associated with the theory of government. α governs ß if and only if

1) $\alpha = X^0$

11) α c-commands ß and if γ c-commands ß then γ either c-commands β or is c-commanded by ß α is ($\pm$N. $\pm$V); i.., it is one of N, V, A, or P.[7]

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4) *Ibid.*, p.29.

5) *Ibid.*, p.36.

6) *Ibid.*, p.170.

7) *Ibid.*, p.163.

In essence, government theory captures the relation between the head of a construction and categories dependent on it. Thus, under any definition of government P will govern NP in the configuration $(_{pp}P$ NP); similarly, V governs NP in $(_{vp}V$ NP PP (PP), Consider below:

    a. $(_sNP$ INFL $(_{vp}V))$

    b. $(_sNP^*$ INFL $(_{vp}V$ NP))

Since a subject NP is not a dependent of the head of the VP, a correct definition of government will have to entail that in (a) NP is not government must be defined so that at most NP*, but not NP, is governed by INFL. Notice that in the case of P and V above, the set of positions that they govern coincides with the set of positions for which they are strictly subcategorized.

Next, consider a slightly more complex example such as (c) $(_sNP^*$ INFL $(_{vp}V^*$ $(_sComp$ $(_sNP^0$ INFL$(_{vp}V$ NP))))) (For ease of reference, I have marked certain occurrences of categories with * or^0, a usage which I will continue throughout.) It is well known that the value of Comp plays a role in the subcategorization (or perhaps selection) of the matrix verb (cf. Chomsky 1965, Bresnan 1970): verbs may or may not require or admit an indirect question as a complement. Suppose now that Comp is the head of S', just as N is the head of NP.

We might now say that the relation of government really holds between V and the head of its dependent; that is, in (b) V governs and subcategorizes for a constituent the head of which is N, and in (c) V* governs and subcategorizes for a constituent the head of which is Comp. given this intuition we would not expect it to be possible for V* to either govern or subcategorize any constituent farther down. This seems to be generally correct. Moreover, in general government and strict subcategorization go together, except for government by INFL and cases of so-called exceptional government and Case-marking to be discussed later. In the case of the sister NP of INFL there is no strict subcategorization, since there simply is no choice (cf. Chomsky (1981)). However, there is government, although additional requirements may have to be met (cf. the literature on the possibility of empty subjects of which Chomsky (1981) gives an overview).

Following Chomsky, I will assume that in the unmarked case clauses are of two kinds: their distribution in complement position should be free. In fact, there is some idiosyncratic variation; the general picture, however conforms to what one would expect if subcategorizing for a clausal complement means "subcategorizing a constituent the head of which is Comp". There are also clausal complements lacking a nonnull complementizer. Assuming that in these cases the Comp position is empty at D-structure, the relevant strict subcategorization feature cannot be "take a projection of Comp", rather, under the assumption that INFL is the head of S, the verb must be taken to be subcategorized for a projection of INFL in such cases. Hence, one would expect the various ways in which INFL can be realized to be relevant for subcategorization only when Comp is empty. This is what we find: most verbs take tensed complements and in addition either to complements or -ing complements, these two realizing (-tense) INFL. -ing constitutes the marked option; that is, it can appear only if explicitly licensed by the strict subcategorization frame of the matrix verb. When a verb requires a + WH Comp, the "ideal" situation with respect to the choice of the other parameters of the complement is approximated most closely: choice between (+ tense) and (− tense) is free, unrestricted by idiosyncrasies, and the marked realization of (− tense), viz.

-ing, is never available. That is, if the verb requires a +WH Comp, it cannot at the same time specify a value for INFL. The theory of government to be adopted will have to reflect this fact.

As mentioned earlier, the ECP requires a trace to be properly governed. Bypassing the discussions of the ECP in the most recent literature, I will pursue the line of Chomsky (1980), where proper government is taken to require government by a lexical category. The set of heads is given by ($\pm$N, $\pm$V), Comp, INFL. The proper governors are ($-$N, $+$V) = V, ($+$N, $+$V) = A, and ($+$N, $-$V) = N, as well as ($-$N, $-$V) = P when it bears the index of a verb (that is, when it is cosuperscripted with a verb (cf. Kayne (1981), Rouveret and Vergnaud (1980)) and Comp when it bears an index. Thus, the position of a subject in the domain of INFL, where it is governed by AG, is set apart, as is the position of an NP in the domain of a preposition lacking a superscript. These positions are not properly governed. This accounts for the impossibility of WH Extraction out of adverbial PPs, as in *who did you say(*that)t came. The usual type of an analysis gives the following structure:

(COMP t(COMP^{that})

Then if that is present, does not c-command the subject trace in the embedded S and RES (NIC) is violated, if local control requires c-command.

who do you think ($_S$ (COMP t'that) ($_S$ t INFL VP))

Since INFL is not a proper governor, t violates the ECP, unless some additional requirement is met; that is, it must be governed by an indexed COMP. When that is present, t' is properly contained in COMP; hence, Comp as such is not indexed, and t still violates the ECP. If that is absent, t' constitutes all of COMP, and hence COMP is a proper governor for the subject trace.

(6) On Binding

In its essentials, Case theory forms part of the theory of government. That is, basic and central instances of Case-assignment are instances of government by a Case-assigner. And also, there was considerable redundancy between notions of Case and Binding. The binding theory too should be developed within the framework of the theory of government, with the latter expressing their common core.

