A Study of Pronominal Anaphora in Terms of the 'C-command' Relation

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主審

委員

委員
To my parents.
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요약

본 논문의 목적은 영어 대명사의 조용현상에 있어서 대명사와 선행사의 coreferentiality의 차이가 구조적인 차이에서 온다는 것을 밝히는데 있다. 많은 대명사의 조용현상중 특히 이동규칙(movement rule)이 적용된 문장에서 Lakoff(1968, 1974)가 지적한 subject vs. nonsubject asymmetry를 주로 분석하였다. 이 논문의 이론적 배경은 EST에 기반을 두었다.

본 논문의 조직을 살펴보면

1장에서는 서론으로서 대명사의 조용에 관한 세가지 질문을 제기하였다.
2장에서는 1장에서 제기된 질문에 따라, 대명사의 조용에 관한 지금까지의 연구를 세부적으로 나누어 각각 설명하고 그들이 갖고 있는 문제점을 살펴보았다.
4장에서는 'c-command' 개념에 의해서도 해결되지 않는 문제점을 지적하였으며, 이를 해결하기 위해 'cleft-sentence'의 구조 연구가 이루어져야함을 제시하였다.
Abstract

This thesis is an attempt to show that whether or not there exists a coreferential reading between a pronoun and its antecedent depends on a structural difference. Most of the examples in this thesis deal with the pronominal anaphora. In particular, we analyze an asymmetry pointed out by Lakeoff between subject and object position for the coreferential reading in terms of the notion of ‘c-command’ proposed in Reinhart (1976). The theoretical framework is Extended Standard Theory.

In Chapter I, we ask three questions about the pronominal anaphora.

In Chapter II, according to how grammarians answer those questions, we divide them into three groups—transformationalists, interpretivists, and functionalists. In addition, basic arguments and shortcomings of each group are discussed.

In Chapter III, introducing the notion of ‘c-command’ as a structural condition, we discuss the coreferential reading among NP’s after applying movement rules (e.g., ‘PP Preposing’, ‘Topicalization’, ‘Left Dislocation’, and ‘Extraposition’).

In Chapter IV, we will point out that there remain problems resistant to the ‘c-command’—treatment. Consequently, we indicate that a further study of a structure of cleft sentences is necessary.
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Chapter 1. Introduction

Traditionally, a pronoun is said to have a variable reference which 'stands for' some previously given noun. In other words, the pronoun is coreferential to a previous noun phrase. However, the function of the pronoun is far more complicated than this explanation suggests.

For example,

(1) a. John was hungry after he woke up.
    b. *He was hungry after John woke up.\(^1\)

(2) a. After he woke up, John was hungry.
    b. After John woke up, he was hungry.

The precedence relation between the antecedent and the pronoun can be illustrated by (1). That is, in (1a), John and he can be interpreted to be coreferential while in (1b), in which the pronoun precedes the antecedent, they can not. But note that in (2a), he is coreferential with John although the pronoun is followed by the antecedent. This means that the traditional grammarians' treatment of the pronoun cannot account for the full range of anaphora phenomena.

Now, we may ask the following questions. "What sorts of mechanisms are suited for representing pronominal anaphora in a grammar?"\(^2\) and "What are the conditions on the rule associating anaphora with their antecedents?" To answer these questions, we must first answer some subquestions as follows:
(A) Is there any structural condition which decides anaphoric relation?
(B) Must the coreferential reading be determined within the sentence level?
(C) In which components of grammar are the coreferential readings determined?

Continuous efforts have been made to answer these questions. According to the questions above, we can divide into three groups the many studies dealing with the coreferential reading.

According to how grammarians answer questions (A) and (B) we can group them into functionalists and non-functionalists. The functionalists (Kuno, Bolinger) analyzed the coreferential reading in terms of functional sentence perspectives taking into account the situation or context in which the pronouns occur. They argue that there is no structural restriction on coreferential reading and it is explained only by a semantic analysis based on 'theme' and 'reidentification'.

Among the non-functionalists, transformationalists and interpretivists offer two different answers to question (C). The transformationalists (Langacker, Ross, Postal) argue that pronouns are derived from underlying full noun phrases by pronominalization transformation. That is, sentence (3) is derived from the underlying structure (4).

(3) *John* said that *he* was hungry.
(4) *John* said that *John* was hungry.

On the other hand, the interpretivists (Dougherty, Jackendoff) argue that
pronouns are generated in the base and that there is no pronominalization transformation. In their terms, the coreferential option between the pronoun and antecedent depends on interpretive rules. These two accounts propose essentially the same assumption—that there is a structural condition on coreferential reading, although the former assumes that the coreferential reading is determined in the underlying structure while the latter assumes that the coreferential reading is assigned to the surface structure.

Introducing the notion of 'command' as a structural condition, R.W. Langacker (1969) suggests the constraint on the pronominalization rule as follows:3

(5) NP§ may be used to pronominalize NP^ unless (1) NP^ precedes NP§; and
(2) either (a) NP§ commands NP^, or (b) NP§ and NP^ are elements of separate conjoined structures.

According to the constraint (5), forward pronominalization can be applied only if the precedence condition is met. That is, the constraint (5) correctly predicates that the sentence (1a) is grammatical and (1b) is not. However, observe the following sentences:

(6) a. Near him, Dan saw a snake.
    b. *Near Dan, he saw a snake.
    c. Near Dan, I saw his snake.

(7) a. In Mary's apartment, a thief assaulted her.
b.*In Mary's apartment, she was assaulted by a thief.

