THE THEORY OF ANAPHORA IN KOREAN SYNTAX

by

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The Theory of Anaphora in Korean Syntax

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ABSTRACT

Anaphoric relations of the three Korean pro-forms, caki, k4, and Ø are discussed. Their distribution and the constraints restricting their occurrence will be shown to depend partly on the structural configurations in which they occur and partly on conditions like Primacy and the A-Over-A Principle. A notion like 'closeness' in terms of hierarchical nodes will be shown to be relevant in defining certain anaphoric linkages. The Thematic Hierarchy and the Hierarchy of Emptiness will be defined and illustrated. They show what properties are needed by an NP to be able to serve as an anaphor of a certain pro-form. The question of how much ambiguity is tolerated by each of the above pro-forms will also be discussed. It will be shown that there is another hierarchy of tolerance for ambiguity. A unique set of algorithms are developed for formalizing the preferences of the pro-form caki. Advantages and problems with formalizing the anaphoric relations of these pro-forms within the 'Extended Standard Theory' will be discussed.

Thesis Supervisor: John Robert Ross
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1. Structural Conditions on Caki Coreference

1.1 Preview

In this chapter, I will discuss coreference possibilities of caki within sentences. By tradition, caki has been referred to as a reflexive pronoun, but that is not its only usage. Caki is the only way to express a direct object that is coreferential with a third person clause-mate subject—in this respect, it is like English pronouns in -self. However, caki, unlike those English pronouns, can also be used across clauses.

(a) Bill₁ -i caki₁ -l₁₁ pipʰ an-het-ta.
    NM himself AM criticized

    Bill₁ criticized himself₁.

(b) Peterₐ -ka [Bill₁ -i caki₁ -l₁₁ pipʰ an-het-ta-kow]
    NM NM him-{i} {j} AM criticized comp.
    (self) {j}

    mal-het-ta.
    said

    Peterₐ said that Bill₁ criticized himself₁ / self₁.

(a) shows caki's use as a reflexive pronoun. (b) shows that caki is not sentence-bound.

This chapter is organized in terms of syntactic structures and will proceed in the following order: simple sentences, complements, adverbials, relative clauses, and coordinate structures. Possible and impossible anaphors of caki will be considered. It will be shown that when more than one possible anaphor occurs in a sentence, caki prefers the hierarchically closest. Algorithms will be developed which will account for anaphoric preferences. It will be shown that caki coref-
erence is structure-dependent, and that there is an interaction between anaphoric preferences and sentence nodes. Consideration will be given to anaphoric linkages which are established in sentences with two caki's.

1.2 Caki in Simple Sentences

1.2.1 Caki must refer to an animate, singular third person NP, and has a strong syntactic tendency to refer to a subject.¹

(1) John₁-i Billᵢ-ke caki₁ j yekî-lîl het-ta.  
John₁ talked to Billᵢ about himselfᵢ.

(2) John₁-i Billᵢ-lîl cakiᵢ i chip-e telikow-kat-ta.  
John₁ took Billᵢ to hisᵢ house.

That caki refers to a surface subject can be seen from (3), the passive of (2), in which the grammaticality of the two possible anaphoric linkages of caki is reversed.

(3) Billᵢ-j Johnᵢ-hantʰe cakiᵢ  j chip-e telyo-ka-pat-at-ta.  
Billᵢ was taken to hisᵢ house by Johnᵢ.

In (2), caki refers to the subject of the active form of the verb telikow-ka-ta 'to take'. In (3), caki refers to the subject of the passive form of the verb telyo-ka-pat-ta 'to be taken'.

The following sentences have causative forms of the verb.

Johnᵢ made Billᵢ do hisᵢ homeworkᵢ.
b. John\textsubscript{1} Bill\textsubscript{1} eke caki\textsubscript{1} sukce-l\textsubscript{1} sik\textsuperscript{h} yot-t\textsubscript{a}.
John\textsubscript{1} made Bill\textsubscript{1} do his\textsubscript{1} homework.

In (4a), the verbs mant\textsubscript{1}l-ta and ha-ta 'to make' take a ke-complement which consists of a full clause followed by the complementizer ke.

Caki may refer to either the matrix clause subject John or the complement subject Bill. In (4b), the verb sik\textsuperscript{h} i-ta 'to make do' does not take a complement clause in surface structure, but an indirect object and a direct object. Here, therefore, caki refers only to the surface subject John.

Caki refers to the surface subject when the causative form of the verb is passivized. Passivizing (4b), we get the following:

(5) Bill\textsubscript{1} John\textsubscript{1} ei-heso caki\textsubscript{1} sukce-l\textsubscript{1} ha-ke mantilocot-ta.
Bill\textsubscript{1} was made by John\textsubscript{1} to do his\textsubscript{1} homework.

In (5), caki refers to the subject of the passive form of the causative verb, and cannot refer to the underlying subject.

1.2.2 Whenever two NP's are coreferential within a clause, and one is the subject, the subject NP appears in surface structure as a full NP or a nonreflexive pronoun, and the other NP appears as caki.\textsuperscript{2}

(6) a. *John\textsubscript{1} John\textsubscript{1} pip\textsuperscript{h} an-het-ta.
(John\textsubscript{1} criticized John\textsubscript{1} .)

b. *John\textsubscript{1} him\textsubscript{1} pip\textsuperscript{h} an-het-ta.\textsuperscript{3}
(John\textsubscript{1} criticized him\textsubscript{1} .)
c. John₁⁻¹ caki₁⁻¹ líl₁ pipʰ an-het-ta.
   NM himself-AM criticized

John₁ criticized himself₁.

First and second person pronouns cannot anteced e caki: If na or no is replaced by caki below, the sentences are ungrammatical.

(7) a. Na₁⁻nin na₁ (casin)⁻¹líl₁ ihe-han-ta.⁴
   I NM me self AM understand

(I understand me.)

I understand myself.

b. No₁⁻nin no₁⁻líl₁ ihe-ha-ni?
   you NM you AM understand

(Do you understand you?)

Do you understand yourself?

A caki subject cannot have a clausemate anaphor.⁵

(8) a. *Caki₁⁻ka John₁⁻líl₁ pipʰ an-het-ta.
    he NM AM criticized

(*He₁ criticized John₁.)

b. *John₁⁻líl₁ caki₁⁻ka pipʰ an-het-ta.
   AM he NM criticized

(John₁, he₁ criticized.)

1.2.3 A caki-nonsubject may refer to a clausemate subject.

(9) a. John₁⁻¹ caki₁⁻¹ líl₁ pipʰ an-het-ta.
   NM himself-AM criticized

John₁ criticized himself₁.

b. Caki₁⁻líl₁ John₁⁻¹ pipʰ an-het-ta.
   AM NM criticized

(Himself₁, John₁ criticized.)

John₁ criticized himself₁.
(10) a. John₁-₁ caki₁ ke-lil₁ kiyowo-han-ta.  
    NM his₁ dog-AM fond of is  
    John₁ is fond of his₁ dog.

b. Caki₁ ke-lil₁ John₁-₁ kiyowo-han-ta.  
    his₁ dog-AM NM fond of is  
    (His₁ dog, John₁ is fond of.)  
    John₁ is fond of his₁ dog.

(11) a. Oliver₁-₁-ka caki₁ eteheso₁ yeki-het-ta.  
    NM himself₁ about talked  
    Oliver₁ talked about himself₁.

b. Caki₁ eteheso₁ Oliver₁-₁-ka yeki-het-ta.  
    him₁ about NM talked  
    (About himself₁, Oliver₁ talked.)  
    Oliver₁ talked about himself₁.

1.3 Caki Referring to a Higher Subject in S's with Complements

In this section, I will examine the hierarchical and the left-right relationships of caki with a higher subject anaphor in subordinating structures with complements.

1.3.1 The following sentences have one embedded complement.
(12) a.

John\textsubscript{1} knows that he\textsubscript{1} is sick.

(12) b.

(That he\textsubscript{1} is sick, John\textsubscript{1} knows.)

John\textsubscript{1} knows that he\textsubscript{1} is sick.
The possible anaphoric linkages in (12) are illustrated with percentage and arrows. The arrow will always go from a more empty (or pronoun-like) NP to a less empty NP. (12a) shows that the linkage where the less empty NP, John in this case, both commands and immediately precedes the pro-form is perfect. (12b) shows that the linkage where the less anaphoric NP commands but does not precede the pro-form is slightly less well-formed.

The percentage values that will be used correspond to the following scale of grammaticality:

\[
\begin{align*}
50\% & \rightarrow 100\% & \text{grammatical} \\
40\% & \rightarrow 50\% & ? \\
30\% & \rightarrow 40\% & ?^* \\
0\% & \rightarrow 30\% & *
\end{align*}
\]

The range within 50\% to 100\% will be used to represent preferences among readings for sentences which are all judged to be grammatical, and the range within 0\% to 50\% will be used to represent the levels of ungrammaticality.

1.3.2 For some examples of preferences among grammatical sentences, consider the following examples. In the sentences of (13), caki can refer to NP's two clauses up.
(13) a.

Ann_{j} thinks that Mary_{i} knows that she_{i>j} won.

(13) b.

Ann_{j} thinks that Mary_{i} knows that she_{i>j} won.
Thus, we see that caki prefers hierarchically closer to hierarchically more distant anaphors, and that if hierarchical distance is kept constant, caki prefers anaphors that precede to anaphors that follow.

Now I will present a simple algorithm to calculate the percentages for each anaphoric linkage. It was observed in section 1.3.1 that a linkage of 100% value is obtained where an NP asymmetrically commands and immediately precedes its anaphor. In (13a), Mary and caki have such a value. To calculate the percentage of Ann, the following algorithm has been used:

\[(I) \quad 100\% - 10\% x\]

where \(x\) = the number of clauses from caki

\[100 - 10(2) = 80\]

In (13a), \(x = 2\), since Ann is two clauses up from caki. Our algorithm provides percentages that are in agreement with the judgments of native speakers. That is, a linkage between Ann and caki is slightly less well-formed than one between Mary and caki.

\[(Ia) \quad \text{Subtract 10\% when the NP follows caki from the percentage where NP precedes caki.}\]

In (13), we see that when caki follows its anaphor, its value is 10\% less then when it precedes, ceteris paribus.

The following sentences show that the anaphoric linkage between
caki and a commanding and an immediately preceding anaphor is assigned 100%.

\[(14)\] a.

\[\text{Ann}_i \text{ thinks that } \text{Mary}_i \text{ knows that } \text{she}_{j>i} \text{ won.}\]

\[(14)\] b.

\[\text{Ann}_j \text{ thinks that } \text{Mary}_i \text{ knows that } \text{she}_{i>j} \text{ won.}\]
According to (I) and (Ia), (14a) presents a problem, for the Mary-caki linkage should be 90% and Ann-caki 80%. However, in fact, the preference is the reverse of this: Ann is the preferred anaphor of caki. Thus (14a) shows that we need the following additional rule:

(Ib) If an NP commands and immediately precedes caki, raise its percentage value to 100%.

(14b) also presents a problem. 70% is the predicted value, but the judgment is about 50%. Recall that 70% is the value we get when we subtract 10% from 80% in (13a) for Ann, since in (14b), Ann follows caki. At present, I have found no solution to this latter problem.

The algorithms will now be examined in cases of sentences with three complements.

1.3.3 Caki's coreference possibilities with anaphor. three clauses up is shown in the following sentences:

(15) a.

\[
\begin{array}{c}
S_1 \\
N \rightarrow P \rightarrow V \\
\text{Jane}_1 \rightarrow \text{Ann}_1 \rightarrow \text{Mary}_k \rightarrow \text{she} \\
\text{50%} \rightarrow \text{80%} \rightarrow (100\%) \\
\text{mal-het-ta said} \\
\text{senkak-han-ta-kow thinks comp.} \\
\text{an-ta-kow knows comp.} \\
\text{w'on SM comp.-AM} \\
\end{array}
\]

Jane$_1$ said that Ann$_j$ thinks that Mary$_k$ knows that she$_{k>j>1}$ won.
(15) b.

Jane\textsubscript{i} said that Ann\textsubscript{j} thinks that Mary\textsubscript{k} knows that she j\textgreater{}k\textgreater{}i won.

(15) c.

Jane\textsubscript{i} said that Ann\textsubscript{j} thinks that Mary\textsubscript{k} knows that she j\textgreater{}k\textgreater{}i won.
(15) d.

Jane$_i$ said that Ann$_j$ thinks that Mary$_k$ knows that she$_{k>j>i}$ won.
The percentage values in (15a) are derived by applying algorithm (I). It was shown in section 1.3.2 how to get values for two clauses up. The value for Jane in the third clause up is

\[ 80\% - 10\% \times 3 = 50\% \]

In (15b), the value of Jane is

\[ 100\% - 10\% \times 3 = 70\% \]

Recall that we subtract 10(x) from the value of the immediately lower clause. The value for Mary is 10\% less the value of Mary preceding caki, or 90\%. In (15c), Ann becomes 70\% when it follows caki, since it is 80\% when it precedes. In (15d), the value of Jane is 40\%, which is 10\% less than 50\%, the value of Jane preceding caki two clauses up, which can be seen in (15a).

The application of algorithm (I) for assigning percentage values for anaphors of caki three clauses up has been discussed. The algorithm consists of two parts: (a) vertical and (b) left-right. The vertical algorithm for caki referring upward consists of the following:

Subtract 10 (the number of clauses up caki) from the value of the clause immediately below.

The left-right algorithm consists of the following:

Subtract 10 from the value of an NP preceding caki to get the value of an NP following caki.