I follow the formulation of Chomsky.

a) An anaphor is bound in its governing category.
b) A pronominal is free in its governing category.
c) An R-expression is free. [8]

The conditions apply to NPs in argument positions (i.e. the base-generated NP positions, not operators, INFL, etc.). An argument is bound if it is c-commanded by a coindexed argument. If an argument is not bound in this sense, it is free. Anaphors are lexical NPs such as each other, himself, etc., the trace of NP Movement, and PRO. Pronominals are NPs such as he, you, etc., as well as PRO. R-expressions are NPs such as Marry (overt element), ect., and the variables, i.e. empty categories coindexed with an expression in a nonargument position, such as a wh-operator in Comp. The terms "free and bound" are defined in the customary way, in terms of coindexing by a c-commanding category. More precisely, we interpret "bound" (similarly, free) as "locally

8) *Ibid.*, p. 188.

A-bound", where β is A-bound by α if β is bound by α and α is in an A-position, that is, a position having a GF such as subject or object. The element β is Ā-bound by α if it is bound by α and the latter is in an A-position (a non-A-position), such as COMP.

A) α is the governing category for ß if and only if α is the mininal category containing ß and a governor of ß, where α = Nb or S [9]

B)
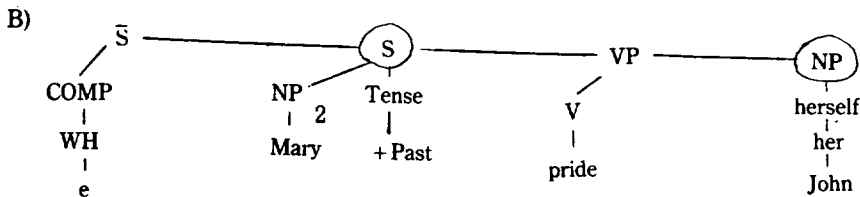
The encircled NP in B is governed by the verb pride (more specifically, it is the direct object of the verb pride). The minimal S or NP-node containing the verb pride is the encircled S-node; hence the encircled S-node is the governing category for the encircled NP.

If the encircled NP-position is filled by the reflexive anaphor herself.then condition(a)specifies that herself must have a c-commanding coindexed antecedent NP within the encircled S.

Now clearly, the NP Mary c-commands the encircled NP, since the first branching node above Mary is the S-node, and the S-node dominates the encircled NP. Thus, if herself is coindexed with Mary, as in: Mary prided herself, then the resultant structure satisfies the Binding Condition (a); but if herself has a different index from Mary, then the sentence is ungrammartical.

Now suppose that the encircled NP is filled by the pronoun her instead. The governing category for her is the encircled S, as we established earlier. The Binding Condition (b) stipulates that her must not be coindexed with a c-ccmmanding NP within the encircled S; but the NP Mary c-commands the encircled NP her. Hence, Mary cannot be coindexed with her. Thus, of the two potential interpretations:

Mary$_i$ prided her$_i$

Mary$_i$ prided her$_j$

Only the second one (in which her is marked as noncoreferential to Mary) satisfies the Binding Condition (b). or, more simplistically, the Binding Condition (b) predicts (correctly) that her can only be interpreted as referring to someone other than Mary.

And what of the case where the encircled NP is filled by a lexical Np like John? Here, condition (c) in effect says that a lexical NP must not be coindexed with any c-commanding argument anywhere in the sentence containing it. If John is coindexed with Mary in (B), then this condition will be violated since Mary c-commands John, as we have already seen. Thus, of the two possible interpretations:

Mary$_i$ prided John$_i$

Mary$_i$ prided John$_j$

9) *Ibid.*, p.

only the second one (in Which Mary and John are marked noncoreferential) satisfies the Binding Condition (c). Or, more informally, condition (c) predicts that Mary cannot refer to the same person as John in such sentences.

III COREFERENCE

It is important to make clear from the start what it means to apply a semantic rule of coreference. There are three relevant points to keep in mind. First, coreference is an exclusively semantic property that cannot be referred to by transformations. Second, coreference is an aspect of semantic interpretation that has nothing to do with the functional structure of the sentence. Third, coreference is formalized in the present approach as a binary relation holding between two NPs (or their semantic readings).

Three or more NPs can be understood as mutually coreferential only if they have been marked pairwise coreferential.

A commonly used device for indicating coreference in generative grammar is the index of coreference, introduced by Chomsky in *Aspects. of the Theory of Syntax*(1965). In Chomsky's formalism, each noun phrase has an associated integer (or index), and two NPs are coreferential if they have the same index.

Jackendoff (1972) suggested the following coreference rule:

If the table of coreference marks two NPs coreferential, those NPs must in fact be able to describe the same individual. [10]

John washed himself. coref.

John washed him. noncoref.

John washed John. noncoref.

John washed Bill. noncoref.

If NP_1 and NP_2 are intended to be coreferential, they must be dependent on

the same type modal operators (weak form)

the same type modal operators (strong form) [11]

UNREALIZED is subject to the strong form of the coreference condition, as shown by the below (a, b, c, d), which we repeat here for convenience.

a. John wants to touch a fish. You can see it over there.

b. John wants to touch a fish and I want to kiss it.

c. John wants to touch a fish and kiss it,too.

d. John wants to touch a fish. He saw one over there.

In (a) IT is not dependent on UNREALIZED, so its antecedent a FISH may not be,either. In (c) A FISH and IT are within the scope of the same instance of WANT, so both can be dependent on the same token of UNREALIZED, that is, on defferent, instances of this general type of modal operator; the fact that we observe only the specific reading, in which neither is dependent on

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10) Ray S.Jackendoff: *Semantic Interpretion in Generative Grammar* (U.S.A.: MIT Press, 1972), p. 112.