(8) a. Mary hit him before John had a chance to get up.

b.*He was hit by Mary before John had a chance to get up.

(9) a. In John's picture of Mary, she looks sick.

b.*In John's picture of Mary, she found a scratch.

We can point out three problems arising from the analysis by the constraint (5) if we observe the coreferential option between the underlined pronouns and the noun phrases in (6)-(9). First, in (6b-9b), coreference is blocked although the pronouns are preceded by their antecedents. Second, we can find that (6c, 7a, 8a), in which the pronouns are in the object position, are grammatical while (6b, 7b, 8b), in which the pronouns are in the subject position, are not. In other words, the constraint (5) cannot explain the asymmetry in coreferentiality between subject and non-subject. Third, (9a) and (9b) have apparently similar structures. Accordingly, the constraint (5) predicts that (9a) and (9b) are both grammatical sentences. But (9a) is grammatical while (9b) is not.

This thesis is an attempt to show that whether or not a pronoun and its antecedent are coreferential depends upon structural difference. In other words, we will argue that there is a structural condition on the coreferential option. This attempt will be made basically through the notion of 'c-command' proposed in Reinhart (1976). Most of the examples in the thesis will deal with the pronominal anaphora. The theoretical framework assumed will be the Extended Standard Theory.
In chapter 2, we will discuss three already proposed solutions to the problems mentioned above—in terms of syntactic account, interpretive account, and functional account. In chapter 3, we will introduce the notion of ‘c-command’ as a structural condition. In chapter 4, we will show that there remain some problems unsolved even if we make use of the ‘c-command’ concept.
Chapter II. Three accounts of coreference

1. Syntactic account

Ross (1967, 1969), Langacker (1969), and Postal (1970) assume that a pronoun originates in deep structure as a full noun phrase identical with its antecedent and that pronominalization transformation replaces the noun phrase with an anaphoric pronoun. They all suggest structural conditions of pronominalization and rule ordering among transformations. In this section, we will compare the condition proposed by Langacker with that proposed by Ross.

To demonstrate a structural relation which restricts application of pronominalization transformation, Langacker (1969) introduces a basic notion of ‘command’ as follows:

(1) A node A ‘commands’ another node B if neither A nor B dominates the other; and the S-node that most immediately dominates A also dominates B.

The ‘command’ relation correctly predicts the difference in grammaticality between (2) and (3).

(2) *He is much more intelligent than Ralph looks.

(3) The woman who is to marry him will visit Ralph tomorrow.

The sentences above have structures in (4) and (5) respectively.

In a similar view, Ross (1969) divides the phenomena of pronominal anaphora into two classes; that is forward (left-to-right) and backward (right-to-left)
pronominalization. He also argues that backward pronominalization may apply if the noun phrase to be changed into a pronoun is in a subordinate clause while forward pronominalization is always free. With that condition, he is able to account for (4) and (5) correctly as does Langacker.

(4)  
\[ \begin{array}{c} \text{S} \\ \quad \text{NP}^p \\ \quad \quad \text{he} \\ \quad \quad \text{NP}^a \\ \quad \quad \quad \text{Ralph} \end{array} \quad \text{S} \] 

(5)  
\[ \begin{array}{c} \text{S} \\ \quad \text{NP}^a \\ \quad \quad \text{him} \\ \quad \quad \text{NP}^p \\ \quad \quad \quad \text{Ralph} \end{array} \]

Consider again the following sentences:

(6)  
A. Near him, Dan saw a snake.

b. *Near Dan, he saw a snake.

These sentences cannot be accounted for by either Langacker’s or Ross’ constraint. We might be able to through rule ordering solve the problem. If pronominalization applies to deep structure (7) before preposing rule, the intermediate structure (8a) is derived, but not (8b):

(7)  
Dan saw a snake near Dan.

(8)  
a. Dan saw a snake near him.

b. *He saw a snake near Dan.

We can now explain the ungrammaticality of (6b) as due to the
ungrammaticality of (8b). Consequently, the rule order (1. pronominalization — 2. preposing rule) can be proposed.

But in what follows, we will show that the solution by the rule ordering is wrong. Observe the following sentences:

(9) a. *Herbert bought a car before he left town.

b. He bought a car before Herbert left town.

(10) a. Before he left town, Herbert bought a car.

b. Before Herbert left town, he bought a car.

Both (10a) and (10b) have the same deep structure (11).

(11) Herbert bought a car before Herbert left town.

According to the rule ordering proposed above, (10b) would not be derived because of the ungrammaticality of (9b) if pronominalization comes before the preposing rule. Therefore, Langacker (1969) proposes the rule order 1. preposing rule, 2. pronominalization. Now, we face to ordering paradoxes like 1. preposing rule — 2. pronominalization — 3. preposing rule.

On the other hand, Ross (1969) argues that pronominalization is an obligatory cyclic rule; that is, the rule applies first to the most deeply embedded S, then to the next most deeply embedded S, and so on. But Lakoff (1968, 1974) and Postal (1970) argue against the cyclicity of pronominalization by showing that pronominalization cannot come before either ‘Extraposition’ or ‘WH Q Movement’ which are last-cyclic rules, respectively. In other words, they claim that pronominalization must be last-cyclic.
Now, let us consider their arguments for the last-cyclicity of pronominalization. In (12)-(15), we find that 'Extraposition' decreases pronominalization possibilities while 'WH Q Movement' increases them.

(12) a. That Mary is pregnant disturbs her.
    b. That she is pregnant disturbs Mary.

(13) a. *It disturbs her that Mary is pregnant.
    b. It disturbs Mary that she is pregnant.