Raise the value of an NP that both commands and immediately precedes caki to 100.
1.4 **Caki** Referring to a Lower Subject in S's with Complements

1.4.1 The following sentences show **caki** referring to a lower subject.

(16) a.

```
 NP
  S1
    NP
    N
     caki -li-1
     AM
    kwelowp
    h in-ta
    disturbs
  NP
  N
  80%
  John -i
  NM
  ap hi- n kos-i
  sick SM comp.-NM
```

That John is sick disturbs him.

(16) b.

```
 NP
  S1
    NP
    N
     caki -li-1
     AM
    kwelowp
    h in-ta
    disturbs
  S2
    NP
    N
    70%
    John -i
    NM
    ap hi- n kos-i
    sick SM comp.-NM
```

That John is sick disturbs him.
In section 1.3.1, it was shown that caki referring upward to a following NP formed a linkage of 90%. However, caki is less able to refer downward than upward. The type of linkage illustrated by (16a), where caki refers downward, is slightly worse than the linkage in (12b). (16a) has therefore been assigned 80%. In section 1.2.3, it was shown that a nonsubject caki has no order restriction within a clause: its anaphor can precede or follow it. (16b) has been assigned 70%, because caki preceding its anaphor is worse than when caki follows.

Let us add the following rule to the left-right algorithm:

(Ic) When caki precedes and commands its anaphor, subtract 10 from the value it has when caki follows.

1.4.2 Caki refers to a lower subject two clauses down in the following sentences.

(17) a.

\[ \text{John}_1 \text{ dislike for him}_i \text{ to see him}_j \text{ study.} \]
Now I will introduce Algorithm (II) to account for the values assigned to the linkages in (17).

(II) From the value of the clause immediately above, subtract $10(x^2)$, where $x =$ the number of clauses away from caki.

Since caki does not refer downward as far as it does upward, I will ensure that the algorithm for downward-referencing referring caki decrements values faster than is the case for upward-referencing caki.

In (17a), $80 - 10(2^2) = 40$ for the Mary-caki linkage. (16b) shows that the Mary-caki linkage is much improved when Mary becomes linearly closer to caki. Let us add the following rule to the left-right algorithm:
(IIa) Raise the value of the linearly closest anaphor of $\text{caki}$ up to
70%.

In contrast with the behavior of objects, $\text{caki}$-subjects obey
the Primacy Constraint. Langacker (1969) formulates the Primacy Con-
straint as follows: "NP$^a$ may be used to pronominalize NP$^p$ unless NP$^p$
bears all relevant primacy relations to NP$^a$." Any violation of a rule
or constraint will result in 0% linkage. The following sentence illus-
trates violations of Primacy.

(18)
1.4.3 That *caki cannot refer to an anaphor subject more than two clauses down is shown by the following sentence.

(19)

Peter₁-ka silo-han-ta-ko NM dislikes comp.
John₁-ι pow-nin kos-ιl NM see SM comp.-AM
Billₖ-ι kownkpu-ha-nin kos-ιl study do SM comp.-AM

Peter₁-ι John₁-ι said that he₁-ι dislikes that he₁-ι see Billₖ-ι study.
In discussing (17a), I have shown how to calculate the percentage for anaphors two clauses below caki. The value produced by the algorithm for anaphors three clauses down is as follows:

\[40 - 10(3^2) = -50\]

Since any value below 0 is interpreted as 0%, the algorithm makes the correct prediction that a Mary-caki linkage in (19) is impossible.

In applying algorithm (I) or (II), the following constitute the class of impossible anaphors for caki: first or second person pronouns, plural NP for caki, singular NP for caki-t+i, classmate anaphors, for caki-subjects, and for caki-subjects, any anaphor violating Primacy.

1.5 Caki Referring to a Higher Nonsubject in S's with Complements

Cases have been shown where caki refers to one or more subjects. When no subject occurs in the sentence, caki may refer to a nonsubject.

(19') Bob₁-i  ke-ka  caki₁-l₁l  mul-ot-ta.
gen. dog-NM him AM bit

Bob₁'s dog bit him₁.

1.5.1 Caki can refer to a nonsubject one clause up.

The following sentences show that when no subject occurs in the sentence, caki may refer to a nonsubject. We will adopt the convention of assigning 80% to a perfect linkage consisting of caki and a nonsubject. This captures the fact that a nonsubject anaphor is not as good as a subject anaphor. After assigning 80% initially, and after the calculation for other linkages has been completed, 80% will be raised to 100%.
(20a) illustrates a perfect linkage for caki and a nonsubject.

In (20b), 10 has been subtracted from 80 by algorithm (Ic), since the anaphor follows caki.

(20) a.

\[ S \]

\[ \begin{array}{c}
NP \\
N \\
Peter_{i-l4l} & caki_{i-ka} & ap^h_{i-n} & kos-i \\
80\% & he & NM & sick & SM comp.-NM \\
100\% & & & & \\
\end{array} \]

\[ S_2 \]

\[ \begin{array}{c}
V \\
kwelop^h_{in-ta} \\
\end{array} \]

It disturbs Peter$_i$ that he$_i$ is sick.

(20) b.

\[ S \]

\[ \begin{array}{c}
NP \\
N \\
S_2 \\
Peter_{i-l4l} & kwelop^h_{in-ta} \\
AM & disturbs \\
\end{array} \]

\[ \begin{array}{c}
NP \\
N \\
caki_{i-ka} & ap^h_{i-n} & kos-i \\
70\% & he & NM & sick & SM comp.-NM \\
\end{array} \]

That he$_i$ is sick disturbs Peter$_i$. 
1.5.2 The coreference possibilities for caki and a nonsubject
two clauses up are shown below. The value of the Bob-caki linkage in \( S_1 \) is
derived by the following algorithm:

(II) Subtract from 80\% 20(\( x \))

where \( x \) = number of clauses from caki

Algorithm (II) is the same as (I), except for the factor of 20,
which is twice that in (I). This captures the generalization that
nonsubjects do not allow caki to refer as far upward or downward as
subjects. After Bill-caki linkage is assigned 80\%, and the Bob-caki link-
age has been calculated, 80\% is raised to 100\%.

(21) a.

```
Bob_i gen. letter NM
\( 40\% \)
Bill_j AM
\( 80\% \)
100\%
caki_{j > 1}
```

```
S_1
NP
NP N
NP N
```

```
S_2
allyot-ta
made known
```

```
S_2
kopcu-n-ta-kow
frightens comp.
```

```
towtuk-ma-e-in kos-i
robbed SM comp.-NM
```

Bob_i's letter made it known that it frightens Bill_j
that his dog was stolen.
In (21b), we obtain 30% for Bob-caki when we subtract 10 from 40, the value when Bob precedes caki.

(21) b.

Bob's letter made it known that it frightens Bill
that his dog was stolen.
In (21c), 70\% for Bill is the value of the linkage where Bill precedes caki minus 10.

(21) c.

Bob₁₄₁, p'yonji-ka allyot-ta

30\%

Billₐ₁ kop-cun-ta-kow

AM frightens comp.

cakiₛ₁ >₁

ke-ka

dog NM

Bob₁'s letter made known that it frightens Billₐ that hisₐ >₁ dog was stolen.
In (21d), the same predictions hold, as predicted by algorithm (II).

(21) d.

Bob₁ -ți p'yonci-ka

Bill₁ -ți kop-cun-ta-kow allyot-ta

80%

100%

cak₁ i > j ke-ka towtuk-mac-in kos-i

dog-NM stolen SM comp.-NM

Bob₁'s letter made known that the fact that his i > j dog was stolen frightens Bill₁.
1.6 **Caki** Referring to a Lower Nonsubject in S's with Complements

I will examine **caki** referring to a nonsubject one or two clauses down. I will then present an algorithm for assigning the percentages to these downward linkages.

1.6.1 **Caki** may refer to a lower nonsubject.

(22) a. \[ S_1 \]

- NP
  - \[ S_2 \]
    - NP
      - NP
        - N
          - ke-ka dog NM
        - 60%
        - John AM
      - N
        - N
          - him AM
          - kwelowp hit-ta disturbed
    - V
      - caki-111

That the dog bit John disturbed him.

Recall from (20a) that the perfect linkage where a nonsubject
both commands and immediately precedes **caki** was 80%. The next best
linkage, which was shown in (20b), was 70%, since there, a nonsubject
anaphor followed **caki**. (22a) shows above that when **caki** commands a
nonsubject, the linkage is worse than the one in (20b), and the value
of 60% is assigned to (22a). Preposing **caki** in \( S_1 \) to the left of John
costs 10%, because of the left-right algorithm, and therefore, we get
50% in the following linkage in (22b).
(22) b.

That the dog bit John disturbed him.

1.6.2 The following sentences show that caki cannot refer
to an anaphor two clauses down.

(23) a.

(His letter made known that it frightens Bill that Bob's dog was stolen.)
(23b) is in conflict with (22a) and (22b). In (23b), linearly close Bob gets some raise, but I don't know exactly how to state it. In (23a), the percentage for caki-Bob is obtained by the following algorithm:

Subtract from 60 20(x^2) = -20

where x = 2, the number of clauses in the path between the NP and caki. Recall that any minus value is to be interpreted as 0%.

In (23b), note that Bob is linearly closest to caki and the value of the linkage should be raised to 70%. However, 10 must be subtracted, since it costs for caki nonsubjects to precede anaphors. Bill here is 10% less than Bill in (23a), because here, Bill follows caki. The sentences in (23) show that caki cannot refer to a nonsubject more than one clause down, unless caki immediately precedes the nonsubject.
Note that the algorithm for caki referring to a lower nonsubject is basically the same as that for caki referring to a lower subject. The only difference is that we multiply 20 by the number of clauses squared, instead of 10, as was the case for subject anaphors. We use 20 for nonsubjects to capture the generalization that caki refers less readily to a nonsubject than it does to a subject. The square of the number of S nodes was used for going downward for both subjects and nonsubjects to capture the generalization that both subjects and nonsubjects allow caki to refer downward less readily than upward.

1.7 Caki Referring to a Subject in S's with an Adverbial Clause

1.7.1 Caki may refer to a higher subject in an adverbial clause.

(24) a. 

If he comes to Cambridge, John will study.
(24) b.

If he\textsubscript{1} comes to Cambridge, John\textsubscript{1} will study.

(24a) and (24b) show that the same percentages hold for sentences with adverbial clauses as for sentences with complements.

1.7.2 In the following sentences, caki refers to a subject two clauses up.

(25) a.

John\textsubscript{1} gets angry if Bob\textsubscript{j} cries when he\textsubscript{j} is sick.
(25) b.

John₁ gets angry if Bobⱼ cries when he₁ⱼ is sick.

(25) c.

John₁ gets angry if Bobⱼ cries when heⱼ₁ is sick.
(25) d.

\[
\begin{align*}
S_1 & \quad \text{NP} \\
& \quad \text{V} \\
S_2 & \quad \text{NP} \\
& \quad \text{N} \\
& \quad \text{John}_i \text{-in} \\
& \quad \text{hwa-li} \text{l nen-ta} \\
& \quad \text{angry gets} \\
S_3 & \quad \text{NP} \\
& \quad \text{N} \\
& \quad \text{Bob}_j \text{-i} \\
& \quad \text{NM} \\
& \quad 100\% \\
& \quad \text{caki} \text{j> i-ka} \\
& \quad \text{he}\text{j> i} \text{- NM} \\
& \quad \text{ap} \text{h-i} \text{- l t'e} \\
& \quad \text{sick SM when} \\
\end{align*}
\]

John\textsubscript{i} gets angry if Bob\textsubscript{j} cries when he\textsubscript{j> i} is sick.

The sentences in (25) have the same percentages as those in (13). This shows that the same algorithm holds for both complements and adverbial clauses.

1.7.3 That caki can refer downward into an adverbial clause is shown by the following sentence.

(26)

\[
\begin{align*}
S_1 & \quad \text{NP} \\
& \quad \text{V} \\
S_2 & \quad \text{NP} \\
& \quad \text{PP} \\
& \quad \text{V} \\
& \quad \text{caki}_i \text{-nin} \\
& \quad \text{kownkpu-ha-lkos-i-ta} \\
& \quad \text{study will} \\
S_3 & \quad \text{NP} \\
& \quad \text{P} \\
& \quad \text{80\%} \\
& \quad \text{John}_i \text{-i} \\
& \quad \text{Cambridge} \\
& \quad \text{e} \text{- o-myon} \\
& \quad \text{to comes-if} \\
\end{align*}
\]

If John\textsubscript{i} comes to Cambridge, he\textsubscript{i} will study.
(27a) shows that Primacy may not be violated in sentences with an adverbial clause when a caki-subject occurs in the matrix clause. Only a caki-nonsubject does not obey Primacy, as can be seen by the grammaticality of (27b) with caki-141 instead of caki-ka.

(27) a.

(*He will study, if John comes to Cambridge.)

(27) b.

(*Him, when Bill was sick, I helped.)
1.7.4 The coreference possibilities of caki with a subject two clauses down are shown in the following sentences.

(28) a. (*He$_i$ will be lonely, if John$_i$ goes to Paris after Bob$_j$ leaves.)
If John₁ goes to Paris after Bobᵢ leaves, heᵢ will be lonely.

The sentences in (28) correspond to those in (17) in the values of the corresponding anaphoric linkages. The algorithm proposed for sentences with complements also holds for sentences with adverbial clauses where caki refers to a higher or a lower subject. That the Primacy Constraint holds for caki-subjects has been shown in (27a) and will not be shown hereafter but will be assumed to hold.
1.8 Caki Referring to a Nonsubject in S's with an Adverbial Clause

1.8.1 Caki may refer to a nonsubject one clause up.

(29) a.

When he was young, I first met John.