11) *Ibid.*, p.294.

UNREALIZED, shows that the strong coreference condition must hold. In the parallel example with the modal operator "future, on the other hand, the dependent reading will be possible and we will conclude that the weak coreference condition holds.

The weak form of the coreference condition applies to FUTURE:

a) John will bring a girl to the party, and she is beautiful.
b) John will bring a girl to the party, and she will be beautiful.
c) John will bring a girl to the party and introduce her to everyone.
d) John said he will bring a girl to the party, and that's why I've brought one.

In (a), where SHE is outside the scope of WILL, A GIRL must be read as specific. In (b), A GIRL and SHE are within the scope of different occurrences of WILL, but nonspecificity is permitted anyway. We conclude that only the weak coreference condition applies. (c) has both A GIRL and SHE within the scope of the same WILL, and the ambiguity is possible. (d) shows that one-pronominalization is not subject to the coreference condition, as predicted by the theory.

Observe that the form of the coreference condition obtains for NEG.

a) ?I didn't catch a fish, and it was ugly.
b) ?I didn't catch a fish, and I didn't bring it home.
c) I didn't catch a fish and bring it home.
d) I didn't catch a fish, but John caught one.

a) Who caught a fish? I saw it over there.
b) Who caught a fish? Who even saw it?
c) Who caught a fish and ate it?
d) Who caught a fish? I saw one over there.

These examples suggest that wh- acts as a modal operator in question. The meaning of C_{wh} is that the identification of a referent depends on the answer to the question.

Lasnik's assumptions:

1) Pronouns may be base-generated
2) Coreference / noncoreference readings taken from surface free; no rule ordering of relevant transformations.
3) Minimal cyclic nodes: NP + S (cf. discussion below).

> *Rule:* If NP_1 *precedes* and *Kommands* NP_2, and NP_2 is *not a pronoun*, then NP_1 and NP_2 are disjoint in reference.
> *defn:* A Kommands B if the minimal cyclic node dominating A also dominates B.

Important features:

1) Marks disjoint reference DR (non coreference), unlike any other rule to da (except which DR is added after coref. rules to "mop-up" - cf. Jackendoff.
2) "Precede" feature remains, as in Ross, Langacker, Jackendoff, unlike Reinhart
3) New: "2nd NP not a pronoun" feature added to account for epithets".
4) No restrictions on forwards coreference.

Successes

NP$_1$ precedes NP$_2$?	Kommands?	NP$_2$ not a pronoun	∴DR= (=*)	DATA
				I. Regular pronominalization
+	+	—	—	a. Oscar finally realized that he is unpopular.
+	+	+	*	b. He finally realized that Oscar is unpopular.
				II. if clause
+	+	—	—	a.　Jan will do it, if she can.
+	+	+	*	b.　She will do it, if Jan can.
+	—	—	—	c. If Jan can, she will do it.
+	—	+	—	d. If she can, Jan will do it.
				III. Relative clause
+	+	—	—	a.　Oscar rewarded those who trusted him.
+	+	+	*	b.　He ＿＿＿＿＿＿ Oscar.
+	—	—	—	c.　Those who trusted Oscar were rewarded by him.
+	—	+	+	d. ＿＿＿＿＿＿ him ＿＿＿＿＿ Oscar.
				IV. Conjunt sentence
+	—	+	—	a. Pay her, and Jan will pay you back.
+	—	—	—	b. Pay Jan, and she will pay you back.
				V. adverb clause preposed (sentential)
+	+	—	—	a. Oscar saw a snake near the child he was talking to.
+	+	+	*	b. He ＿＿＿＿＿ Oscar ＿＿＿＿＿.
+	—	—	—	c. Near the child Oscar was talking to, he saw a snake.
+	—	+	—	d. ＿＿＿＿＿ he ＿＿＿＿＿, Oscar ＿＿＿＿＿.
				VI. non-sentential adverb clause / possessive
+	—	—	—	a. Jan's brother saw a shake near her.
+	—	+	—	b. Her brother saw a snake near Jan.
+	+	+	*	c. Near her, Jan's brother saw a snake
+	+	—	—	d. Near Jan, her brother saw a snake.
				VII. Possessives
+	+	—	—	a. Mary gave her friends a going-away present.
+	+	+	*	b. She gave Mary's friends ＿＿＿＿＿.
+	—	—	—	c. Mary's friends gave her a going away present.
+	—	+	—	d. Her friends gave Mary ＿＿＿＿＿.

NP$_1$ precedes NP$_2$?	Kommands?	NP$_2$ not a pronoun	∴ DR = (=✱)	DATA
				VIII. Questions and Relative clauses
+	−	−	−	a. Which of the people who visited Betty do you think she liked most?
+	−	+	−	b. Which of the people who visited her do you think Betty liked most?
				IX. Epithets
+	−	+	−	a. Though the professor was berating John, the fool was laughing
+	−	−	−	b. _____, he (John) _____.
				But note:
+	−	+	⊖	c. ?? Though the professor was berating the fool, John was laughing
+	−	+	−	d.V _____ him, John _____.
				X. Passives
+	+	−	−	a. Jan claimed that she was the best runner in the race.
+	+	+	✱	b. She claimed that Jan was the best runner in the race.
+	−	+	−	c. That she was the best runner in the race was chaimed by Jan.
+	−	−	⊖	d. That Jan was the best runner in the race was claimed by her.
				XI. Abverb Preposing (non-sentential)
+	+	−	−	a. Jan saw a snake near her.
+	+	+	✱	b. She saw a snake near Jan.
+	+	+	⊛	c. Near her, Jan saw a snake.
+	+	−	⊖	d. Near Jan, she saw a snake.
				Also:
				XIII.
+	−	−	⊖	a. Realizing that Mary was sick worried her.
+	−	+	−	b. Realizing that she was sick worried Mary.
+	+	−	⊖	c. Near John, we all thought he found a snake
+	−	−	⊖	d. Which pictures of Betly does she like best?
+	−	−		e. Which of Betty's hats does she wear most?
+	−	−	⊖	f. In a recent portrait of Bill, he found a scratch.
+	−	−	−	g. In a recent portrait of Bill, he looks sick