(14) a. Mary visited someone she knows.
    b. *She visited someone Mary knows.

(15) a. Who that she knows did Mary visit?
    b. Who that Mary knows did she visit?

If pronominalization comes before 'Extraposition' and 'WH Q Movement', (13a) cannot be blocked and (15b) cannot be derived. Thus, the rule ordering paradox for the transformational theory remains unsolved.

2. Interpretive account

Interpretivists (Dougherty; 1969, Jackendoff; 1972) claimed that the coreference relation between noun phrases cannot be referred to by transformation because it is an aspect of semantic interpretation. Hence, they assume that pronouns are present in deep structure as lexical items with the feature [+pro] and that their antecedents are determined in the semantic component by interpretive rules.
According to Jackendoff (1972), coreference relation is expressed in a table of coreference. He suggests two rules as follows:

(16) **Coreferential rule** (optional)

Enter in the table: \( NP^1 \text{ coref} \left( NP^2 \text{ +PRO} \right) \) unless \( NP^2 \) both precedes and commands \( NP^1 \)

(17) **Noncoreferential rule** (obligatory)

If for any \( NP^1 \) and \( NP^2 \) in a sentence, there is no entry in the table \( NP^1 \pm \text{ coref} NP^2 \), enter in the table \( NP^1 \neg \text{ coref} NP^2 \).

Rule (17) says that any noun phrases that have not yet been related by a rule of coreference are noncoreferential.

Now, let us turn to the ordering paradox. In order to resolve the paradox, the interpretive theory suggests that the interpretive rule for pronominalization applies not to deep structure, but to surface structure. Consider the following sentences:

(18) a. *Frank said that it disturbs *her that *Mary is pregnant.

b. Frank said that it disturbs *Mary that *she is pregnant.

(19) a. Who that *she knew do you think *Mary visited.

b. Who that *Mary knew do you think *she visited.

In the interpretive theory, these sentences have the respective underlying structures (20) and (21), with pronouns generated in the base.

(20) a. \([s_1 \text{ Frank said } [s_2 \text{ that } [s_3 \text{ that Mary is pregnant disturbs her}]])\)
b. \([s_1 \text{ Frank said } [s_2 \text{ that } [s_3 \text{ that she is pregnant disturbs Mary}]]]\)

(21) a. \([s_1 \text{ You think } [s_2 \text{ Mary visited who } [s_3 \text{ that she knew}]]]\)

b. \([s_1 \text{ You think } [s_2 \text{ she visited who } [s_3 \text{ that Mary knew}]]]\)

Only in (21b), the environment for pronominalization does not appear on the \(S_2\) cycle. However, since Jackendoff (1972) assumes that the coreferential rule (16) is a cyclic rule and applies after ‘WH Q Movement’, \(she\) and \(Mary\) can be marked coreferential in \(S_1\) after ‘WH Q Movement’ has applied in the \(S_1\) cycle to form (19b).

Now, consider the noncoreferential rule (17) after Extraposition applies to (20a), the rule (17) makes \(her\) and \(Mary\) in (18a) noncoreferential. If ‘WH Q Movement’ does not occur in (21b), then \(she\) and \(Mary\) is marked noncoreferential by the rule (17). A cyclic rule of coreferential rule combined with a last-cyclic noncoreferential rule can cope with the examples that are problematic to the transformational theory.

In the above sections, we noticed that the constraint on the transformation proposed by Langacker (1969) is preserved as the constraint on an interpretive rule. In other words, the syntactic and interpretive accounts propose essentially the same constraint; that is, there is a structural condition on coreferential reading. The only difference between those two approaches is that the former assumes that the coreferential reading is represented in the underlying structure while the latter assumes that the coreferential reading is assigned to the surface structure.
But whether coreferential reading is determined in deep structure level or in surface structure level, there are sentences in which the structural relation ('precede and command') cannot explain the coreferential option. Observe the following sentences by which Lakoff (1968, 1974) demonstrates an asymmetry in coreferential possibility between subject and object.

(22) a. In Mary's apartment, a thief assaulted her.
   b. In her apartment, a thief assaulted Mary.

(23) a. *In Mary's apartment, she was assaulted by a thief.
   b. In her apartment, Mary was assaulted by a thief.

(24) a. Mary hit John before he had a chance to get up.
   b. Mary hit him before John had a chance to get up.

(25) a. John was hit by Mary before he had a chance to get up.
   b. *He was hit by Mary before John had a chance to get up.

Two simple trees (26) and (27) show the structures of (22)-(25).

(26) S
   └── PP
       └── NP_1
           └── VP
               └── P
                   └── NP_2

(27) S
   └── PP
       └── NP_1
           └── VP
               └── V
                   └── NP_2
                       └── P
                           └── S
                               └── NP_3
First, let us consider the tree (27). In Langacker's terms, NP₁ precedes and commands NP₂ and NP₃. Hence, NP₂ and NP₃ must be pronouns to have a coreferential relation as in (26). NP₂ also precedes and commands NP₃. But in (24b), backward pronominalization is possible.

Second, let us consider the tree (26) with a preposed constituent. NP₃ precedes and commands NP₁ and NP₂. But in (22b), in which NP is in the object position, backward pronominalization is acceptable while in (23a), in which NP is in the subject position, forward pronominalization is blocked and backward pronominalization is possible.

These problems can be solved in either of two ways. One solution is to postulate some other structural condition for coreferential reading instead of 'precede and command' relation. This alternative condition will be discussed in chapter 3. The other is to claim that there is no structural condition for coreferential reading. Section 3. will be concerned with this claim.