(29) b.

(John, when he was young, I first met.)
The sentences in (29) have the same percentages for the anaphoric linkages as those in (20) and the algorithm for complements holds also for adverbial clauses here.

1.8.2 The following sentences show *cak'i*’s coreference possibilities with a nonsubject two clauses up. The sentences in (30) parallel those in (21), and the corresponding sentences have the same percentages. Here *a*<sub>cak'i</sub> again, we see that the same algorithm holds for sentences with complements and adverbial clauses.

(30) a.

![Diagram of sentence structure]

When he<sub>i > j</sub> won, the news was made known to Joe<sub>j</sub> after it went to Bob<sub>i</sub>. 
After the news went to Bob\textsubscript{i}, it was made known to Joe\textsubscript{j} when he\textsuperscript{i>j} won.
It was made known to Joe\textsubscript{j} after the news went to Bob\textsubscript{i} that he\textsubscript{j>i} won.
(30) d.

It was made known to Joe, after the news went to Bob, when he won.
1.8.3 Caki may refer to a nonsubject one clause down.

(31) a.

\[
S_1 \\
\text{NP} \quad \text{V} \\
\text{NP} \quad \text{NP} \quad \text{V} \\
\text{N} \quad \text{N} \quad \text{caki}_{i-nin} \quad \text{ul-ot-ta} \\
\text{Ke-ka} \quad \text{John}_{i-il} \quad \text{mul-oss-il t'el} \quad \text{cried} \\
\text{dog-NM} \quad \text{AM} \quad \text{bit} \quad \text{SM when} \\
\]

When the dog bit John_i, he_i cried.

(31) b.

\[
S_1 \\
\text{NP} \quad \text{V} \\
\text{NP} \quad \text{NP} \quad \text{V} \\
\text{N} \quad \text{N} \quad \text{caki}_{i-nin} \quad \text{ul-ot-ta} \\
\text{ke-ka} \quad \text{John}_{i-il} \quad \text{mul-oss-il t'el} \quad \text{cried} \\
\text{dog-NM} \quad \text{AM} \quad \text{bit} \quad \text{SM when} \\
\]

When the dog bit John_i, he_i cried.

(31) c.

\[
S_1 \\
\text{NP} \quad \text{V} \\
\text{NP} \quad \text{NP} \quad \text{V} \\
\text{N} \quad \text{N} \quad \text{caki}_{i-il} \quad \text{nowlile-ke-het-ta} \\
\text{him} \quad \text{John}_{i-il} \quad \text{mul-oss-il t'el} \quad \text{surprised} \\
\text{AM} \quad \text{AM} \quad \text{bit} \quad \text{SM when} \\
\]

When the dog bit John_i, it surprised him_i.
Note that the sentences in (31) and in (2) have the same percentages. In both cases, Primacy is shown to hold only for caki-subjects. The same algorithm for complements holds here also for adverbial clauses.

1.8.4 The following sentences show caki’s coreference possibilities with a lower nonsubject two clauses down.

(32) a.

When I made it known to Joe after the dog bit Bill, he fainted.

(32) b.

When I made it known to Joe after the dog bit Bill, it surprised him.
(32a) and (32b) correspond to (23a) and (23b) and the same algorithm holds here again. Note also in (32a) that ne 'I' is an impossible anaphor, and will be disregarded by caki, even if it is the subject.

It has been shown that the algorithms for NP and caki occurring in sentences with complements also hold for those in sentences with adverbial clauses.

1.9 Caki Referring to an Anaphor in S's with a Relative Clause

1.9.1 Possible anaphoric linkages in the surface structure of relative clauses

Relative clauses precede the head NP in Korean. Relative clauses are marked by -n or -in for the past tense, and by n4n in the present. The normal way of making a relative clause is by ø-ing, but sometimes, it is possible to have caki. The NP which becomes ø will be referred to as the target, which occurs within the relative clause. The anaphor of ø in the matrix clause is the trigger. When the target is a subject or a direct object which does not refer to the subject of the relative clause, only ø is possible. Caki as a direct object can only refer to the head noun if the subject is ø and refers to the head noun.

(33) a.

```
(S
  NP NP V
  N N
  {*caki -ka
    he NM
          John -il t'eli-n
          AM hit SM
    }
  N
    salam
  person
)
```

the person who hit John
(33) b.  
```
(33) b.  
S₁  
   / \  
  S₂  NP  
   / \    \  
  NP NP  V   
   / \    / \  
 N N  V  Salam₁  
```

Johnᵢ NM   { *cakiᵢ⁻⁴⁺₁ ț'el-i-n }
           { him AM }  hit SM
the person₁ who John hit

(33) c.  
```
(33) c.   
S₁  
   / \  
  S₂  NP  
   / \    \  
  NP NP  V   
   / \    / \  
 N N  V  salam₁  
```

{ cakiᵢ⁻⁴⁺₁ ț'el-i-n }
himself-AM  hit -SM
the person₁ who hit himself₁
An indirect object, an object of a postposition, or a genitive may occur as **caki** within a relative clause, and be anaphoric to the head NP. An object of a postposition is better than an indirect object as the target NP occurring as **caki**. A genitive-**caki** is best. The following linkages and percentages capture these preferences.

(34) a.

```
(34) a.
```

(34) b.

```
(34) b.
```

---

the person to whom I sent a message

the person from whom I got the message
(34) c.

NP
   /
  S₁
     /
    NP
     /
   N
ne-ka
I NM

NP
   /
  N
pat-ìn
got-SM

caki₁ his₁ yollak-ìl
message-AM

the person₁ whose message I got

1.9.2 Now I will examine caki inside a relative clause referring to a matrix NP other than the head noun. In the following sentences, caki is referring to an anaphor one clause up.

(35) a.

NP
   /
  S₁
     /
    NP
     /
   V

S₂
   /
  NP
    /
   N
John₁-⁻¹ NM N
j
100%
caki₁-ka
he \{갑\} NM

NP
   /
  S₁
    /
   N
salank-ha-nin
loves do SM

NP
   /
  N
pip[ha-'het-ta]
criticized

John₁ criticized the person_j whom he₁ loves.
(35) b. 

\[ S_1 \]

\[ \begin{array}{c}
\text{John}_1 \text{-} i \\
NP \text{NM N} \\
\end{array} \]

\[ \begin{array}{c}
\text{caki}_i \text{-} ila \\
\emptyset_j \\
\end{array} \]

\[ \begin{array}{c}
\text{salank-} \text{-} ha-} \\
\text{nin} \text{ AM} \\
\end{array} \]

\[ \begin{array}{c}
\text{salam-} \text{-} il \\
\text{person AM} \\
\end{array} \]

John\textsubscript{1} criticized the person\textsubscript{j} who loves him (self)\textsubscript{i}.

(35) c.

\[ S_1 \]

\[ \begin{array}{c}
\text{he}_i \text{-} ka \\
NP \text{NM N} \\
\end{array} \]

\[ \begin{array}{c}
\text{caki}_i \\
\emptyset_j \\
\end{array} \]

\[ \begin{array}{c}
\text{salank-} \text{-} ha-} \\
\text{nin} \text{ AM} \\
\end{array} \]

The person\textsubscript{j} whom he\textsubscript{i} loves criticized John\textsubscript{1}.
In (35a) and (35b), caki in the subject or object position within the relative clause may not refer to the head noun, as discussed in the preceding section. Since John commands and immediately precedes caki, the linkages have a perfect score of 100%. (35c) and (35d) show that when the NP follows caki, the linkage loses 10%.

1.9.3 Now I will examine cases where caki occurs in the matrix clause outside of the relative clause and refers to an anaphor within the relative clause.

(36a) shows that caki referring to its clausemate subject salam 'person' forms a perfect linkage. John referring upward to caki costs 20%, as in the case of complements, and we get 80% for a John-caki linkage. In (36b), caki may not refer to John, since it is a nonsubject,
and we already have a subject salam in the sentence to which caki can
and does refer perfectly.

(36) a.

\[
S_1 \leftarrow \text{NP} \rightarrow \text{NP} \rightarrow \text{V} \rightarrow \text{NP} \rightarrow \text{NP} \rightarrow \text{V} \\
\text{NP} \rightarrow \text{N} \rightarrow \text{NP} \rightarrow \text{N} \rightarrow \text{V} \rightarrow \text{NP} \rightarrow \text{N} \\
\text{John}_{1} \rightarrow \text{NM} \leftarrow \emptyset \rightarrow \text{salank-ha-nin} \leftarrow \text{loves} \rightarrow \text{SM} \\
\begin{array}{c}
\text{salam}_{-1} \text{ caki} \leftarrow \text{100\%} \\
\text{person NM him-} \leftarrow \text{111 pip^an-het-ta} \\
\{i\} \text{AM criticized} \\
\{j\} \text{(self)}
\end{array}
\]

The person \(j\) whom John\(i\) loves criticized him (self)\(j\).

(36) b.

\[
S_1 \leftarrow \text{NP} \rightarrow \text{NP} \rightarrow \text{V} \rightarrow \text{NP} \rightarrow \text{NP} \rightarrow \text{V} \\
\text{NP} \rightarrow \text{N} \rightarrow \text{NP} \rightarrow \text{N} \rightarrow \text{V} \rightarrow \text{NP} \rightarrow \text{N} \\
\emptyset \rightarrow \text{John}_{1} \rightarrow \text{AM} \leftarrow \text{salank-ha-nin} \leftarrow \text{loves} \rightarrow \text{SM} \\
\begin{array}{c}
\text{salam}_{-1} \text{ caki} \leftarrow \text{0\%} \\
\text{person NM him-} \leftarrow \text{111 pip^an-het-ta} \\
\{i\} \text{AM criticized} \\
\{j\} \text{(self)}
\end{array}
\]

The person \(j\) who loves John\(i\) criticized himself \(j\).
The following sentences show what coreference possibilities exist for \textit{caki} when it cannot refer to a clausemate.

(36) c.

\[ S_1 \]

\[ S_2 \]

\[ \text{Salam-\textit{caki}-ka pip\textsuperscript{h} an-het-\textit{ta}} \]

\[ \text{person AM he \{\textit{i}\} NM criticized} \]

\[ \text{John\textit{-i \text{NM}}} \]

\[ \emptyset \]

\[ \text{sulank-ha-n\textit{n}} \]

\[ \text{loves SM} \]

The person\textsubscript{j} whom John\textsubscript{i} loves, he\textsubscript{i} criticized.

(36) d.

\[ S_1 \]

\[ S_2 \]

\[ \text{Salam-\textit{caki}-ka pip\textsuperscript{h} an-het-\textit{ta}} \]

\[ \text{person AM he \{\textit{i}\} NM criticized} \]

\[ \emptyset \]

\[ \text{John\textsubscript{i} AM} \]

\[ \text{sulank-ha-n\textit{n}} \]

\[ \text{loves SM} \]

(*The person\textsubscript{j} who loves John\textsubscript{i}, he\textsubscript{i} criticized.*)
In (36c) and (36d), caki occurring as a subject cannot refer to a clausemate anaphor. In (36c), the matrix caki refers to the lower subject, and we obtain 80%, as predicted by our algorithm. In (36d), a matrix caki refers to the lower nonsubject. The perfect linkage with a nonsubject is 80%, but caki commands its anaphor, and we obtain 60%, by subtracting 20%. Recall that 70% would be for a linkage where the anaphor of caki commands, but follows it.

The following sentences show that caki subjects may not violate the Primacy Constraint in sentences with a relative clause. A linkage that violates such a constraint is 0%.

(36) e.

\[
\text{(\*He}^1 \text{criticized the person}_j \text{whom John}_1 \text{loves.)}
\]

(36) f.

\[
\text{(\*He}^1 \text{criticized the person}_j \text{who loves John}_1 \text{.)}
\]
1.9.4 **Caki** within a Relative Clause Referring to a Subject

Two Clauses Up

I will now discuss coreference possibilities of **caki** within a relative clause that is embedded within another relative clause. The preferred anaphors of **caki** will be shown by the percentages that are obtained by applying the algorithms. I have already developed for them other types of embedding structures, namely complements and adverbial clauses. In the following sentences, the linkage involving the head noun and the target-NP **caki** is irrelevant, because this linkage is always 90%.

(37) a.

```
S1
  NP
    N
      John
  NP
    N
      hit
      SM
  V
    70%
    t'eli-n
    met
S2
  NP
    N
      Salam
  NP
    N
      100%
      θj
S3
  NP
    N
      θk
  V
    90%
    ai-lil
    child
  V
    caki
    him(self)
```

John met the person who hit the child who criticized him(self).
In (37a), John is a subject that both commands and immediately precedes caki and their linkage is therefore, assigned 100%. At 'child' commands but follows caki; it costs 10%, and we obtain 90%. Salam is two clauses up from caki and gets 70%. Since John is three clauses up from caki, we subtract 10 times 3 = 30 from 70 and obtain 40%.

(37b) below shows that when John is postposed and follows the relative clauses, it becomes an impossible anaphor. Note that our algorithm predicts that our best anaphor, when postposed, becomes the worst anaphor. Our vertical algorithm will give us the value of a John-caki linkage in such a structure.

(37) b.

John met the person who hit the child who criticized him (self).
1.9.5 Caki within a Relative Clause and a Subject

Two Clauses Down

The following sentences show that caki cannot refer to a subject two clauses down.

(38) a.

The person whom the child whom John invited met criticized him (self)
In (38a), salam and caki are clausemates, so we get 100%, as in simple sentences. Ai is one clause down and we get 80%, by our general principle which shows caki's preference to refer upward over downward. John is two clauses down, and so we subtract \(2^2 \times 10 = 40\) from 80 and we obtain 40% for the John-caki linkage (II).