Ⅳ Coreference and Index

a) Max$_i$ told Fred$_j$ that he$_k$ should leave.

Here 'k' can be identical to either 'i or j' (or neither). Therefore, the behavior of 'he' as proximate or obviative is captured within the theory of free indexing in (a),but the analogous property–namely, that 'He' can refer to Max and Fred, or to neither, or to one or the other with some other people is not captured in case (a).Hence, we might say that we want to devise some INDEXING RULE which will assign appropriate indices to all the NPs in a sentence, thereby representing all the relevant coreference relations. For the time being, let's consider the possibility of a very general indexing rule along the lines of:

1) INDEXING RULE

Assign every NP in a sentence an index (where the index is a random integer)[12]

A rule like (1) would allow for the twin possibilities that any random pair of NPs might either share the same index, or be assigned different indices: thus in a sentence like (a) Max and he are assigned the same index or different indices, and hence interpreted as coreferential or interpreted as noncoreferential. In effect, then, the overgeneral rule (1) specifies:

2) Any random pair of NPs in a sentence can either be interpreted as coreferential, or as noncoreferential.

Clearly the rule(1)–which makes the prediction(2) is overgeneral, and will overgenerate in the sense of assigning to sentences interpretations which they cannot have. For example, rule (1) would give rise to interpretations like:

(b) I$_i$ like yourself$_i$

in which I and yourself are coindexed (i.e. assigned the same index), and therefore wrongly predicted to be interpretable as coreferential. Of course, we could rule out "impossible" interpretations like (b) by some condition like:

(3) MATCHING CONDITION

If two NPs are assigned the same index, they must "match" in features (e.g. number, gender, person, ect.)[13]

(3) would be a kind of 'semantic filter.'

Consider some examples of coreference and index:

1) *The function of Stressed Pronouns:* Stress on pronouns forewarns the hearer that normal rules for establishing coreference linkage would not work.

e.g. a. John$_i$'s brother is visiting him$_i$, and Bill$_j$'s sister is visiting HIM$_j$.

    b. cf. John is visiting his$_i$ brother, and Bill$_j$ is visiting his$_j$ sister. (no emphatic stress needed for the second pronoun)

    c. John$_i$ hit Bill$_j$, and then he$_i$ hit Mary. (use the parallel structure interpretation)

    d. John$_i$ hit Bill$_j$, and then HE$_j$ hit Mary. (Don't use the parallel structure rule)

2) *Constraint on Genitive-Triggered Pronominalization:* Pronominalization with a genitive NP as trigger usually requires that the genitive NP be.coreferential with the discourse topic.

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12) Andrew Radford: *Transformational Syntax* (U.S.A.: Cambridge University Press, 1981), p.366.

13) *Ibid.,*

e.g. a. ?? Whose$_i$ brother killed him$_i$?

 b. John$_i$'s brother is visiting him$_i$. (According to (2), (b) is possible only if JOHN has been the topic of the preceding discourse.)

 c. *John'$_i$s brother is visiting him$_i$. and Bill'$_i$s sister is visiting him$_j$. (the second HIM, if destressed, will refer to JOHN)

3) *Reflexive Pronouns in English:* Reflexives when their referents are the direct targets of the actions or states represented by the sentences. Otherwise, pronouns are used.

 a. John hid the book behind himself. (He was holding the book)

 b. John hid the book behind him.

 a. John pulled the blanket over himself. (He tried to hide)

 b. John pulled the blanket over him.

 a. John has confidence in himself.

 b. John has passion in him.

 4) *Other examples*

  1) The bell$_{i/}$*θ_i *having rung*, John$_j$ rushed out of the classroom.

  2) θ_i *Coming* home, John$_i$ found a letter.

  3) θ_i *Hearing* the floor creak behind me, my$_i$ heart froze with fear, for I realized that Moriarty was inches away.

  4) I obmaslilos'ego$_i$ lico, θ_i *predstavja* gusja žarenogo. (Solženicyn)

   & gleamed his face imagining goose roasted

   'And his face gleamed, thinking of a roast goose.'

  5) V takuju noč', θ_i *proxodja* po cepjam, θ_i *sagaja* čerez golovy

   in such night passing along lines stepping over   heads

   spjascix krasnoarmejcev, gusto mozgi nalivajutsja dumani. (Furmanov)

   of-sleeping Red-army-men heavily brains swell with-thoughts

   'In such a night, passing along the lines and stepping over the heads of sleeping Red Army men, one's brains heavily swell with thoughts.

  6) Zabole me$_i$ glava, θ_i *slušajuči* tu dreku. (Stevanovic)

   ached me head listening that quarrel

   'My head started to ache, listening to that quarrel.'