3. Functional account

Without depending on formal treatment of pronominalization which generative-transformationalists emphasize, the functionalists (Kuno, Bolinger) demonstrated that the functional sentence perspective within the framework of discourse analysis is more adequate to account for pronominalization phenomena. They argue that the key to pronominalization is not to be found on the sentence level.
For example, two grammatical sentences (28) and (29)

(28) If John can, he will go to see a movie.

(29) If he can, John will to go see a movie.

are not always acceptable in discourse as follows:

(30) Speaker A: What will John do this Sunday?

Speaker B: a. If he can, John will go to see a movie.

B.*If John can, he will go to see a movie.

(31) Speaker A: Who will do this for me?

Speaker B: a.*If he can do it, John will do it.

b. If John can do it, he will do it.

Kuno (1972a, 1978, 1980) accounts for the difference in acceptability between (30) and (31) by introducing functional notions. Informal definitions of some of these notions are as follows:

(A) Old (predictable) Information: An element in a sentence represents old, predictable information if it is recoverable from its preceding context.

(B) New (unpredictable) Information: An element in a sentence represents new, unpredictable information if it is not recoverable from the preceding context.

(C) Theme: Theme is what the rest of the sentence is about.

(D) Rheme: Rheme is the part of the sentence that contains new information.

Kuno (1972a) accounts for the unacceptability of (30b) by a constraint that a
predictable theme (i.e., the subject of the main clause in (30b)) cannot be pronominalized intrasententially and the unacceptability of (31a) by a constraint that backward pronominalization is possible only when the reference of the pronoun is predictable from the preceding discourse.

Now, consider the following sentences:

(32) a. In Mary's portrait, she looks sick.
    b. In her portrait, Mary looks sick.

(33) a.*In Mary's portrait, she found a scratch.
    b. In her portrait, Mary found a scratch.

(32) and (33) are structurally parallel, but coreference is impossible only in (33a). Let us contrast Jackendoff's account with Kuno's account. Jackendoff (1975) accounts for the coreferential reading semantically; that is, she must denote 'Real-Mary' in (33a) while 'Image-Mary's in (32a). In order to explain the difference in coreferentiality between (32a) and (33a), Jackendoff (1980) proposes two sets of rules; that is, 'lexical decomposition rules' (LDR) and 'image correspondence rules' (ICR) as follows:

(34) a. 'real-character' ——— 'image-character'
    LDR
    b. 'image-character' ——— 'image-character'
    ICR

If we apply (34) to (32) and (33), we get the following:
(35) a. In Mary's portrait, she looks sick.
    real — image — image
    LDR       ICR
b. In Mary's portrait, she found a scratch.
    real — image — real
    LDR       ICR

In (35a), we get the image-character by virtue of ICR. And in (35b), we get the
real-character violating ICR. Hence, (35a) is grammatical while (35b) is not. But
he cannot account for syntactically similar sentences with nonimage interpretations as follows:

(36) a. In Mary's apartment, she feels sick.
    b. In her apartment, Mary feels sick.
(37) a.*In Mary's apartment, she smokes dope.
    b. In her apartment, Mary smokes dope.

In (36) and (37), coreferential possibilities are the same as in (32) and (33),
respectively.

Kuno (1975, 1978) accounts for (32)-(33) and (36)-(37) with the distinction
between thematic and nonthematic adverbs. According to him, there are two
types of adverbs. One is a thematic adverb, and the other is a nonthematic
adverb; that is, in (38b), in 1960 receives thematic interpretation while in (38a),
in 1960 receives nonthematic interpretation.

(38) a. John was born in 1960.
b. John was still a small boy in 1960.

The interpretation of (38a) is that of when John was born; that is, the time adverb is a nonthematic time-specifying adverb. On the other hand, (38b) is a statement about how the situation was in 1960. Kuno argues that the thematic adverbs originate from a sentential-initial position in deep structure and the nonthematic adverbs originate from a VP-internal position in deep structure. Therefore, forward pronominalization is unacceptable in (33) and (37). 5)

But he fails to explain the grammaticality of (36b) in which backward pronominalization applies. And if a thematic adverb is postposed as in (39).

(39) a. *She feels sick in Mary's apartment.
    b. Mary feels sick in her apartment.

he must give another condition to explain the unacceptability of (39a) with a postposed adverbial.

Now, consider Bolinger’s opinion of so-called backward pronominalization. According to Bolinger (1977), in the sentence (30a), the noun phrase John is not the antecedent of the pronoun he, but the one which is reidentified or repeated. In addition to a condition of ‘tight and loose connection’, Bolinger (1979) formulates the following principles as a condition on NP reidentification, by making use of the Kuno’s theme-rheme relation to reidentification.

(40) The topic may be reidentified easily in the theme, but in the rheme only if the theme lacks a normally topical form.
Let us apply (40) to (22)-(25). The subjects of the sentences (23) and (25) are normally interpreted as the theme. Hence, (23a) and (25a), in which full noun phrases are reidentified in the non-thematic positions, are unacceptable while (23b) and (25b), in which noun phrases are reidentified in the thematic positions, are acceptable. But (40) does not explain (22) and (25) in which backward and forward pronominalizations can apply.

On the other hand, let us consider (32-33) and (36-37). In (33a) and (37a), Mary is reidentified in the non-thematic adverbs while in (32a) and (36a), Mary is reidentified in the thematic adverbs. This fact accounts for the difference in acceptability between them. Since the subjects can be also themes, in (32b) and (36b), Mary can be reidentified in the subject positions.