In the following sentence, caki is preposed and we see that each linkage corresponding to the one in (38a) is lower by 10%, except John which undergoes another rule, namely, the rule which raises the value of caki's linearly closest preceding anaphor to the value of 70%. This rule is followed by the rule which subtracts 10% from 70%, since caki precedes John and it costs to do so.

(38) b.

The person whom the child whom John invited met criticized him(self)_{i > k > j}. 
In (38b), since salam follows caki, we subtract 10 from the perfect score and obtain 90%. Ai is one clause down from caki, which precedes, so we subtract 10 from 80 and obtain 70%. Since John is linearly closest to caki and caki precedes, we raise the linkage of John to 70% (I'a) and subtract 10. We obtain 60% for John. We have a problem for ai, because ai is predicted to be better than John, but it is in fact the worst linkage in (38b), although it is acceptable. Ai should be about 50%, but we predict 70%.

1.9.6 Caki within a Relative Clause and a Nonsubject

Two Clauses Up

In this section, I will examine caki's coreference possibilities in sentences embedded within a relative clause with higher nonsubjects. I will first examine the possibility of caki referring to a nonsubject two clauses up. The following sentence will show that in using our algorithm, we must treat head nouns of a relative clause as a subject even if the head noun is not a subject, because it behaves like a subject. We will therefore, use the subject algorithm (I) for head nouns of relative clauses.

In (39), an ai-caki linkage is assigned 90% by our algorithm for relative clauses. Salam is two clauses up from caki and we obtain 70% by (II). Since John is a nonsubject that is three clauses up from caki, we obtain 10%. But note that this nonsubject both commands and immediately precedes caki. We independently assign 80%, which is later raised to 100%, by our convention for a perfect linkage of caki and a nonsubject. This raising to 100% takes place after
we have applied all the vertical algorithms. Note that the subject of \( S_1 \) is a plural NP which cannot be a possible anaphor of \textit{caki} which is a singular form. Therefore, the choice of \textit{caki} is here confined to non-subjects.

(39)

Friends introduced the person \( j \) who hit the child \( k \) who criticized him (self) \( i \) to John \( i \).
In (40), John-eko, the perfect anaphor in (39), is postposed and becomes the worst anaphor, in accordance with the prediction of our algorithm. In (40), ai and salam have the same percentages as in (39) and the application of our algorithm has been explained. Since John-eko is both hierarchically and linearly farthest from caki, it is the worst anaphor, as our algorithm predicts.

Friends introduced the person who hit the child who criticized him (self) to John_1.

Friends introduced the person who hit the child who criticized him (self) to John_1.
1.9.7  

Caki Coreference with a Nonsubject Two Relative Clauses Down

The following sentences show that caki cannot refer to a nonsubject more than one clause down in a sentence with more than one relative clause embedded in another.

(41) a.

(His \(i^{>}_j^{>}_k\) dog bit the person \(i\) who hit the child \(j\) who criticized John \(k\).)
Algorithm (II') explains the percentages assigned to the anaphoric linkages in (41a). *Salam* and *caki* are clausemates and we first assign 80%, since *salam* is a nonsubject. Since *ai* is one clause down from *caki*, and it is a head noun, we use the subject algorithm (II) and we obtain 70%. *John* is two clauses down from *caki*, and it is neither a subject nor a head noun, we use algorithm (II'), and we obtain 0%. These percentages correctly reflect the native intuition.

(41) b.
(41b) shows that when caki is preposed, John becomes linearly adjacent to John and its value is raised to 70% (II'a). Since caki precedes all of its anaphors, 10 is subtracted from the value of ai and salam when they precede caki. In (41b), ai and salam have percentages lower by 10% from the corresponding linkages in (41a). Note that John is only 60% because caki preceding its anaphor costs 10%, just as it does for other anaphors in (41b).

1.10 (Caki-NP Linkage with Intervening NP-less Clauses,Impossible Anaphors, or Nonsubjects

Any number of NP-less clauses (i.e. kanink-ha-ta 'is possible', swip-ta 'is probable, or likely', or kat-ta 'seems' may intervene between caki and its anaphor.

(42) a.

Jane-1
NP
N

100%

NP

S3

NP

S2

NP

V

mal-het-ta
said

kat-ta-kow
seems comp.

swiu-l-kos
likely comp.

S4

V

NP

N

caki-ka
she-1
NM

mowt-ka-ki-ka
neg.-go-comp.-NM

Jane said that it is likely that she won't be able to go.
Even when *Jane* is postposed, *caki* can refer to it more than two clauses up, although this type of linkage is a little less well-formed than the one in (42a).

(42) b.

Jane\textsubscript{i} \textit{i} mal-het-ta
\textit{NM} said

90\%

Kat-ta-kow
seems comp.

Swiu-l-kos
likely comp.

caki\textsubscript{i}-ka
she \textit{NM}
mowt-ka-ki-ka
neg.-go-comp.-\textit{NM}

*Jane\textsubscript{i}*, said that it is likely that she won't be able to go.
Note therefore, that it follows that since first and second person pronouns are not possible anaphors, that any number of clauses containing first and second person pronouns may intervene between caki and its anaphor. This holds for sentences where caki refers to either the subject or a nonsubject.

(43)

\[ S_1 \]

\[ S_2 \]

\[ S_3 \]

\[ S_4 \]

Bob\(_1\) heard that you know that I said that he\(_1\) won.
(43) shows that caki refers to Bob which commands and immediately precedes it. That caki refers to Bob, even if Bob follows caki, is shown in (44). Both (43) and (44) show that any number of impossible anaphors like na 'I' or no 'you' may intervene between caki and a possible anaphor.

(44)

\begin{center}
\begin{tikzpicture}
  \node (s1) {S_1}
    [sibling distance=3cm]
  child {node (np1) {NP}
    child {node (np2) {NP}
      child {node (v1) {V}}}
  }
  child {node (v2) {V}
    child {node (np3) {NP}
      child {node (n1) {N}
        child {node (s2) {Bob$_i$ til-ot-ta}}}
    }
    child {node (n2) {N}
      child {node (v3) {V}}
    }
  }
  child {node (s3) {S_3}
    child {node (np4) {NP}
      child {node (n3) {N}
        child {node (v4) {V}}}
    }
    child {node (np5) {NP}
      child {node (n4) {N}
        child {node (v5) {V}}}
    }
  }
  child {node (v6) {V}
    child {node (np6) {NP}
      child {node (n5) {N}
        child {node (v7) {V}}}
    }
  }
  child {node (n6) {N}
    child {node (v8) {V}}
  }
  child {node (caki) {caki$_1$-ka}
    child {node (he) {he$_1$ NM}}
  }
  child {node (iki) {iki-n kos-il}
    child {node (won) {won-SM comp.-AM}}
  }
  child {node (bob) {Bob$_1$ heard that you know that I said that he$_1$ won.}}
\end{tikzpicture}
\end{center}
1.10.1 Up to this point, I haven't considered any sentence with both subject and nonsubject anaphors. The following sentences illustrate that caki chooses a subject over a nonsubject that may be in a position for a better linkage. The fact that caki-subject linkage is good even when there is an intervening nonsubject shows the non-cyclicity of these rules.

(45) a.

Mary_{1} thinks that it surprised Ellen that she ran away.

(45) b.

Mary_{1} thinks that it surprised Ellen that she ran away.
In (45a), Ellen both commands and immediately precedes caki and would be expected to be 80% which would later be raised to 100%. Mary is two cyclic nodes up from, and follows caki. We would predict its value as follows: 2(10) subtracted from 80 = 60, with 10 more being subtracted from 60, to obtain 50% by (I) and (II). Thus if we were to apply the algorithm to both the nonsubject and subject in a sentence simultaneously, we would obtain the wrong result: Caki cannot refer to a nonsubject when there is a subject, namely that Ellen-caki is a better linkage than Mary-caki as shown by the percentage in (45a) and (45b).

The same wrong result would be obtained if we applied the algorithm to both Ellen and Mary in (45b). Ellen would be 70% and Mary, 50% by (I) and (II). But this would conflict with observed acceptability judgments: Mary is the only possible anaphor for caki in (45b).

(45a) and (45b) show that even when nonsubjects are in the best position to refer to caki, caki can refer only to subjects, even if they are in a worse position. We can conclude that nonsubjects cannot be an anaphor when a subject is there.

Therefore, before algorithms can apply, one must scan the entire tree to determine if there is a possible subject anaphor. If there is one, then only the subject algorithm (I) and (II) applies.

We will adopt the following convention:

A tree is scanned and all subjects are circled, if any occur. If no subject occurs in the tree, only nonsubject anaphors of caki are circled. Thus in (46), only the subject is circled.
Bob said that it surprised Peter that I know that he won.
That caki chooses an indefinite subject over a definite object can be seen from the following sentences. It will become clear, however, that definiteness plays a very small role, when compared to subjecthood.

(47)
Nonsubjects are like first and second person pronouns in that they are impossible anaphors of caki when there is a subject in the sentence. The difference between nonsubjects and the first and second person pronouns is that the latter can never refer to caki, even if there is no other possible anaphor in the sentence.

1.10.2 When there occur a definite nonsubject and an indefinite subject in a sentence, caki chooses the indefinite subject over the definite nonsubject.

Somebody\textsubscript{i} said that it surprised Bill\textsubscript{j} that he\textsubscript{i} won.
Somebody₁ said that it surprised Billᵢ that he₁ won.

If we apply algorithm (I') to Bill and (I) to ot'on salam, we obtain 70% for Bill and 50% for ot'on salam, which is a wrong result. We see that caki chooses a subject over a nonsubject, without regard for definiteness. Note that the nonsubjects in (48) are in a better position than subjects to refer to caki.
The Like-Anaphor Constraint (LAC)

This constraint captures the fact that in a certain structural configuration, more than one occurrence of caki must usually refer to a common anaphor. I will first show where this constraint is operative, and then try to distinguish the structural configurations where this constraint holds from those where it does not.

Clausemate caki's must refer to a common anaphor.

(49) Peter₁-ka chowte-he-so Brunoⱼ-ka nowllo-wat-ta.  
NM invited since NM play came

Since Peter₁ invited (himⱼ), Brunoⱼ came to play.

he *[i] NM himself *[i] AM introduced
[ j ] *[ j ] [ j ]

He [i] introduced himself [i].
[ j ]

The following sentences show that caki's occurring inside a relative clause must refer to a common anaphor, unless either caki has a clausemate anaphor or a hierarchically closer anaphor.

In (50), both caki's are clausemates and they refer either to Bill or to salam. Although Bill is preferred, because it both commands and immediately precedes caki. The LAC blocks one caki from referring to Bill and the other from referring to salam.
(50)

Bill -i
NM

salam -il
person AM

Bill-caki: perfect linkage (Bill commands and precedes)
salam-caki: 90 (Relative Clause rule)

Although Bill is preferred, because it both commands and precedes caki, over salam, both caki's may refer either to Bill or to salam. The LAC blocks one caki from referring to Bill and the other from referring to salam.
(50) was a case with clausemate caki's. In (51), nonclausemate caki's occur inside a relative clause and refer to a common anaphor. Again, because Bill commands and immediately precedes the caki in $S_3$, it is preferred for both caki's to refer to Bill, though again, both can refer to salam.

(51)
The following sentence with a relative clause shows that when either caki has a clausemate anaphor, the LAC does not hold. It will be shown later that this also holds in other structures. In the following example, the LAC may, but need not, hold. When the LAC holds, caki's may refer to Mike or to salam Mike is preferred, since the caki in S, has a 100% linkage to it.

(52)

The person who said in his house that Mike criticized him-

(self) came.
The following sentence with complements provides another illustration of the LAC.

(53)

Bill$_1$ said that he$_i$ thinks that John$_j$ doesn't know that he$_i$ won.
Caki in $S_4$ chooses Bill by the principle of immediate precedence and command. Caki in $S_4$ refers to caki in $S_2$ by the LAC.

So far, cases with clausemate caki's, caki's in a relative clause, and those in complements have been shown to obey the LAC.

The following sentence with a complement illustrates that when each caki has a clausemate anaphor which is a subject, the LAC is not obeyed. Each caki refers to its clausemate anaphor. Cases where the LAC does not hold simply illustrate the interaction of this constraint with caki's preference for the hierarchically closest anaphors. Here, caki's coreference with a clausemate anaphor is so great that the LAC does not hold.

(54) Paul$_1$-i caki$_{\text{ENE}}$ (1) ane$_{\text{ENE}}$-eke$_{\text{ENE}}$ (1) [Mary$_j$-ka caki$_{\text{ENE}}$ (1) $\uparrow$-1+1

NM his$_j$ (1) wife$_k$ to$_{\text{ENE}}$ (1) NM her$_{\text{ENE}}$ (1) AM

sissot-ta-ko ] mal-het-ta. washed comp. said

Paul$_i$ told his$_i$ wife$_k$ that Mary$_j$ washed herself$_j$.

I will now discuss sentences with complements and an adverbial clause and show the effect of the LAC in such structures. I will then try to formulate the structural conditions on when the LAC is obeyed. My algorithms developed in Chapter One do not account for all of the linkages that are assigned percentages in the following sentences. Some percentages merely reflect the native intuition for such. At the time of this writing, I have not been able to arrive at an adequate algorithm that will also give us a way of predicting when the LAC holds and does not hold. This needs further research.
In (55a), both caki's refer to the hierarchically closer anaphor John, and the LAC is observed.

(55) a.

When John demanded that Bill work, he desired to rest.

In (55b), both caki's refer to the hierarchically closer anaphor John. (55b) suggests that caki in S₄ links to caki in S₂ which in turn, links to John.