  7) θ_i *Ayant couru* a toute haleine, mon$_i$ coeur se mit a battre.

   having run at full speed, my heart began-to-pound

   'Having run at full speed, my heart began to pound.'

  8) No θ *Porovnjavšis's* s Litvinovymi lico generala$_i$ mgnovenno

   · but having-caught-up with L. face general's in-

   stantly

   izmenilos'. (Turgenev)

   changed

   'But catching up with Litvinov, the general's face changed immediately.'

  9) ...θ_i *slušaja* ego, u menja$_i$ goreli glaza i ščeki...(Čexova-Knipper)

   listening him at me burned eyes and .cheeks

10) θ_i *Hearing* the floor creak behind me, my wife$_i$ froze with fear...

11) No θ_i *porovnjavsis'* s Litvinovym, žena$_i$ generala mgnovenno...

    but having-caught-up with L, wife general's instantly

    'But having caught up with L., the general's wife changed...'

12) θ_i *Proležav* na žestkoj kušetke v ètom neudobnom položenii

    having-lain on hard sofa in this uncomfortable position

    ves den', u menja$_i$ razbolelas' golova.

    all day at me ached head

    'Having lain on the hard sofa in this uncomfortable position all day, my head started to ache badly.'

13) Golova ego ležala na poduške.

    head his rested on pillow

    'His head was resting on a pillow.'

14) Ešče θ_i *podxodja* k igornoj zale, za dve komnaty, tol'ko ja zaslyšu

    still approaching to game hall before 2 rooms as-soon - as I hear

    dzen'kanje peresypajuščixsja deneg, — so mnoju$_i$ počti delajutsja sudorogi. (Dostoevskij)

    ringing of-rolling money with me almost happen convulsions

    'While still approaching the gaming parlor, two rooms before it, as soon as I hear the ringing of coins, I almost develop convulsions.'

15) θ *Poselivšis'* teper' v derevne, ego$_i$ mečta i ideal byli v tom,

    having-settled now in village his dream and ideal were in that

    ctoby voskresit' tu formu zizni, kotoraja byla...pri dede. (Tolstoj

    so-as-to revive that form of- life which was in grandfather's-time

    'Having settled in the country now, it was his dream to revive the form of life which had been there...in his grandfather's time.'

16) Strah me$_i$ obuzima, θ_i *pomišljaući* na povratak. (Stevanovič)

                          of treturn

    fear me seized thinking

    'Fear seized me when thinking about returning.'

17) θ_i *Entering* the church, his$_j$ first act was to kneel down.

18) After θ_i *watching* the Cubs in spring training, it is the opinion of many observers that you can't think any less of them than you did during the winter. (The Sporting News)

19) En θ_i *lisant* ta lettre, my$_i$ joie fut immense.

    upon reading your ljetter my joy was immense

20) θ_i *Entering* the church, his first chancellor$_i$ was to kneel down.

21) θ_i *Jasuci* ispod groblja, konj. se plahu od biela krsta. (Andric)

    riding by cemetery steed shied-away from white cross

    'While riding by the graveyard, my horse shied away from a white cross'

22) En θ_i *chevauchant* a travers la forêt, nosi montures prirent peur.

    while riding through the forest our mounts became afraid

    'Travelling through the forest on horseback, our mounts became afraid.'

23) While θ_i driving through the snowstorm, dreading every curve, my$_i$ car skidded helplessly over the icy road.

24) *Ešče *podxodja* k igornoj zale,....sudorogi delajutsja so mnoju.

still approaching to game hall convulsions happen to me

25) *θ_i hearing the floor creak behind me/him (self), a man$_j$'s heart froze with fear

26) θ_i Ie ni *tui-te*, John$_i$ wa/*ga tegami o hakken sita.

home to arriving J. letter (acc) discovered

'Arriving home, John found a letter.'

27) Zoo wa hana ga nagai. 'Elephants have long trunks.'

elephant nose long

28) Zoo no hana wa nagai. 'Elephants trunks are long.'

elephant's nose long

29) θ_i Zii-ai no otosigo ni *umare-te*, Mari$_i$ wa hana ga takaku hada ga sIrokat

GI 's brat as born M. nose tall. skin white-was

'Born as an illegitimate child of a GI, Mari had a prominent nose and white skin.'

30) *θ_i Zii-ai no otosigo ni *umarete*, Mari$_i$ no hana wa takaku, hada wa sirokatta.

GI 's brat as born M. 's nose tall skin white-was

'Born as an illegitimate child of a GI, Mari's nose was prominent and her skin was white.'

31) Boku wa atama ga itaku nat-te-kita yo. 'I have developed a headache.'

I head aching become-started (part.)

32) *Boku no atama wa itaku nat-te-kita yo. 'I have developed a headache.'

I 's head aching become-started (part.)

33) Ken wa kimoti ga dooyoo-sita. 'Ken's feelings were stirred.'

K. feeling stirred

34) Ken no kimoti wa doo-yoo-sita. 'Ken's feelings were stirred.'

K 's feeling stirred

35) θ_i Zyazu bakari kik-asare-te, boku. (wa) atama ga itaku nat-te-kita yo.

jazz only hear-(pass.)-(ger.) I head aching-secome-started (part.)

'Being forced to listen to jazz all this time, I have developed a headache.'

36) *θ_i Zyazu bakari *kit-asare-te*. boku$_i$ no atama wa itaku-nat-te-kita yo.

jazz only hear-(pass.)-(ger.) I's head aching-become-started (part.)