In short, the functionalists argue that there is no backward anaphora and that all pronouns have their antecedents in the preceding discourse as in (41).

(41) A. S₁: ... NPₐ ... 

B. S₂: ... NP₈ ... NPₐ ... 

However, they cannot explain some sentences indicated above. Furthermore, G. Carden (1980) convincingly argued against the claim that there exists only forward pronominalization by presenting data from spontaneously-produced discourses in which backward anaphora applies.
Chapter III. 'C-command' condition on coreference

We noted that there must be some other constraint on coreferential reading instead of the 'precede and command' relation in the previous chapter. The other structural restriction based on Reinhart (1976, 1981) will be discussed in this chapter.

1. Syntactic domains of 'c-command'

Before considering the alternative structural restriction on coreferential reading, we will consider the general characterization of syntactic domain.

Langacker (1969) proposes 'restricted domain principle' which is limited to two echelons of embedding in order to explain embedding rules. 40 Thus, he characterizes the structural relation between two elements in terms of a syntactic domain. Claiming that the structural condition on coreference can be defined by the syntactic domain, Reinhart (1976) defines a domain of Langacker's 'precede and command' relation as follows:

(1) The domain of a node A consists of A together with all and only the nodes that A precedes and commands.

For example, let us consider a sentence (2), which has a structure in (3).

(2) Susan married Ed in June.
By definition (1), the domain of the subject in (3) is the whole sentence since the subject precedes and commands the whole sentence and the domain of the verb is the VP. We also have the domains \([Ed \ in \ June], \ [in \ June],\) and \([June]\). As we saw, such domains are not all constituents. Therefore, the domain of ‘precede and command’ relation is not appropriate to show a relation between two elements.

As an alternative structural relation, Reinhart (1976) proposes ‘constituent-command’ (hence, c-command). The definition of ‘c-command is given by Reinhart (1976) as follows:

(4) Node A c(onstituent)-commands node B iff the branching node \(\alpha_1\) most immediately dominating A either dominates B or is immediately dominated by a node \(\alpha_2\) which dominates B, and \(\alpha_2\) is of the same category type as \(\alpha_1\).  

—20—
The syntactic domain of a given node can be defined as (5) by the alternative structural restriction.

(5) The domain of a node A consists of all and only the nodes c-commanded by A.

Let us consider again the sentence (2). Within the COMP theory, the sentence (2) has a structure (6).

(6)

```
  S
 /   \
 COMP  S
    /   \
   NP₁  VP
      / \
     V  NP₂
       / \
      Ed  P
       / \
     NP₃  in
```

According to the definition (4), the subject of S in (6) c-commands not only VP but also the COMP of S because the branching node S most immediately dominating NP₁ is immediately dominated by a node S which dominates COMP, and S is of the same category type as S. Hence, the c-command domain of the subject is the whole sentence. In the same way, the domain of the verb is the VP just as the domain of 'precede and command' relation. But note that the domain
of the object is also the whole $\overline{VP}$ because the NP$_2$ c-commands not only the verb but also the PP. Similarly, the domain of NP$_3$ is the PP. Thus, the domains defined in (5) are always constituents; that is, S, VP, and PP.

Now, let us see how the coreference restriction operates on the ‘c-command’ domains. A coreference restriction (8) is suggested by Reinhart (1976).

(8) A given NP cannot be interpreted as coreferential with a distinct nonpronoun in its c-command domain.

The restriction (8) means that the other NP$_3$ which are in the ‘c-command’ domain of the given NP must be marked by pronouns in order to be coreferential with the given NP. But the coreferential reading is free if the other NPs are not in the domain of the given NP.

In chapter II, seemingly unsolved coreference problems in sentences with a moved constituent were noted. Movement rules affecting coreferential reading can be divided into two classes; that is, leftward movement rules (e.g., ‘PP Preposing’, ‘Topicalization’, and ‘Left Dislocation’) and rightward movement rules (e.g., ‘Extraposition’). The coreference difference among NPs after those movement rules applies will be discussed to test the alternative syntactic restriction mentioned above. In other words, we will show sentences in which, according to the ‘c-command’ definition, a full noun phrase is not in the domain of a pronoun and coreference is permitted though the full noun phrase is in the domain of the pronoun and coreference should be blocked according to the ‘precede and command’ definition.
2. The coreference in sentences with a moved constituent.

2.1. Prepositional phrase and preposing

Emonds (1976) makes an argument that sentential PP’s and verb-phraseal PP’s are generated by different base rules like (9).

(9) a. S → S – PP
       b. VP → VP – PP

According to him, a number of ‘causal’ PP’s (e.g., because (of), in case (of), on account of, in order, so that, if, unless, despite, although, etc.) are sentential PP’s. In addition to those PP’s, Williams (1975) argues that whether-clauses and with-phrases (e.g., with John gone) are also sentential PP’s. PP’s which are always verb-phraseal are instrumental (with...) PP’s, manner (by...) PP’s and PP’s in a sentence with a verb which is subcategorized to require a PP.

Consider the following examples:

(11) a. We sent him to West Point in order to please Ben’s mother.

       b. We’ll just have to find him whether McIntosh likes it or not.

(12) a.*Rosa tickled him with Ben’s feather.

       b.*It’s time to put him in the baby’s bed.

The sentences (11) and (12) have structures in (13) and (14) respectively.
If we examine the ‘c-command’ domain of PP, sentential PP in (13) is not in the domain of the object, and the coreference restriction does not apply to block coreference as in (11). On the other hand, the verb-phrasal PP in (14) is in the domain of the object, and coreference between pronouns and NP’s is blocked as in (12). But note that regardless of whether the PP is sentential of verb-phrasal,
the NP in the PP in (13) and (14) are in the domain of the subject. It correctly predicts the ungrammaticality of the sentences in (15b-16b).