(55) b.

When he demanded that he work, John desired for Bill to rest.
Note that in both (55a) and (55b), one caki commands the other caki, and one NP commands the other NP. For now, we will hypothesize that such a structural condition for caki and its anaphor is needed for the LAC to hold.

The following sentences show cases in which the LAC is not obeyed. In (56), neither caki commands the other, and in (57), neither NP commands the other.

(56)

\[ S_1 \]
\[ \begin{array}{c}
S_2 \\
NP \\
NP \\
NP
\end{array} \]
\[ \begin{array}{c}
V \\
N \\
N
\end{array} \]
\[ \begin{array}{c}
\text{Bill}_i \text{ yowku-hess-il t'ë}
\end{array} \]
\[ \begin{array}{c}
\text{NM demanded SM when}
\end{array} \]
\[ \begin{array}{c}
S_3 \\
NP \\
NP
\end{array} \]
\[ \begin{array}{c}
10\% \\
90\%
\end{array} \]
\[ \begin{array}{c}
V \\
N
\end{array} \]
\[ \begin{array}{c}
caki \\
he
\end{array} \]
\[ \begin{array}{c}
*-i \\
1
\end{array} \]
\[ \begin{array}{c}
*-j
\end{array} \]
\[ \begin{array}{c}
\text{90\% work comp.-AM}
\end{array} \]
\[ \begin{array}{c}
\text{10\% rest comp.-AM}
\end{array} \]

When Bill demanded that he work, John desired to rest.

Caki in $S_4$ refers to Bill, but not to John. Caki in $S_3$ refers to John, but not to Bill. Note that neither caki commands the other.

In the following sentence, caki in $S_2$ refers to Bill in $S_4$, and caki in $S_1$ refers to John in $S_3$. Note that neither NP commands the other. (56) and (57), like others which do not obey the LAC, are counterexamples to this constraint.
(*When he$_i$ demanded that Bill$_i$ work, he$_j$ desired for John$_j$ to rest.

(58) is also a counterexample to the LAC. Each caki has a hierarchically closer anaphor. In $S_2$, Bill commands caki, whereas in $S_1$, caki commands John. Note that neither NP commands the other.

(*When Bill$_i$ demanded that he$_i$ work, he$_j$ desired for John$_j$ to rest.*)
(59) is a mystery, since the LAC may, but need not hold, and
there are two possible linkages.

(59)

(*When he\textsubscript{1} demanded that Bill\textsubscript{1} work, John\textsubscript{j} desired to rest.)

In (59), caki in S\textsubscript{2} does not command caki in S\textsubscript{3}, although John
commands Bill. One of the conditions for the LAC is not satisfied,
so we predict that the LAC will not hold. The conditions for the
LAC are the following: (a) one caki commands the other and (b) one
NP commands the other. They were illustrated by (55). In (59), how-
ever, contrary to our expectation, either possibility is available.
The explanation for such must await further research.
1.12 The LAC and Coordinate Structures

In this section, I will first describe caki's coreference possibilities in coordinate structures. Then I will demonstrate that since neither caki's nor NP's command the other in such structures, the LAC does not hold.

1.11.1 Caki cannot refer to an anaphor in a coordinate structure, if each conjunct contains a possible anaphor, and the coordinate structure is in the same level of embedding as caki.

The following sentence is there, ungrammatical.

(60) *John_{i} TV-{i} pow-kow, Mary_{u} c'ek-{i} ilk-kow, John_{i} saw and Mary_{u} book AM read and

\[ \text{caki} \rightarrow \text{he} \{i\} \text{NM henkpowk-het-ta.} \]
\[ \text{he}_{j} \text{NM was happy} \]
\[ \text{she} \{j\} \]

(John_{i} watched TV, and Mary_{u} read a book, and he_{i} / she_{j} was happy.)

Caki may refer to a clausemate anaphor, even if it is prepoced.

(61) Caki_{i} TV-{i} John_{i} pow-kow, caki_{i} Mary_{i} pip an-het-kow, caki_{i} AM criticized and him-\{i\} \text{NM Bob}_{j} c'hinkc'han-het-ta. and him-\{j\} \text{AM praised}

(\text{Himself}_{i}, John_{i} criticized, and himself_{j}, Bob_{j} praised.)

\[ \text{John}_{i} \text{ criticized himself}_{i}, \text{ and Bob}_{j} \text{ praised himself}_{j}. \]

Caki may refer to an anaphor in the preceding conjunct, if no other possible anaphor occurs.
    NM house to came and he NM rested

    John₁ came home, and he₁ rested.

Primacy must be obeyed by caki-subjects.

    he NM house to came and NM rested

(*He₁ came home, and John₁ rested.)

Primacy is not obeyed by a caki-nonsubject in a coordinate structure.

(63) a. Sinmun-i John₁-il pipʰ an-het-ta. Kilona, caki₁-nín
    NM AM criticized but he

    kikos-il mollat-ta.
    it AM did not know

    The newspaper criticized John₁, but he₁ did not know it.

b. Sinmun-i caki₁-il pipʰ an-het-ta. Kilona, John₁-in
    NM him AM criticized but NM

    kikos-il mollat-ta.
    it AM did not know

(The newspaper criticized him₁, but John₁ didn't know it.)

The following sentences have real coordinate conjunctions; namely,

conjunctions of semantically unrelated propositions or disjunctions.

They may include cases where there is no temporal or causal relation
between the two events in the coordinate structure. First, I will
show that caki-subjects obey Primacy and then that caki-nonsubjects
do not.

(64) a. *Caki₁-ka mowtín salamtíl-il salank-ha-kow, mowtín
    he₁ NM every one AM loves and every

    salamtíl-il John₁-il salank-han-ta.
    one NM AM loves

(*He₁ loves everyone, and everyone loves John₁.)
b. Mowtin salamtil-i caki₁-lif salank-ha-kow, John₁-in every one NM him AM love and NM

mowtin salamtil-il salank-han-ta.
every one AM loves

(Everyone loves him₁, and John₁ loves everyone.)

(65) a. *Caki₁-ka uli-lif kowyownik-ha-kona, ani-myon John₁-in he NM us AM employ or neg.-if NM
talin salam-il kuhe-ya-han-ta.
other person-AM find must

(*Either he₁ employs us, or otherwise, John₁ must find some
other person.)

b. Uli-ka caki₁-lif kowyownik-ha-kona, ani-myon John₁-in we NM him₁ AM employ or neg.-if NM
talin il-il kuhe-ya-han-ta.
other work-AM find must

Either we employ him₁, or John₁ must otherwise find
some other work.

(64) and (65) have shown the contrast between caki-subject and caki-nonsubject in obeying the Primacy Constraint. Both (64) and (65) have real coordinates. In (64), the propositions in the conjuncts are not temporally or causally related. In (65), we have a disjunction. Both of these sentences show that caki-nonsubjects are not subject to Primacy in any coordinate structure.

In (66), it is shown that an NP in a subordinated coordinate structure can refer to a higher caki. Since both IP's are hierarchically equidistant from caki, the linearly closer one wins.⁹
When the wife played the piano and the husband sang, he was happy.

That hierarchical closeness is more important than linear closeness is seen by the anaphoric linkages below.

Since the husband won the prize and the picture that the wife drew was popular, he was satisfied.
The following sentences further illustrate that the LAC does not hold in a coordinate structure. We see once again that caki refers to an anaphor in its own clause.

(68) John₁-in caki₁ NM his₁ room in play and Billⱼ-in cakiⱼ NM hisⱼ room in kownkpu-het-ta.

John₁ played in his₁ room, and Billⱼ studied in hisⱼ room.

(69) John₁-in, Billⱼ-in cakiⱼ NM cip-e tel-i-kow-ka-kow, NM his₁ house-to took and Bobₖ-in, Peter₁-ka caki₁ cip-e tel-i-kow-kat-ta. NM NM his₁ house-to took

As for John₁, Billⱼ took (him₁) to hisⱼ house, and as for Bobₖ, Peter₁ took (himₖ) to hisₖ house.

In this section, I have briefly discussed anaphoric linkages of caki in coordinate structures. The LAC was shown not to hold here, since neither caki commands the other, and neither NP commands the other. Caki was also shown not to be able to refer to any NP in a coordinate structure with more than one possible anaphor, unless the coordinate structure is subordinated to the sentence in which caki occurs. It was shown that hierarchical closeness is more important than linear closeness in a coordinate structure. As elsewhere, only caki subjects obey Primacy here.

1.13 Caki and the Thematic Hierarchy¹⁰

The following hierarchy exists for NP's that can serve as anaphors
of caki. The higher in the hierarchy, the better an NP will be as an anaphor of caki. A natural consequence of this hierarchy is that caki cannot be higher in the hierarchy than its anaphor.

topic > subject > direct object > indirect object>

an NP object of lowpuh° 'from' > an NP object of etehese 'about' >
genitive NP

Only topics can serve as anaphors of caki-subjects within a simple sentence:

(70) a. Bill-i-in, caki-ka howna-so ikos-il het-ta.
    NM he_i NM alone this AM did

As for Bill_i, he_i did this alone.

No caki topic can be anaphoric to the subject of a sentence.

    NM NM alone this AM did

(As for himself_i, Bill_i did this alone.

A subject-NP can serve as the anaphor of caki, but not conversely.

(71) a. John-i caki-i-lii1 pip_h an-het-ta.
    NM himself-AM criticized

John_i criticized himself_i.

b. Caki-i-lii1 John-i pip_h an-het-ta.
    himself-AM NM criticized

(*Himself_i, John_i criticized.)

c. *John-i-lii1 caki-i-ka pip_h an-het-ta.
    AM he NM criticized

(*John_i, he_i criticized.)

d.*Caki-i-ka John-i-lii1 pip_h an-het-ta.
    he NM AM criticized

(*He_i criticized John_i.)
In (71), it is shown that when the subject is the anaphor of *caki* which is a direct object, a direct object-*caki* can be preposed. (71c) and (71d) show that a sentence in which a *caki*-subject is preposed is much worse than one where the *caki*-subject follows an object anaphor, although both types of linkages are bad.

The following sentences show that it is better to have a *caki* indirect object refer to a direct object-NP than conversely.

(72) a. Ne-ka John₁-e John₁-e ke le ko₁₁-e pic⁴^h_0-pow-yo-cu-ot-ta. I 1 NM AM him to mirror in showed

\[ \text{I showed John₁ to him₁ in the mirror.} \]

b. ?Ne-ka caki₁-eke John₁-e John₁-e ko₁₁-e pic⁴^h_0-pow-yo-cu-ot-ta. I NM him₁ to 1 AM mirror-in showed

(I showed *him₁ John₁ in the mirror.)

I showed John₁ to *him₁ in the mirror.

c. ??Ne-ka John₁-eke caki₁-e John₁-e ko₁₁-e pic⁴^h_0-pow-yo-cu-ot-ta. I NM to him₁ AM mirror-in showed

(I showed to John₁ *him₁ in the mirror.)

I showed John₁ to *him₁ in the mirror.

d. *Ne-ka caki₁-e John₁-eke ko₁₁-e pic⁴^h_0-pow-yo-cu-ot-ta. I NM *him₁ AM to mirror-in showed

(I showed *him₁ to John₁ in the mirror.)

I showed John₁ to *him₁ in the mirror.

(72a) shows that a direct object NP can be an anaphor of a *caki*-indirect object. When *caki-eke* is preposed, the sentence is worse than when it is not. (72c) shows that an indirect object-NP can precede a *caki*-direct object, but (72c) is not as good as (72a). This is shown by the badness of (72d) when the *caki*-direct object is preposed and it refers to an NP lower in the hierarchy, namely, an indirect object.
Subjects can serve as anaphors of caki-indirect objects, but not conversely.

(73) a. John_1-i caki_1-eke sowksakyot-ta.
    NM himself-to whispered

    John_1 whispered to himself_1.

b. Caki_1-eke John_1-i sowksakyot-ta.
    himself-to NM whispered

    (To himself_1, John_1 whispered.)

    John_1 whispered to himself_1.

c. *John_1-eke caki_ka sowksakyot-ta.
    to he NM whispered

    (*To John_1, he_1 whispered.)

d. **Caki_1-ka John_1-eke sowksakyot-ta.
    he_1 NM to whispered

    (**He_1 whispered to John_1.)

John can refer to a caki-indirect object, and caki-preposing is here good, since the subject John is much higher in the hierarchy than the indirect object. (73c) shows that the caki-subject cannot refer to a clausal mate indirect object. If the caki-subject precedes its anaphor, as in (73d), the linkage is at its worst, as expected.

Topics can refer to caki-indirect objects, but not conversely.

(74) a. John_1-in, ne-ka caki_1-eke p'yonci-li1 pownet-ta.
    NM I NM him_1 to letter AM sent

    As for John_1, I sent a letter to him_1.

b. *Caki_1-nin, ne-ka John_1-eke p'yonci-li1 pownet-ta.
    he NM I NM to letter AM sent

    (*As for him_1, I sent John_1 a letter.)
That the indirect object is higher in the hierarchy than the object NP of a lowput^h^o-phrase can be seen in relative clauses, where it is worse to have within a relative clause a caki-ekte 'to caki' anaphoric to the head noun than a caki-lowput^h^o 'from caki' which is similarly anaphoric to the head noun.

(75) a. ?[Ne-ka caki-ekte p^h^yonci-l^tl ssii- n] salam
   I NM him^i to letter AM wrote SM person

   the person^i to whom I wrote the letter

   b. [Ne-ka caki-lowput^h^o p^h^yonci-l^tl pat-in] salam
   I NM him^i from letter AM got SM person

   the person^i from whom I received a letter

The object NP of lowput^h^o 'from' can serve as the anaphor of the object NP of eteheso 'about', but not conversely.