'Being forced to listen to jazz all this time, I have developed a headach'

37) θ_i Sono koto o *kii-te*, ken; wa kimoti ga dooyoo-sita.

this thing (acc.) hear-(ger.) K. feeling stirred

'Hearing this, Ken's emotions were stirred.'

38) θ_i Sono koto o *kii-te*, Ken$_i$ no kimoti wa dooyoo-sita.

this thing (acc.) hearing K's feeling stirred

'Hearing this, Ken's feelings were stirred.'

39) θ_i *Vozvraščajas'* domoj, nas$_i$ zastala v rošče groza.

returning home us caught in grove shower.

'While returning home, a shower caught us in a grove.'

40) θ_i *Vračajuči* se uveče, dočekala me je mlaka orvenokasta svetlost'. (Petrovič)

returning (refl.) at-night welcomed me warm purple light

'Returning home in the evening, a warm purple glow welcomed me.'

41) θ_i *Turning* the corner, somebody clubbed me over the head.

42) θ_i *Pridja* na kvartiru k Ivanovym, menja$_i$ očen laskovo vstretil

coming to apartment to I. me (acc.) very nicely welcomed

ix starsij syn, inzener-metallurg.

their eldest son engineer-metallurgist

'Arriving at the Ivanovs' apartment, their eldest son, a metallurgical engineer, welcomed me very nicely.'

43) Mati zyuu iti niti *sagasi-mawat-te*, yatto kono handobaggu ga

town all one day searching-around finally this handbag

mitultatta no.

showed-up (part.)

'After looking around town all day, I finally came across this purse.'

44) En θ_i *arrivant* devant ma porte, un voleur me$_i$ matraqua.

upon arriving at my door a thief me clubbed

'Upon arriving at my door, a thief clubbed me.'

45) En θ_i arrivant devant ma porte, Marie$_i$ m$_i$'a appele.

upon arriving at my door M. me called

'Arriving at my door, Marie caled me.'

46) En θ_i arrivant devant ma porte, Marie$_i$ l$_i$a appelé.

upon arriving at my door M. him called

'Avriving at my door, Marie called him.'

47) •Vozvraščajas' domoj, groza zastals v rošče nas.

returning home shower caught in grove us.

48) • Turning around the corner, it was me whom somebody clubbed over the head.

49) θ_i Pridja na kvartiru k Ivanovym, ix starsij syn$_i$ laskovo vstretil menja.

coming to apartment to I. their eldest son nicely welcomed me

V CONTROL AND BINDING

There are three basic questions that arise in connection with the element PRO; 1) where may it appear? 2) where must it appear? 3) how is its reference determined? The first question falls under general principles of the theories of government and binding, the second under the projection principle and Case theory, and the third under control theory.

PRO has the following properties.

a) PRO is ungoverned.

b) The antecedent of PRO is in a θ-position, that is, PRO, lacking an antecedent in some case, has an independent θ-role.

c) the antecedent-PRO relation (where PRO has an antecedent) need not satisfy the subjacency condition.

1) Mary signaled to John PRO to shave himself.

2)• Mary signaled to John PRO to shave oneself.

3)• Mary signaled to John PRO to shave herself.

Depending on the nature of the verb, PRO is controlled either by the complement of the verb or by its subject. These examples indicate that 'PRO' is obligatorily controled by the GOAL argument of SIGNAL.

1) Mary passed John in the hall yesterday drunk as usual.

In (1), either the subject **Mary** or the Object John can be the controller of 'drunk as usual', although there may be a slight preference to interpret Mary as controller.

       (bi ga) (ja ju on da)

       (bi ga) (oda) PRO jaj da)

PRO is controlled by "bi ga"

       Consider the Binding theory next.

In its essentials, Case theory forms part of the theory of government. That is, the basic and central instances of Case-assignment are instaneces of government by a Case-assigner. One of the problems in the OB-framework was that there was considerable redundancy between notion of Case and binding.

The basic notions of the theory of binding may be defined as the following:

A) 1) α is X-bound by ß if and only if α and ß are coindexed, ß, c-command α and ß is in an X-position

      2) α is X-free if and only if it is not X-bound

      3) α is locally bound by ß if and only if $\mathcal{L}$ is X-bound by ß, and if γ Y-bound L then either γ Y-binds ß or γ = ß

      4) α is locally X-bound by ß if and only if α is locally bound and X-bound by ß

α is a variable if and only if

      1) $\alpha = (NP^e)$

      2) α is in an A-position (hence bears an A-GF)

      3) there is a ß that locally A-binds α [14]

Cases (1) and (2) of (A) define "bound" and "free" with "X" replaced by "A" or "Ā". Similarly, case (A4). In (3), "X" and "Y" may be independently replaced by "A" or "Ā". We have excluded the possibility that an element may be locally bound by two different elements, hence that it may be both locally A-bound and locally Ā-bound. Note further that if α is A-bound by ß amd Ā-bound by γ, then ß binds γ or conversely by properties of c-command

      In the case of a variable, the binder ß in (B) may be an operator, a trace in COMP, an empty NP in COMP, or some other element adjoined to S or S̄. This formulation leaves open a variety of questions about the class of rules I have been calling "movement-to-COMP," as a loose designation.

      Chomsky's solution is to propose a number of indexing conditions, or as he prefers to call them Binding Conditions.

      a) John$_i$ hurt himself$_i$

      b) John$_i$ hurt him$_j$

      c) John$_i$ hurt Mary$_j$

The three conditions which he proposes to rule out overgenerated interpretations like those in (a), (b) and (c) are respectively:

      A) An anaphor is bound in its governing category.