(15) a. John was hit by Mary before he had a chance to get up.

b. *He was hit by Mary before John had a chance to get up.

(16) a. Mary was assaulted by a thief in her apartment.

b. *She was assaulted by a thief in Mary's apartment.

Now, consider the following examples:

(17) a. Rosa is riding a horse in Ben's picture.

b. Rosa found a scratch in Ben's picture.


b. The gangster killed Hoffa in Detroit.

Kuno(1975, 1978) distinguishes (17a-18a) from (17b-18b) in his terms of thematic and nonthematic adverb, respectively. According to him, the former is a sentential PP and the latter is a verb-phrasal PP. It means that some other PP's are not inherently marked as sentential or verb-phrasal. While Kuno argues that the distinction can be explained by the semantic factor, Reinhart (1976, 1981) shows that there exist syntactic differences corresponding to the Kuno's distinction by means of syntactic rules which operate on the whole VP, such as, 'Pseudo-clefts', 'Though Movement', and 'VP Preposing'.

For example, let us consider the test with 'Pseudo-clefts' The predicate part of pseudo-cleft sentences can consist of VP constituents while what-clause can
consist of non-VP constituents; that is \([\text{what} \ldots \text{did}] \text{ is } [\text{VP} \ldots]\). If we apply 'Pseudo-clefts' to (17) and (18), the results are (19) and (20) respectively:

(19) a. I. *[what Rosa did] was [\text{VP} \text{ ride a horse } [\text{PP } \text{ in Ben's picture}]]

II. [What Rosa did] was [\text{VP} \text{ find a scratch } [\text{PP } \text{ in Ben's picture}]]

b. I. [what Rosa did] was [\text{PP } \text{ in Ben's picture}] was [\text{VP} \text{ ride a horse}]

II. *[what Rosa did [\text{PP } \text{ in Ben's picture}]] was [\text{VP} \text{ find a scratch}]

(20) a. I. [what people do] is [\text{VP} \text{ worship Kissinger } [\text{PP } \text{ in Washington}]]

II. [what the gangster did] is [\text{VP} \text{ kill Hoffa } [\text{PP } \text{ in Detroit}]]

b. I. [what people do [\text{PP } \text{ in Washington}]] is [\text{VP} \text{ worship Kissinger}]

II. *[what the gangster did [\text{PP } \text{ in Detroit}]] is [\text{VP} \text{ kill Hoffa}]

We can see from this test that the PP's are sentential in (17a-18a) but the PP's are verb-phrasal in (17b-18b).

Now, observe the coreferential option in sentences with a preposed PP. In this case, we can raise a question as to where the preposed constituent is attached.

Emonds (1976) gives an answer that all the root transformations that front phrasal constituents without inducing comma intonation are substitutions for the sentence-initial COMP node. According to him, both structures in (13) and (14), have the same surface structure, that is the structure like (21) after 'PP Preposing' applied.
(21)

\[
\begin{array}{c}
\text{S} \\
\text{COMP} \\
\text{PP} \\
P \\
\text{NP}_3 \\
\text{S} \\
\text{NP}_1 \\
\text{VP} \\
V \\
\text{NP}_2 \\
\end{array}
\]

In the structure (21), NP$_3$ and NP$_2$ do not c-command each other. Hence, they are in different domains; that is, so-called forward and backward pronominalizations are all possible as in (22) and (23).

(22) a. In her apartment, a thief assaulted Mary.

b. In Mary's apartment, a thief assaulted her.

(23) a. Before he had a chance to get up, Mary hit John.

b. Before John had a chance to get up, Mary hit him.

If we observe the relation between NP$_1$ and NP$_3$ in (21), we can see that NP$_3$ is in the domain of NP$_1$. Therefore, NP$_3$ must be a pronoun in order to be coreferential with NP$_1$. This analysis can explain (25), in which a verb-phraseal PP is preposed, but cannot explain (24), in which a sentential PP is preposed.

(24) a. Before he had a chance, John was hit by Mary.

b. Before John had a chance, he was hit by Mary.

(25) a. In her apartment, Mary was assaulted by a thief.

b."In Mary's apartment, she was assaulted by a thief."
Therefore, we can assume that sentential PP's and verb-phrasal PP's are attached to different positions. The assumption can be supported by the fact that 'WH-Fronting' is possible after the sentential PP as in (26a-27a) while not after the verb-phrasal PP as in (27b).

(26) a. In Ben's picture of her, how does she look?
   b. *In Ben's picture of her, what did she find?

(27) a. In Washington, who do they worship?
   b. *In Detroit, who did the gangster kill?

Reinhart (1976) suggests that verb-phrasal PP's are moved into the COMP position, but sentential PP's are moved into a higher position than the S-node dominating COMP. According to him, the sentences (24) and (25) have the structures in (28) and (29), respectively.

(28)
The difference between the structures (28) and (29) is only in the relation of NP₁ and NP₃; that is, NP₁ does not c-commands NP₃ in (28) but NP₁ c-commands NP₃ in (29). Hence, in (24), backward and forward pronominalizations are possible while in (25), forward pronominalization is impossible.

Furthermore, Reinhart (1976) illustrated sentences in (30) to show why the coreference rule cannot apply directly to semantic representation involving them-rheme distinction.

(30) a. In Rosa’s wedding picture, she looks like a lady.

b. I.*In Rosa’s wedding picture, she hopes to look like a lady.