(76) a. Ne-ka John^x-ulowput^h^o caki^-eteheso til-ot-ta.
   I NM^i from him^i about heard

   [I heard from John^i about him^i.]

   I NM him^i about from heard

   (I heard about him^i from John^i.)

   I heard from John^i about him^i.

c. ?*Ne-ka John^-eteheso caki^-lowput^h^o til-ot-ta.
   I NM about him^i from heard

   I heard about John^i from him^i.

   I NM him^i from about heard

   (I heard from him^i about John^i.)

   I heard from John^i about him^i.
When an NP higher in the hierarchy is the anaphor of caki, the caki-phrase may precede this anaphor, as in (76b). When the lowputₜₒ-phrase contains caki, which is higher in the hierarchy than the NP in the eteheso-phrase, the sentences are ungrammatical, as can be seen in (76c) and (76d). As before, it is worse for the caki-phrase to precede its anaphor.

The NP in an eteheso-phrase may be an anaphor of a caki-genitive, but not conversely.

(77) a. Ne-ka John₁-eteheso caki₁ cʰ³₁ ink⁻eke ye⁻k⁻het⁻ta.
    I NM about his₁ friend to talked

   I talked to John₁ about his₁ friend.

b. Ne-ka caki₁ cʰ³₁ ink⁻eke John₁-eteheso ye⁻k⁻het⁻ta.
    I NM his₁ friend to about talked

   (I talked to his₁ friend about John₁.)

   I talked about John₁ to his₁ friend.

c.?Ne-ka John₁-ii cʰ³₁ ink⁻eke caki₁-eteheso ye⁻k⁻het⁻ta.
    I NM gen. friend to him₁ about talked

   I talked to John₁'s friend about him₁.

d. *Ne-ka caki₁-eteheso John₁-ii cʰ³₁ ink⁻eke ye⁻k⁻het⁻ta.
    I NM him₁ about gen. friend to talked

   (I talked about him₁ to John₁'s friend.)

   I talked to John₁'s friend about him₁.

(77c) and (77d) show that a genitive NP cannot form an anaphoric linkage with a caki in an eteheso-phrase.

Thus, a thematic hierarchy has been shown to exist for caki, and it has been demonstrated that the linear order of an anaphor and caki plays a relatively minor role.
One interesting phenomenon arises which is the opposite of what we might expect from the thematic hierarchy. When a topic and a subject occur with caki, caki prefers the subject anaphor over the topic. This follows from the general preference of caki for subjects over nonsubjects.

(78) \(\text{John}_1\)-in, Peter\(_j\)-ka caki \(\text{his}_j\) cip-e telikow-kat-ta.  
As for John\(_1\), Peter\(_j\) took \(\{\text{himself}_j\}\) to his\(_j\) home.

(78) is particularly interesting in view of the fact that

(79) \*Ne-ka John\(_1\)-eke Peter\(_j\)-eteheso caki cip-eso yeki-het-ta.  
I to about his \(\{\text{his}_1\}\) home-in talked

I talked to John\(_1\) about Peter\(_j\) in his\(_1\) house.

is bad: Usually, caki doesn't tolerate ambiguity, if a subject is around, with two NP's unless both are subjects. In addition to the thematic hierarchy, we need the subject preference condition. Such a preference condition does not exist for nonsubjects. Therefore, when we have more than one nonsubject, caki cannot choose one nonsubject over the other. The sentence is too ambiguous and is therefore ungrammatical.

The existence of a thematic hierarchy and the preference of subject anaphors over nonsubjects has been discussed above. In the following discussion, I will examine discourse facts and try to see if 'empathy' plays any role in coreference possibilities of caki.
1.13.1 **Caki** and Empathy

Kuno (1975) defines the Topic Empathy Hierarchy as follows:

"It is easier for the speaker to empathize with an object (e.g., person) that he has been talking about than with an object that he has just introduced into discourse for the first time."

Discourse-anaphoric > Discourse-nonanaphoric

The following sentences illustrate how **caki** can refer to a non-subject, when the speaker empathizes with that nonsubject.

(80) a. Ot'on salam-i Bob-\(^j\)-ke caki\(^i\) omoni-\(^{*i}\) some \(^i\) person \(^j\) NM to his \(^j\) mother gen.

konkank-eteheso mul-o-cu-ot-ta.

health about asked ben.

Somebody\(^i\) asked Bob\(^j\) about his\(^j\) mother's health for him\(^j\).

b. Ot'on salam-i Bob-\(^j\)-ke caki\(^i\) omoni-\(^{*i}\) konkank-some \(^i\) person \(^j\) NM to his \(^j\) mother-gen. health eteheso mul-ot-ta.

about asked

Somebody\(^i\) asked Bob\(^j\) about his\(^i\) mother's health.

In (80a), **caki** refers to Bob\(^j\), a nonsubject, rather than to the syntactic subject. The form **mul-o-cu-ot-ta** is the form used when the speaker describes the action from the receiver's point of view, rather than from the giver's point of view. This reinforcement expresses the speaker's empathy with Bob, and not with **ot'on salam 'somebody', as can be see from the contrast in (80).

The following illustrate Kuno's examples of empathy.

(a) John\(^i\) hit Mary\(^j\).  (neutral)

(b) John\(^i\) hit his\(^i\) wife.  (empathy with John )
(c) Mary's husband hit her.  (Empathy with Mary)

Further examples of a speaker's object of empathy with caki's anaphor follow.

(81) a.

```
S_1
    /\     /
   /  \   /  \
NP    NP N

S_2
    /\    /
   /  \   /
NP    NP V

NP     N

NP   N

ni-ii
his

omoni-ka caki i-lil miwo-ha-nin-kos-i
mother NM him AM dislikes comp.-NM her

kwelewp h yot-ta
disturbed

That his mother dislikes him > herself disturbed Bill_i.
```

(81) b.

```
S_1
    /\     /
   /  \   /  
NP    NP N

S_2
    /\    /
   /  \   /
NP    NP V

NP     N

NP   N

kinyo-ii
her gen.

at4il-41
son AM

kwelewp h yot-ta
disturbed

Mary-ka caki i-lil miwo-ha-nin-kos-i
NM her- i AM dislikes SM comp.-NM self
him

That Mary_i hates herself_i disturbed her_i son_j.
```
In (81a), the speaker expresses his empathy with Bill by saying *kt-ți ḍomoni* 'his mother' in referring to Bill's mother. Otherwise, he would have referred to Bill's mother as, say, Mary, and to Bill, as her son, as in (81b). Note the contrast between (81a) and (81b). In (81a), caki prefers Bill to the subject, since the speaker empathizes with Bill. In (81b), however, caki prefers the subject, Mary, since the speaker empathizes with Mary. Note that empathy does not exclude the possibility of caki referring to a subject.

1.13.2 Caki may refer to a semantic source.

The following sentences illustrate how caki may refer to a semantic source:

(82) John₁-1 Mary₂-lowput h o caki₁ yeki-ı̱l tı̱l-ot-ta. th infnm j from th nm his th nm story-AM heard

John₁ heard his₁/her_j story from Mary₂.

(83) John₁-1 Peter₂-lowput h o caki₁ sonmul-ı̱l pat-at-ta. th infnm j from th nm his th nm present-AM got

John₁ got from Peter₂ his₁ present. th nm his th nm

Before I conclude this section, I will point out that caki's preference for a subject over a nonsubject is much stronger than the preference for an NP that is empathized with. The following sentences show that genitives cannot serve as anaphors of caki and only subjects can.

(84) [Mary₁-tı̱ atıl-ı̱ caki₁-ı̱l pip an-ha- n kos-ı̱ ]

[Mary₁-tı̱ gen. son j NM caki₁-ı̱l pip an-ha- n kos-ı̱ ]

[Mary₁-tı̱ gen. son j NM caki₁-ı̱l pip an-ha- n kos-ı̱ ]
kínyo-ìììi nolle-ke-het-ta.
her AM surprised

That Mary's son criticized himself, surprised her.

Note that caki can refer only to atil 'son', even though the
speaker empathizes with Mary by saying Mary-ìì atil 'Mary's son'.

The following sentence also illustrates a similar point.

(85) Bill-ìì kì-iì omonì-ka caki cìp-esu pow-at-ta.
AM his-gen. mother-NM his {nî} house-in saw

(His mother saw Bill in her house.)

It has been shown that when caki refers to a speaker's object of
empathy, some form of semantic reinforcement is required; i.e.
benefactive forms of verbs, or a verb of feeling distressed, sad, etc.
Genitives alone are clearly inadequate to overrule caki's reference
only to a subject.

1.14 Summary

In simple sentences, it has been shown that a caki-subject cannot
refer to a clausemate anaphor. Caki can never refer to first and second
person pronouns in any structure. That caki subjects obey Primacy has
been shown in subordinating and coordinate structures. In relative
clauses, I have shown that there is a thematic hierarchy for caki
referring to the head noun. The lower caki is in the accessibility
hierarchy, the better caki inside a relative clause will be able to
refer to the head noun. I have also discussed conditions for object-
caki within a relative clause. A direct object-caki may refer to the
head noun, if it refers to the subject of the relative clause. An indirect object is acceptable, but other objects of a postposition like the lowput o-phrase or the eteheso-phrase are better, and genitive caki's are best when they refer to the head noun.

Among possible anaphors, caki has been shown to choose a subject over a nonsubject. Both with subjects and with nonsubjects, caki has preferences that are structure-dependent. In general, caki prefers referring upward to referring downward. Subject anaphors allow caki to refer further upward or downward than nonsubjects. The perfect anaphor for caki was shown to be one which both commands and immediately precedes caki (Ib). Algorithms were presented to capture these preferences.

Algorithm I: Multiply 10 by the number of S-nodes up from caki to its anaphor and subtract the product from the percentage of the immediately lower linkage.

Algorithm II: Multiply 10 by the square of the number of S-nodes down from caki to its anaphor and subtract the product from the percentage of the linkage immediately above. Algorithms (I') and (II') were for nonsubject anaphors and caki.

These two algorithms capture the fact that caki will refer further up than down. That caki refers less up or down with nonsubject anaphors has been captured by algorithms (I') and (II'), which multiply the number of S-nodes by a factor of 20, instead of 10.

Subparts of these algorithms capture the fact that linkages where caki is preceded by its anaphor are better than ones where caki precedes its anaphor. We subtract 10 from the perfect linkage, if
caki precedes (Ia). We capture the fact that linear closeness improves an anaphoric linkage by algorithm (I'a), which states that linkages to an NP that is linearly closest to caki should be raised to a value of 70%. In short, we have introduced a vertical and a left-right algorithm for capturing caki's anaphoric preferences.

The generality of these algorithms has been shown in their applicability in structures with complements, adverbiaial clauses, and relative clauses.

By looking at structures with both subjects and nonsubjects, we concluded that in scanning a tree, subjects are first looked for and circled if there are any. If no subject occurs, nonsubjects are circled among possible anaphors and the algorithms are used to decide on the order of preferred anaphors.

Finally, I have discussed caki's reference to an anaphor in terms of a thematic hierarchy which states that the following hierarchy exists for caki's anaphors:

- topic > subject > direct object > indirect object >
- object of lowputo > object of eteheso > genitive

It was also shown that the condition that caki chooses a subject over a nonsubject is needed in addition. There appears to be no factor which would choose one particular nonsubject over another.

Caki was shown to refer to a semantic source or an object of a speaker's empathy, among nonsubjects. It was also shown that when caki refers to an object of empathy, some form of semantic reinforcement is necessary, in addition to uses of genitives or
benefactive forms of verbs. Genitives alone are inadequate to make caki refer to a nonsubject.

Thus the features of a sentence that determine the well-formedness of anaphoric linkages involving caki are a complicated mix of syntax, semantics, and discourse factors. Which of these types of factors will be decisive in any particular case is a complicated issue whose resolution must await further study.
Footnotes to Chapter One

1. Cases in which this tendency to refer to subjects can be overruled by other factors will be discussed in Chapter One, sections 1.5 and 1.11.

2. K₄ may appear as a possessive coreferential with the subject. The facts about k₄ will be discussed in detail in Chapter 2.

3. K₄ is a nonreflexive pronoun.

4. The use of casin here is optional. Casin is used like the English intensive reflexive.

5. Topics may antecede caki subjects. The fact that a topic may occur where no movement could have taken place suggests that topicalization in Korean is by copying, followed by an optional deletion of the copy. Consider the following sentence:

   John₁-₄n, (caki₄-ka) hownca-so kownkpu-het-ta.
   NM he NM alone studied

   As for John₁, he₁ studied alone.

6. The point that there is a hierarchy of emptiness will be developed in Chapter 4.


8. In the bracket notation, if the first line of the first pair of brackets is chosen, the first line of the second pair must be chosen. The second line of the first pair goes with the second line of the second pair, etc. No cross products are allowed in the bracket notation.
9. In one restricted dialect, caki cannot refer to any NP in a coordinate structure where more than one possible anaphor occurs. In such a dialect, (66) would be ungrammatical. The algorithm gives \text{namp\_yon-caki} a value of 90\%, but this does not accord well with speakers' intuitions for (66) which is marginal, even for those who do get it.


Kuno has suggested to me that caki may refer to a speaker's object of empathy (personal communication).