      B) A pronominal is free in its governing

      C) An R-expression is free.

The terms 'free and bound' are defined in the customary way, in terms of coindexing by a c-commanding category. More precisely, we interpret 'bound' (similarly, free) in (A), (B) and (C) as

14) Noam Chomsky: *Lectures on Government and Binding* (Holland: Foris, Dordrecht, 1982), p.184-185.

'locally A-bound', where ß is A-bound by α if ß is bound by α and α is in an A-position, that is, aposition having a GF such as subject or object. The element ß is $\bar{A}$-bound by α if it is bound by α and the latter is in an $\bar{A}$-position, such as COMP. Thus, variables are $\bar{A}$-bound by their operators in COMP, but an NP-trace or anaphor is A-bound by its antecedent. The element ß is "locally X-bound" by α if it is X-bound by α and α is, in the obvious sense, the "closest" binder of ß.

I consider some examples of Korean and Japanese as non-configurational languages.

A) R-expression is free

   (na-neun$_i$) (Mary-reul$_j$) ($_{vp}$jo-a-han-da)
     nom   obj

B) A pronominal is free

   a) (na-neun$_i$) (geu-reul$_j$) ($_{vp}$jo-a-han-da)
        nom   obj

   b) (geu saram-i$_i$) (oi) (nam$_j$eui chaik-eul) ($_{vp}$ga-jyu-ga-neu-nya)?
        nom   ques obj

But, a pronominal is bound in the following examples:

   a) (ne-ga$_i$) (oi) (nam$_i$-eui chaik-eul) ($_{vp}$ga-jyu-ga-neu-nya)?
        nom   ques   obj

   b) (hyung-nim-do$_i$) (dang-sin$_i$ il-reul) (mun-ju) ($_{vp}$hai noh-eu-si-yo)
        nom   obj

   c) (a-bu-ji-neun$_i$) (dang-sin$_i$ sang-gak-man) ($_{vp}$ha-si-neun-ga bo-a-yo)

C) An anaphor is bound

   a) (na-do$_i$) (ja-j gi$_i$ eui jo-chi-reul) (jom) ($_{vp}$hai-ya ha-get-da)
        nom   obj

   b) (nu-do$_i$) (ja-gi$_i$-eui hu-meul-eul) (jom) ($_{vp}$saing-gak ha-yu-ra)
        nom   obj

   c) (geu-neun$_i$) (ja-gi$_i$) ($_{vp}$saing-gak-man ha-gut-da)
        nom   obj

   1) *John$_i$ believes [Bill likes himself$_i$]
   2) *[[Bill's$_i$] friend] likes himself$_i$
   3) *John$_i$ believes [himself$_i$ is crazy]

α is the governing category for ß if and only if α is the minimal category containing ß and a governor of ß, where α = NP or S.

Control Theory

   4) I want [PRO to leave], [PRO to leave], would be nice
   5) *PRO left
   6) *I looked at PRO

PRO is a pronominal anaphor

   7) John wanted [Bill to decide [PRO to leave]]
   8) John persuaded/promised Bill [PRO to leave]
   9) [PRO$_i$ to get himself arrested] would be bad for [[John's$_i$] career   ]
                                                                    ?*father

10) *[[John's_i]   career] wasn't interesting enough [PRO to impress Bill]
    father

11) John thinks that [[PRO to get himself arrested[would be bad (for Bill)]]

The controller of PRO is a (preceding?) argument of the next higher argument structure.
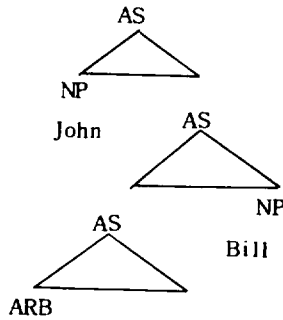
{ Why no principle B?
  Why bound/free in subject?
  Why no pronominals in Japanes only subjects are NP's,
                                everything else are PP's

12) John-ga Mary-ni [[Bill-ga jibun-ni kureta] hon-o] miseta
                            SELF   gave   book   showed

13) John-ga [Mary-ga jibun-o semeta koto-o] shitte-iru
                     SELF blamed   Knows

14) John-ga [[Mary-no [jibun-no e ni tsuie-no] hyooka-ga] karai koto-o   shitte-
                      SELF   picture   evaluation severe   knows

15) [[jibun-ga_i kaita] hon-ga] { John-o_i kaeta "changed"   }
            write book   { *John-ni_i atatta "hit"   }

(A) An anaphor is bound (in its governing category)
(A') An anaphor is bound by Subject

16) [[John-ga_i kaita] hon-ga] { *kare-o_i kaeta   }
                               { kare-ni_i atatta   }

17) [[Mary-ga_i wasureta] hon-o] kanojo-ga_i yonda
            forgot   read

(C) An R-expression is free
(C') An R-expression is free of Subject
(B) A pronominal is free (in its governing category)
(B') A pronominal is free of Subject

18) John-wa [kare-ga Bill-ni tegami-o kaita koto-o] kakushita
                            letter   wrote   concealed .