II. In her wedding picture, Rosa hopes to look like a lady.

As in (30a), PP in (30b) is a thematic adverb which originates from sentence-initial position in Kuno’s opinion. Therefore, forward pronominalization must be possible, but not in fact. The reason is that the PP in (30b) function as verb-
phrasal PP of $S_1$ because the clause ($S_2$) containing this PP in the underlying structure (31) is in the VP of $S_1$ although in its clause the PP is sentential.

(31) $S_1$ Rosa hopes $S_2$ to look like a a lady [PP in her wedding picture]]

2.2. Topicalization and Left Dislocation

Ross (1967) classifies ‘Topicalization’ and ‘Left Dislocation’ among chopping transformations and copying transformations respectively. He also formalize the two rules as follows:

(32) *Topicalization* (optional)

```
       X  —  NP  —  Y
 1  2  3
2#[1  2  3]
``` 

(33) *Left Dislocation* (optional)

```
       X  —  NP  —  Y
 1  2  3
2#[1 2  3]
       +PRO
``` 

On the other hand, Emonds distinguishes root transformations that induce comma intonation from those that do not induce comma intonation. He called the latter COMP substitution rules. Then he suggests that ‘Left Dislocation’ belongs to the former and ‘Topicalization’ belongs to the latter. According to him, both rules attach NP’s to the highest S because all the root transformations
are substitutions for the sentence-initial COMP node.

Now, let us consider the coreference in the following sentences with a topicalized or left dislocated NP.

(34) a. *Sonya, she denies that Hirschel admires.
    b. Sonya, she denies that Hirschel admires her.

In the sentences above, we can find difference in coreferentialty between (34a) and (34b); that is, forward pronominalization is blocked in (34a) while forward pronominalization is permitted in (34b). Hence, we can assume that (34a) and (34b) have different surface structures.

Observing that the difference in coreferentiality between sentences with a topicalized NP and a left dislocated NP is parallel to the difference between sentences with a preposed verb-phrasal PP and a preposed sentential PP, Reinhart (1976) argues that the topicalized NP is attached to the COMP node as in (35) but left dislocated NP is attached to a position higher than the COMP as in (36).

(35)
In (35), the topicalized NP is c-commanded by the subject while in (36) the left dislocated NP is not c-commanded by the subject. Hence, the difference in coreferentiality between (34a) and (34b) can be explained by ‘c-command’ domains.

Reinhart’s argument can be supported by the following syntactic test. This test shows us that a topicalized NP can follow a left dislocated NP as in (37b) but not conversely, as in (37c).

(37) a. I will dedicate my next book to Rosa.

b. Rosa, my next book, I will dedicate to her.

c. *My next book, Rosa, I will dedicate to her.

2.3. Extraposition.

As mentioned in the previous sections, the position to which an extraposed
clause is attached is important in this section because the syntactic domain which decides coreference among NP’s depends on the position. There are two views on the position of an extraposed clause.

First, Rosenbaum (1968) and Emonds (1976) both have the assumption that all extraposed clauses are attached to the VP of S. In Emonds’ framework, ‘Extraposition’ is a structure-preserving rule because the following structure is generated by a base rule.

\[
\begin{array}{c}
\text{(38)} \\
VP \\
V \quad S
\end{array}
\]

Therefore, to preserve the structure generated by the base rule, the extraposed clause must be moved into the S-node immediately dominated by the VP.

An alternative analysis is suggested by Williams (1975). He classifies items that occur after a verb in a clause into four groups as follows;

\[
\begin{array}{c}
\text{(39)} \\
S \\
\text{COMP} \quad S' \quad \text{IV} \\
\text{NP} \quad \text{Pred., Phr.} \quad \text{II} \\
\text{Aux} \quad \text{VP} \quad \text{II} \\
\text{V} \quad \text{I}
\end{array}
\]
Then, he argues that 'Extraposition' must be applied strictly with IV group. In other words, all extraposed clauses are attached to the matrix S-node which corresponds to the S-node of the Extended Standard Theory.

Now, consider the following sentences:

(40) a. [₅That Rosa has failed] bothered her.
   
   b.*It bothered her [₅ that Rosa has failed.]

(41) a. Nobody [₅ who knows anything about Rosa's weird sleep habits] would ever call her before noon.
   
   b. Nobody would ever call her before noon [₅ who knows anything about Rosa's weird sleep habit.]

The difference in coreferentiality between (40) and (41) shows that the assumption that all extraposed clauses are attached to the same position is wrong.

The difference in coreferentiality between (40) and (41) is explained by Reinhart's analysis that sentential-subject Extraposition as in (40) attaches the extraposed S₂ to the VP, while Extraposition form NP as in (41) attaches the extraposed S₂ to the matrix S node. Thus (40) and (41) have different surface structures (42) and (43) respectively.
In (42), the object c-commands the NP in the extraposed clause, but in (43), the object does not c-command the NP in that clause.

The discussion in this chapter has shown that the same movement rule attaches a moved constituent to the different positions. According to the 'c-command' definition, coreference is permitted though coreference should be blocked according to the 'precede and command' definition in the sentences
with a moved constituent. Consequently, 'c-command' relation correctly explains the asymmetry pointed out by Lakoff between subject and object position for the coreferential reading.
Chapter IV. Problems

In the previous chapter, we discussed the coreferential condition based on a structural relation (i.e., ‘c-command’ relation). The ‘c-command’ relation can correctly explain the asymmetry in coreferentiality between subject and nonsubject positions which is pointed out by Lakoff (1968, 1974).