12. I use the term 'semantic source' as the person from whom one receives X or hears Y.
2. Conditions on ꝏ Noncoreference

2.1 Preview

In this chapter, I will examine the nonreflexive pro-forms like ꝏ, 'he', and discuss their coreference possibilities in various structural configurations. First, I will study the behavior of ꝏ in simple sentences both when ꝏ occurs as a subject, and when it occurs as a nonsubject. It will be seen that ꝏ does not obey Primacy in all NP positions, but rather, only when ꝏ is a subject, parallel to the behavior of caki. I will show that sentences with an assertive complement show a unique constraint that I call the "Non-reflexive Nonsubject Constraint." This constraint will be shown to be operative when either of the two NP's, the matrix subject or the complement subject, is a nonreflexive pronoun and the other is a full NP. I will then discuss the possibility of formalizing the noncoreference possibilities of ꝏ by the rule of Disjoint Reference and Chomsky's "Conditions."

2.2 The Clausemate Noncoreference Constraint

The non-reflexive pronouns in Korean are ꝏ, ꝏ-gyo, and ꝏ-ṭl, corresponding to 'he', 'she', and 'they', respectively. From now on, I will speak only of ꝏ, but what goes on for ꝏ also holds for the others.

No non-reflexive anaphoric linkage is possible between clausemates, if either is a subject.
(1) a. *John₁-₁ k₄₁-₁ɨ₁ sowke-het-ta.
   NM him AM introduced
   \[\text{*John₁ introduced him₁.}\]
   him AM NM introduced
   \[\text{*Him₁, John₁ introduced.}\]
   he NM AM introduced
   \[\text{*He₁ introduced John₁.}\]
d. *John₁-₁ɨ₁, k₄₁-ka sowke-het-ta.
   AM he NM introduced
   \[\text{*John₁, he₁ introduced.}\]

In (1a), the subject precedes the k₄ direct object. In (1b), k₄ is preposed and the same noncoreference holds. In (1c), the k₄ subject cannot refer to the direct object. This holds true in (1d), where the direct object is preposed. The fact that (1a) is as bad as (1b) and (1c) as bad as (2d), shows that there is a prohibition of a non-reflexive linkage between two clausemates, when one of them is a subject.

(2) a. *John₁-₁ k₄₁-eke cunkolkolyot-ta.
   NM him to mumbled
   \[\text{(*John₁ mumbled to him₁.)*}\]
   him to NM mumbled
   \[\text{(*To him₁, John₁ mumbled.*)}\]
   he NM to mumbled
   \[\text{(*He₁ mumbled to John₁.)*}\]
d. *John₁-eke, kᵢ₁-ka cunkolkolyot-ta.
    to he NM mumbled

(*To John₁, he₁ mumbled.)

In (2a) and (2b), the subject NP cannot refer to the indirect object, kᵢ₁. In (2c) and 2d), the subject kᵢ₁ cannot refer to the indirect object.

We find the same prohibition obtaining between subjects and objects of postpositions:

    NM him about talked

*John₁ talked about him₁.

    him about NM talked

*About him₁, John₁ talked.

    he NM about talked

*He₁ talked about John₁.

    about he NM talked

*About John₁, he₁ talked.

In (3a) and (3b), the subject cannot refer to kᵢ₁, the object of a postposition. In (3c) and (3d), the subject kᵢ₁ cannot refer to the object of a postposition.

Genitive kᵢ₁'s, unlike other nonsubjects, may refer to a clause-mate subject.

(4) a. John₁-i kᵢ₁-ᵢ₁ ke-ᵢ₁₁ cowaᵢ₁̅han-ta.
    NM his dog-AM likes

    John₁ likes his₁ dog.
b. Ki-ii ke-lii John-i cowa-han-ta.¹
   his    dog AM   NM likes

(His dog, John¹ likes.)

   he NM   i gen. dog-AM likes

(*He¹ likes John¹'s dog.)

   gen. dog-AM he NM likes

(*John¹'s dog, he¹ likes.)

(4a) and (4b) Show that a genitive ki may refer to the subject John:
the (c) and (d) sentences from (1) to (4) all show that no subject ki
may refer to a clausemate anaphor.²

That ki can refer to a clausemate nonsubject is shown by the fol-
lowing sentences. I will show that an anaphoric linkage is possible
between a direct object and an indirect object when either is a non-
reflexive pronoun.

   I NM   AM him to mirror-in showed (ben.)

   I showed John¹ to him¹ in the mirror.

   I NM him to AM mirror-in showed (ben.)

   (I showed him¹ John¹ in the mirror.)

(5a) is better than (5b) and shows that an anaphoric linkage is im-
proved when the anaphor precedes the pro-form. In the above sentences,
a direct object is the anaphor of the ki-indirect object. The opposite
type of linkages follow below: an indirect object is the anaphor of
the ki-direct object.
I NM ₁ to him₁ AM mirror-in showed (ben.)  
(I showed to John₁ him₁ in the mirror.)  
I showed John₁ to him₁ in the mirror.  

I NM him₁ AM to mirror-in showed (ben.)  
(I showed him₁ to John₁ in the mirror.)  

(6a) is better than (6b), because the anaphor precedes the pro-form.  
K₄ is higher in the hierarchy but precedes its anaphor in (6b). The  
sentences in (5) are better than those in (6) and show that when the  
anaphor is a direct object, the linkage is better than when the anaphor  
is an indirect object. An indirect object is a better anaphor than NP-eteheso.  

(7) a. Ne-ka Peter₁-eko k₄₁-eteheso yeki-het-ta.  
I NM ₁ to him₁ about talked  
(I talked to Peter₁ about him₁.)  

b. Ne-ka k₄₁-eteheso Peter₁-eko yeki-het-ta.  
I NM him₁ about to talked  
(I talked about him₁ to Peter₁.)  

That a topic may be an anaphor of a k₄-subject, but not conversely  
can be seen in the following sentences:  

(8) a. John₁-₁n, k₁₁-ka hownca nown-₁a.  
NM he NM alone plays  
As for John₁, he₁ plays alone.  

b. *K₄₁-n₁n, John₁-₁ hownca nown-₁a.  
he₁ NM NM alone plays  
(*As for him₁, John₁ plays alone.)  

Note that the same thematic hierarchy for caki is observed here  
for k₄. The hierarchy of anaphors for k₄ seems to be as follows:  
topic > subject > direct object > indirect object >  
lowputʰow -NP > eteheso-NP > genitive NP
The evidence for this claim is that a kí-subject, like caki-subject, cannot refer to a clausemate anaphor. The sentences in (7) show that an eteheso phrase with kí can refer to an indirect object NP which is higher in the hierarchy. Kí-eteheso 'about him' may precede its anaphor. The following sentences show that when the indirect object is kí, and it refers to the object of an eteheso-phrase, the anaphoric linkages are worse.

(9) a. ?*Ne-ka Peter₁-eteheso kí-eke yeki-het-ta.
   I NM about him₁ to talked

   I talked about Peter₁ to him₁.

   I NM him₁ to about talked

   (*I talked to him₁ about Peter₁.)

The indirect object, kí-eke, is higher in the hierarchy than the eteheso-phrase, which accounts for the ungrammaticality of (9a) and (9b). Note that the linkage is at its worst when the kí precedes an anaphor.

The following sentences show that the lowputʰ⁻o-phrase is higher in the hierarchy than the eteheso-phrase:

(10) a. Ne-ka Peter₁-lowputʰ⁻o kí-eteheso t₁l-ot-ta.
   I NM from him₁ about heard

   I heard from Peter₁ about him₁.

   b. Ne-ka kí-eteheso Peter₁-lowputʰ⁻o t₁l-ot-ta.
   I NM him₁ about from heard

   (I heard about him₁ from Peter₁.)

The eteheso-phrase can occur with kí and refer to the lowputʰ⁻o-phrase. Kí-eteheso may even precede its anaphor. The following sentences show that the lowputʰ⁻o-phrase cannot occur as kí when its anaphor is an eteheso-phrase.

(11) a. ?*John₁-i Peter₁-eteheso kí-lowputʰ⁻o t₁l-ot-ta.
   NM j about him₁ from heard

   John₁ heard about Peter₁ from him₁.
b. * John_\textsubscript{1-i} k\textsubscript{4-j}-lowput\textsubscript{h-o} Peter_\textsubscript{j-eteheso} til-ot-ta.
   NM him from about heard

(John\textsubscript{1} heard from him\textsubscript{j} about Peter\textsubscript{j}.)

The sentences in (5), (6), (7), and (8) show that the eteheso-phrase is lower in the hierarchy than the indirect object, or a lowput\textsubscript{h-o} phrase. Since a subject k\textsubscript{4} cannot refer to any clausemate, it must be the highest in the hierarchy.

The hierarchy of direct objects, indirect objects and the lowput\textsubscript{h-o} phrases can be seen in relative clauses when these NP's occur as k\textsubscript{4} inside the relative clause and are coreferential with the head noun. Such a linkage is impossible when k\textsubscript{4} functions as a direct object. The order of preference in retaining the k\textsubscript{4}-NP is in the following increasing order:

indirect object < lowput\textsubscript{h-o} -phrase < eteheso-phrase

It is inadequate to generalize that only subjects may not form a clausemate nonreflexive anaphoric relation: we need the same hierarchy of anaphoricity for k\textsubscript{4}, that we had for caki.

In (4a) and (4b), it was shown that a k\textsubscript{4}-genitive can refer to a subject NP. A genitive may form a nonreflexive anaphoric linkage with any other nonsubject.

(12) a. John\textsubscript{1-i} apoci\textsubscript{j-ka} k\textsubscript{4-j}-l\textsubscript{4l} cinke\textsubscript{h-an-het-ta}.
    gen. father-NM \{\textsubscript{i}\}him-AM praised

John\textsubscript{1}'s father\textsubscript{j} praised him\textsubscript{i}.

b. K\textsubscript{4-i-l\textsubscript{4l}}, John\textsubscript{1-i} apoci-ka c\textsubscript{h}inke\textsubscript{h-an-het-ta}.
    him AM gen. father NM praised

(Him\textsubscript{i}, John\textsubscript{1}'s father praised.)
   his father NM AM praised
   His father praised John₁.

   AM his father NM praised
   (John₁, his father praised.)

In (12a), a direct object kį may refer to a genitive NP. In (12b), a genitive kį may refer to a direct object NP. In the following, a nonreflexive anaphoric linkage is shown to be possible between a genitive and an indirect object, regardless of order, although the linkage where the anaphor precedes the pro-form is preferred.

    gen. father NM {⁎j₁}h.m-to letter AM wrote
    John₁'s father wrote him a letter.

   him to letter AM gen. father NM wrote
   (To him₁, John₁'s father wrote a letter.)

c. Kįᵢ-ii apociᵢ₃-ka John₁-eko pʰyonci-l⁽¹⁾₂₁ ssot-ta.
   his father NM to letter AM wrote
   (His father wrote John₁ a letter.)

d. John₁-eko pʰyonci-l⁽¹⁾₂₁ kįᵢ-ii apociᵢ₃-ka ssot-ta.
   to letter AM his gen. father NM wrote
   (To John₁, his father wrote a letter.)

In the following, a nonreflexive anaphoric linkage can be seen to be possible between a genitive and a lowputʰ-o-phrase.

(14) a. John₁-ii apociᵢ₃-ka k što lowputʰ₀ pʰyonci-l⁽¹⁾₂₁ pat-at-ta.
    gen. father NM {⁎j₁}him from letter AM got
    John₁'s father got a letter from him₁.
b.  \( \text{K}^4 \cdot \text{lowput}_h^0 \ p^h \text{yonci-l}i^1 \ \text{John}_i^4 \cdot \text{ii} \ \text{apoci} \cdot \text{ka} \ \text{pat-at-ta}. \)
   \( \{^41\} \) him from letter AM gen. father NM got
   (From him, John's father got a letter.)

c.  \( \text{K}^4 \cdot \text{ii} \ \text{apoci}_j^j \cdot \text{ka} \ \text{John}_i^4 \cdot \text{lowput}_h^0 \ p^h \text{yonci-l}i^1 \ \text{pat-at-ta}. \)
   his father NM from letter AM got
   (His father got a letter from John.)

d.  \( \text{John}_i^4 \cdot \text{lowput}_h^0 \ p^h \text{yonci-l}i^1 \ \text{K}^4 \cdot \text{ii} \ \text{apoci}_j^j \cdot \text{ka} \ \text{pat-at-ta}. \)
   from letter AM his father NM got
   (His father got a letter from John.)

In the following, a nonreflexive anaphoric linkage can be seen to be possible between a genitive and an eteheso-phrase:

(15) a.  \( \text{John}_i^4 \cdot \text{ii} \ \text{apoci}_j^j \cdot \text{ka} \ \text{K}^4 \cdot \text{eteheso} \ yeki-het-ta. \)
   gen. father NM \( \{^4j\} \) him about talked
   \( \text{John}_i^4 \) 's father talked about him.

b.  \( \text{K}^4 \cdot \text{eteheso} \ \text{John}_i^4 \cdot \text{ii} \ \text{apoci}_j^j \cdot \text{ka} \ yeki-het-ta. \)
   \( \{^4j\} \) him about gen. father got
   (About him, John's father talked.)

c.  \( \text{K}^4 \cdot \text{ii} \ \text{apoci}_j^j \cdot \text{ka} \ \text{John}_i^4 \cdot \text{eteheso} \ yeki-het-ta. \)
   his father NM about talked
   (His father talked about John.)

d.  \( \text{John}_i^4 \cdot \text{eteheso} \ \text{K}^4 \cdot \text{ii} \ \text{apoci}_j^j \cdot \text{ka} \ yeki-het-ta \)
   about his gen. father got
   (About John, his father talked.)