There are no pronominals in Japanese
Restrictions on preceding lower antecedents

19) Mary-ga [[John-no_i]ojisan-o] kare-ni_i { awaseta "cause to meet" }
                                            { shokaishita "introduce" }

20) Mary-ga [[John-no_i] mochimono-o] kare-ni_i kaeshita
                        possessions   returned

21) *Mary-ga [Susan-ga John-o$_i$ aishite-iru to] kare-ni$_i$ itta
                        loves   said

22) Mary-ga[Susan-ga John-o$_i$ aishite-iru koto-o] kare-ni$_i$ tsutaeta
                                                        convey message

```
        AS
       /| \
      / |  \
    NP_i  AS
         / \
        /   \
      PRo_i
```

Restrictions on following "antecedents" (backwards pronominalization)

23) *[[kare-no$_i$] okaasan-ga] John-o$_i$ aishite-iru
              mother   loves

24) * Mary-ga [[kare-no$_i$] ojisan] John-ni$_i$ shokaishita
                     uncle   introduce

25) *[kare-ga$_i$ erabareta koto-ga] John-o$_i$ odorokaseta
          elected   surprised

26) [keisatsu-ga kare-o$_i$ taihoshita koto-ga] John-o$_i$ odorokaseta
     police   arrested   surprised

27) [[kare-no$_i$] okaasan-no] immota-ga] John-o$_i$ aishite-iru
            mother   sister   loves

28) [[[kare-ga$_i$ erabareta to] iu] uwasa-ga] John-o$_i$ oborokaseta
            elected   rumor   surprised

29) ?[[kare-no$_i$]rikoshugi-ga] Tanaka-o$_i$ hametsu-saseta
           egoism   destroyed

30) [keisatsu-ga kare-o$_i$ taihoshita toki] [Tanaka {wa} shushoo datta]
     police   arrested when   {ga}$_i$ P.M. was

kare/kanojo may not carry arbitrary interpretation
Kare, Karryo can't be ARB

VI Conclusion

With the rapid development of theories, modern linguistics has made its way toward Universal Garmmar, and no other linguistic research is considered the proper subject of linguistics but that based on Universal Grammar. In fact,new and amazing turning-points have been arranged early in the 1980's with the shift of study from Rule System to System of Principle, the establishment of Empty Category and so on.

Hereupon this treatise has dealt with the following:

(1) Brief explanation of GB theory

(2) Introduction of some linguistic theories concerning Coreference that has been studied by semanticists, and explanation of it with some quotations in Korean,.Japanese as well as English

(3) With the explanation of Control & Binding, it has been intended to help the reader to make a comparative study of semanticists' Coreference and Chomsky's Control & Binding theory. Syntax shows, in fact, a tendency to pull semantics into its field by introducing Index theory into Coreference — that is,the semantic field is being gradually encroached upon by the syntactic field.

(4) I explained Control & Binding theory that takes an important part in Government & Binding, and also Coreference that has been studied by semanticists, with quotations in various languages besides English, hoping the reader will receive assistance in understanding GB theory.

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國 文 抄 錄

변형-생성문법은 2기로 나누어 생각할 수 있다. 즉 Expanion 과 Retrenchment 가 그것이다. Expansion 시기에는 직접 구성 구절문법의 범위를 벗어난 언어의 심층구조를 파헤치고, 언어의 변형이 강한 연구대상으로 되었는데 Retrenchment 시기에는 여러가지 변형규칙들이 일반화되고 공식화되는 시기였다.

그러나 80년대에 접어들면서 언어학 연구에 새로운 장을 열게 되었으니 그것은 GB treory 에 관한 연구인 것이다.

이것은 과거 20여년동안 주된 연구대상인 언어의 규칙의 체계에 관한 연구에서 원리의 체계를 연구의 대상으로 삼았다는데 언어학 연구에 진일보한 것이며 더욱이 Universal Grammar 에의 접근을 시도했다는데 있다.

규칙체계는 세분야로 나누어 생각해 볼 수 있는데,

① Lexicon ② Syntax ③ Interpretive Component 로 나누어 주로 연구되고 있고,

원리의 체계를 보면

① X-bar theory ② Q-theory ③ Case theory ④ Binding theory ⑤ Bounding theory ⑥ Control theory ⑦ Government theory 등으로 나누어 연구되고 있다.

또한 이 G.B. theory 에서 중요한 부분을 이루는 것은 Zero element(trace. PRO) 가 문분석에 한 요소로서 사용되고 있고 또한 이 Empty Category 연구가 정착화 되고 있다는 것이다. 자연히 지금까지 무시하고 문분석을 했던 Empty Category 의 설정으로 말미암아 지금까지의 방법을 탈피하여 새로운 방법으로 문을 분석하고 연구하게 되었는데, 이에 따라 격연구, θ-theory 연구등 새로운 방향을 모색하게 되고, 특히 이 GB theory 에 의한 세계각국 언어연구가 활발히 진행되고 있는 것이다.

이에 본 논문에서는 Control theory 와 Binding theory 를 논함에 앞서 지금까지 의미론적으로 다루었던 공지시(coreference) 를 다루었는데, 이는 Lasnik, Jackendoff, Kuno, Ross. Langacker 등의 이론을 참작하여 다루었고, 의미론적인 관점에서 다루었다.

또한 변형문법학자들이 공지시개념을 통사론적 입장에서 취급하게 되었는데 이는 Index theory 를 사용함으로써 가능하게 되었다. 즉 지금까지 의미론적으로 다루었던 분야가 통사론에서 취급되고, 이에 대한 이론이 나옴으로써 언어학 연구에 다른 차원이 생기게 되었는데 GB theory 가 나옴으로써 이에 대한 문제는 급격히 해결되게 되었다. 끝으로 지금까지 논했던 것을 기초로 하여 Control theory 와 Binding theory 를 다루었는데 한국어·영어·일본어 등을 예문으로 사용하여 분석, 연구함으로써 폭넓게 이해하고 연구하는데 도움이 되게 했다.