As in the movement rules discussed in chapter two, the asymmetry of subject vs. nonsubject in cleft sentences is illustrated by Lakoff as follows:

(44) a. It was his dog that John bit.
    b. *It was John’s dog that he bit.

(45) a. It was his dog that bit John.
    b. It was John’s dog that bit him.

In the cleft construction (‘it — is — focus constituent — that — S), the focus constituent receives the main sentence stress. In (44), where a focused constituent is the object, backward pronominalization is blocked while in (45), where a focused NP is the subject, forward and backward pronominalizations are permitted. Such examples show that in cleft sentences the subject of a that-clause c-commands the focused constituent while the object does not.

Now, consider the structure of the cleft sentence. Akamjian (1970) proposes that a cleft sentence is syntactically derived from pseudo-cleft sentence by a rule (in his terms, ‘Cleft-Extraposition’) which extraposes the initial clause of the pseudo-cleft sentence to the end of
sentence with ‘It’ left behind. Agreeing with Akmajian’s assumption, Emonds (1976) argues that the ‘Cleft-Extraposition’ is structure-preserving, hence, the rule moves a S constituent as the arrow in (46) shows.

(46)

According to Akmajian and Emonds, (44) have the structure in (47).

(47)

By the definition of ‘c-command’, NP₁ c-commands NP₂ in (47). Hence, NP₂ must be a pronoun in order to be coreferential with NP₁. But (44b) in which NP₂
is a pronoun is ungrammatical.

A different structure of the cleft sentence is assumed by Chomsky (1977). According to his analysis, the underlying structure of the cleft sentence is as in (48).

(48) it — is — [s TOP S]^{10}

Giving the following examples, he argues that the cleft derives from topicalization.

(49) a. The book, I read.
   b. It was the book that I read.

(50) a. This book, I asked Bill to read.
   b. It was this book that I asked Bill to read.

According to Chomsky (1977), the structure of (44) is (51) which shows the structure of predicate part.

\[ (51) \]

\[
\begin{array}{c}
\overline{S} \\
\text{Top} \\
NP_1 \\
\vdots \\
NP_2 \\
\end{array}
\]

As in (47), NP_2 must be a pronoun in order to be coreferential with NP_1 in (51) because NP_2 is c-commanded by NP_1.
On those assumptions, the coreferential option in (48) cannot be explained by any of the analyses mentioned above. Furthermore, the coreferential option in (49), where a focused NP is the subject because on Akmajian's assumption, the predicate part of Pseud-cleft sentence can consists on only VP and on Chomsky's assumption, the subject cannot be topicalized.

Now, we are not sure that there is a structure which defines coreferential reading in cleft sentences correctly by the definition of 'c-command'.
Chapter V. Conclusion

If our discussion in this thesis is correct, it has the following implications:

First, there must be a syntactic condition for coreferential reading. This claim is supported by the fact that thematic and nonthematic adverbs in Kuno's sense, or left dislocated and topicalized NP's, or extraposed sentential subject and extraposed clause from NP are attached to different positions, when applying those movement rules. This is an argument for structural approaches and against functional approaches.

Second, pronouns are generated by the base rule in deep structure, not by transformation. And the syntactic condition is applied not to deep structure but to surface structure. This is an argument for interpretivists and against transformationalists.

Finally, our discussion presents a problem to be studied further; that is, the structure of cleft sentences.
NOTES

1) The asterisk in (1b) indicates that the underlined pronoun and NP cannot be coreferential. But the sentence is acceptable if the pronoun has the antecedent in a previous context.

2) According to Chomsky, there are three distinct types of anaphora.
   (i) Anaphors which can have no independent referent (e.g., reciprocal anaphors, and reflexive anaphors)
   (ii) Pronominals that are traditionally called ‘personal pronouns’
   (iii) Lexical NP which are neither anaphors nor pronominals.

3) See p.6.

4) According to Emonds (1976), a node which immediately dominates before-clauses in (22-23) is PP in the structure (25). (see note 8.)

5) Another Kuno’s account for (32-33) as follows: (33) is generated by applying Reflexivization to the deep structure (i) and then preposing the adverbial phrase.
   (i) *Mary* found a scratch in *Mary’s* portrait.

Hence, *Mary* cannot appear in the preposed adverbial phrase in (32), that is, a thematic adverb originated from the sentence-initial position and Reflexivization cannot apply backwards, *Mary* can appear in the sentence-initial adverbial phrase in (32).
6) For example, consider extraposition.
   (i) a. \([_S \text{ That Peter is a drunk}]\) bothers Penelope.
       b. it bothers Penelope \([_S \text{ that Peter is a drunk.}]\)
   If this rule were not restricted in scope to two echelons, the wrong results
   would be obtained in some instances as in (ii):
   (ii) a. \([_S \text{ That Harvey thinks [ that Peter is a drunk ]}]\) bothers Penelope.
       b. *That Harvey thinks (it) bothers Penelope that Peter is a drunk.
       c. it bothers Penelope \([_S \text{ that Harvey thinks[_S that Peter is a drunk]}]\).

7) Bresnan (1970) and Emonds (1976) suggests a base rule as follows:
   (i) $\bar{S} \rightarrow \text{COMP S}$

8) According to Emonds (1976), the node label PP indicates not only
   prepositional phrases in the traditonal sense of that term (Preposition with
   NP object) but also certain clauses introduced by subordinating
   conjuctions and certain other adverb phrases.

9) For example, Put \([+ - \text{ NP PP}]\)

10) See Chomsky (1977), P. 211.
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