Genitives may have a nonreflexive anaphoric linkage:

(16) a.  \( \text{John}_i^4 \cdot \text{ii} \ \text{apoci}_j^j \cdot \text{ka} \ \text{K}^4 \cdot \text{ii} \ c^h \text{ek-}i^1 \ \text{ilot-ta}. \)
   gen. father NM \( \{^4j\} \) his book AM got
   \( \text{John}_i^4 \) 's father lost his book.
b. K̃4-i1 c̣̣ek-i1, John̂_i-i1 apocị̣-ka ilot-ta.
   his gen. book-AM gen. father-NM lost
   (Hiŝ_i book, John̂_i's father̂_j lost.)

c. K̃4-i1 apocị̣-ka John̂_i-i1 c̣̣ek-i1 ilot-ta.
   his-gen. father-NM gen. book-AM lost
   (Hiŝ_i father̂_j lost John̂_i's book.)

d. John̂_i-i1 c̣̣ek-i1, K̃4-i1 apocị̣-ka ilot-ta.
   gen. book-AM his-gen. father-NM lost
   (John̂_i's book, hiŝ_i father̂_j lost.)

In this section, I have discussed nonreflexive anaphoric possibilities between clausemates. My first generalization, that no anaphoric nonreflexive linkage is possible between clausemates if either is a subject must be modified, because we have seen that such a linkage is possible between a subject and a genitive. The generalization is that no subject K̃4 may be anaphoric to a clausemate. A genitive may form a nonreflexive anaphoric linkage with any clausemate NP. It has also been suggested that there is a thematic hierarchy for K̃4, just like the one we have seen for caki (Chapter 1). I have discussed how the eteheso-phrases seem to be lower in the hierarchy than indirect objects or lowpuṭ̣-phrases. Further facts to support this idea of a hierarchy can be found in relative clauses. The grammaticality of linkages between K̃4 and a clausemate is almost entirely independent of linear order ("almost" only because of the difference between (9a) and (9b) and (11a) and (11b). That is, the K̃4-clausemate linkages are basically only conditioned by the thematic hierarchy.

2.3 The Primacy Constraint

In this section, I will show that only subject K̃4's obey Primacy
in subordinating and coordinate structures.

*K as a genitive is good anywhere (except, for some speakers, preceding a clausemate anaphor.) A nonreflexive genitive may refer to a nonclausemate anaphor, in violation of Primacy.

    his mother NM NM sick comp. said

    (His mother said that John1 is sick.)

b. John1-ii omoni-j-ka [k1-ka ap'h-ta-kow] mal-het-ta,  
    gen. mother NM he NM sick comp. said

    John1's mother said that he1 is sick.

A subject k obeys Primacy in sentences with a complement.

(18) a. Fred1-i [k1-ka cikap-il humc'i-n kos-il] huhwe-het-ta.  
    NM he NM purse AM stole SM that-AM regretted

    Fred1 regretted that he1 stole the purse.

    HE NM NM purse AM stole SM that-AM regretted

    *Hei regretted that Fred1 stole the purse.

c. [K1-ka cikap-il humc'h-i-n kos-il] Fred1-i huhwe-het-ta.  
    he NM purse AM stole SM that-AM NM regretted

    (That he1 stole the purse, Fred1 regretted.)

d. [Fred1-i cikap-il humc'h-i-n kos-il] k1-ka huhwe-het-ta.  
    NM purse AM stole SM that-AM he NM regretted

    (That Fred1 stole the purse, he1 regretted.)

The sentences in (18) contrast with those in (19), where Primacy does not hold, because k is not a subject in the matrix clause.

(19) a. [Peter1-ka ap'i-n kos-i] k1-il1 kwelowp yo-ta.  
    NM sick SM comp.-NM him AM disturbed

    (That Peter1 is sick disturbed him1.)
   him AM          NM sick SM comp. NM disturbed
   (*Him, that Peter is sick disturbed.)

c. [K italiano ap'ine-kos-i] Peter italiano kwelowp hyot-ta.
   he NM         sick SM comp. NM AM disturbed
   (That he is sick disturbed Peter.)

d. Peter italiano, [k italiano ap'ine-kos-i] kwelowp hyot-ta.
   AM he NM    sick SM comp. NM disturbed
   (Peter, that he is sick disturbed.)

That a subject ki obeys Primacy in sentences with an adverbial clause is shown by the following sentences:

(20) a. John-in k italian Boston-e o-l t'e pihenki-low o-n-ta.
   NM he NM        to comes-SM when airplane-by comes
   (John, when he comes to Boston, comes by plane.)

   he NM      NM to comes-SM when airplane by comes
   (*He comes by plane when John comes to Boston.)

   he NM       to comes-SM when NM airplane-by comes
   (When he comes to Boston, John comes by plane.)

d. John-in Boston-e o-l t'e k italiano pihenki-low o-n-ta.
   NM to comes-SM when he NM airplane-by comes
   (When John comes to Boston, he comes by plane.)

However, a nonsubject ki does not obey Primacy in sentences with an adverbial clause, as shown by (21).

(21) John-il, k italiano Boston-e wass-il t'e, ne-ka c owte-het-ta.
   AM he NM       TO came-SM when I NM invited
   (Him, when John came to Boston, I invited.)
b. Ktι-lîl, Johnι Boston-e wass-îl t'e, ne-ka ʰowte-het-ta.
   him AM NM to came-SM when I NM invited

(Himι, when Johnι came to Boston, I invited.)

   he NM to came SM when I NM AM invited

(When heι came to Boston, I invited Johnι.)

d. Johnι-îl Boston-e wass-îl t'e, ne-ka kî-lîl ʰowte-het-ta.
   NM to came-SM when I NM him AM invited

(When Johnι came to Boston, I invited himι.)

A subject kι obeys Primacy in sentences with a relative clause.

   AM he NM likes SM dog NM bit

(Johnι, the dog heι likes bit.)

   him AM NM likes SM dog-NM bit

(Himι, the dog Johnι likes bit.)

   he NM likes SM dog-NM AM bit

(The dog that heι likes bit Johnι.)

   NM likes SM dog-NM him AM bit

(The dog that Johnι likes, bit himι.)

A subject kî obeys Primacy in coordinate structures:

   NM to attends and she NM linguistics studies

(Maryι attends MIT, and sheι studies linguistics.)

   she NM to attends and NM linguistics studies

(*)Sheι attends MIT, and Maryι studies linguistics.)
But a nonsubject \(\text{k}_i\) does not:

(24) a. No-ka \(\text{k}_i\)-li\(\text{h}\) c'owte-ha-kona, ani-myon ne-ka Bill\_i\_il you-NM him-AM invite either neg.-if I NM AM c'owte-ha-ket-ta.

will invite

(Either you invite him\_i, or otherwise, I will invite Bill\_i.)

b. No-ka Bill\_i\_il c'owte-ha-kona, ani-myon ne-ka \(\text{k}_i\)-li\(\text{h}\) you-NM AM invite either neg.-if I NM him AM c'owte-ha-ket-ta.

will invite

(Either you invite Bill\_i, or I will invite him\_i.)

In this section, I have shown that Primacy Constraint holds in all structures, but only for \(\text{k}_i\)-subjects and never for \(\text{k}_i\)-nonsubjects.

2.4 The \(\text{k}_i\)-Nonsubject Constraint

If \(\text{NP}_a\) is the subject of a complement and \(\text{NP}_b\) is the subject of an assertive predicate, \(\text{NP}_a\) and \(\text{NP}_b\) are not coreferent if either is \(\text{k}_i\).

Assertive predicates in Korean include the following: mal-ha-ta 'to say', senkak-ha-ta 'to think', mit-nin-ta 'to believe', and \(\text{sisim-han-ta}\) 'to suspect'.

The following sentences illustrate the constraint:


\(\text{NM}\) \(\text{he}\) \(\text{NM}\) rich is comp. said

John\_i said that he\_i is rich.
b. *[K*\textsubscript{i}_i-ka puca-la-kow ] John\textsubscript{i}-i mal-het-ta.  
he NM rich is comp. NM said  
(That he\textsubscript{i} is rich, John\textsubscript{i} said.)  
c. *[John\textsubscript{i}-i puca-la-kow ] k*\textsubscript{i}-ka mal-het-ta.  
NM rich comp. he NM said  
(That John\textsubscript{i} is rich, he\textsubscript{i} said.)  
d. *K*\textsubscript{i}-ka [John\textsubscript{i}-i puca-la-kow] mal-het-ta.  
he NM NM rich comp. said  
(*He\textsubscript{i} said that John\textsubscript{i} is rich.)  
This constraint holds in Japanese also. 10  
(26) a. *John\textsubscript{i} ka [kale\textsubscript{i} ga byooki da-to] omot'e-ilu.  
NM he NM sick is comp. thinking is  
John\textsubscript{i} thinks that he\textsubscript{i} is sick.  
b. *[Kale\textsubscript{i} ka byooki-da-to] John\textsubscript{i} ga omot'e-ilu.  
he NM sick is comp. NM thinking is  
(That he\textsubscript{i} is sick, John\textsubscript{i} thinks.)  
c. *[John\textsubscript{i} ka byooki-da-to] kale\textsubscript{i} ka omot'e-ilu.  
NM sick is comp. he NM thinking is  
(That John\textsubscript{i} is sick, he\textsubscript{i} thinks.) 11  
This constraint holds true also of a k*\textsubscript{i}-subject conjoined with another NP:  
(27) a. *Ann hako Bill\textsubscript{i}-i [k*\textsubscript{i}-ka puca-la-kow ] mal-het-ta.  
and NM he NM rich is comp. said  
Ann and Bill\textsubscript{i} said that he\textsubscript{i} is rich.  
b. *[K*\textsubscript{i}-ka puca-la-kow] Ann hako Bill\textsubscript{i}-i mal-het-ta.  
he NM rich is comp. and NM said  
(That he\textsubscript{i} is rich, Ann and Bill\textsubscript{i} said.)
    NM rich is comp. and he NM said

(That Billᵢ is rich, Ann and heᵢ said.)

The following sentence with an assertive complement containing
both a subject and a nonsubject shows that the Kᵢ-Nonsubject Constraint
holds only for subjects.

    NM AM criticized comp. heᵢ j NM said

That Johnᵢ criticized Billᵢ, heᵢ said.

In (28), the matrix subject, kᵢ, may refer to the complement
direct object Billᵢ, but not to the subject Johnᵢ.

The Kᵢ-Nonsubject Constraint also applies when the complement
subject is a passive subject. This suggests that the constraint does
not apply at the deep structure level.

          NM he NM robbed comp. thinks

Johnᵢ thinks that heᵢ was robbed.

    he NM robbed comp. NM thinks

(That heᵢ was robbed, Johnᵢ thinks.

    NM robbed comp. he NM thinks

(That Johnᵢ was robbed, heᵢ thinks.)

The Kᵢ-Nonsubject Constraint does not apply to a matrix nonsubject and
a complement subject, regardless of which is a nonreflexive proform.

      NM to sheᵢ j NM go must comp. said

Jillᵢ said to Annᵢ that sheᵢ must go.
   (Jill₁ told her₁ that Ann₁ must go.)

In (30a), the matrix indirect object Ann may refer to the complement subject kinyo. In (30b), the complement subject Ann may refer to a matrix indirect object kinyo. Thus, (28) and (30) show that the K₄-Nonsubject Constraint does not hold when either of the NP's, the embedded NP in (28), or the matrix NP, in this case, is a nonsubject.

The K₄-Nonsubject Constraint does not hold except between a full Nᵣ and a nonreflexive pronoun:

(31) \[
\begin{bmatrix}
  \text{Caki₁} & \text{-ka am-i-la-kow} \\
  \text{he} & \text{NM cancer-has-comp.} \\
  \text{caki₁} & \\
  \text{k₄₁} & \\
  \text{k₄₁} & \\
\end{bmatrix}
\]

\[
\begin{bmatrix}
  \text{ki₄} & \text{-ka ışisim-han-ta.} \\
  \text{he} & \text{NM suspects} \\
  \text{caki₁} & \\
  \text{k₄₁} & \\
  \text{caki₁} & \\
\end{bmatrix}
\]

He₁ suspects that he₁ has cancer.

In this section, I have defined and discussed the K₄-Nonsubject Constraint. This constraint holds if two NP's are subject of a complement and subject of an assertive predicate, if either is a non-reflexive pro-form, and the other is a full NP. ¹²

2.5 The K₄-Nonsubject Constraint as a Rule of Disjoint Reference

In this section, I will examine the consequences of formulating the coreference possibilities of k₄ in terms of the rule of Disjoint
Reference. Within the interpretive theory which I here assume, *kì* proforms would be generated by the Base in all NP positions.

\[ \text{NP} \rightarrow \text{kì} \]

The rule of Disjoint Reference may be formulated as follows:

**Disjoint Reference I**

(32) Mark *kì* as noncoreferential with a full NP.

This rule will account for noncoreference between a *kì*-subject and any full NP clausemate, or between a full NP subject and a clausemate *kì* (section 2.2). This rule will not allow coreference between a genitive and a clausemate.

The A-Over-A Principle can block this rule from applying in cases like the following:

(33)

\[ S_1 \]

\[ \text{NP}_1 \]

\[ \text{NP} \]

\[ \text{N} \]

\[ \text{ke-ka} \]

\[ \text{John}_1 \text{-ìì} \]

\[ \text{John}_1 \text{'s dog bit him}_1. \]

By A/A, \( \text{NP}_2 \) and \( \text{NP}_1 \) will be marked as noncoreferential. \( \text{NP}_2 \) and the lower \( \text{NP}_3 \) cannot have Disjoint Reference apply to them, because a
higher node dominates NP₃, and we must take the higher node.

The problem with the above formulation of the rule of Disjoint Reference is that it cannot account for the fact that coreference between nonsubject clausemates, in particular, sentences such as (7) and (10) is possible. For now, cases like (7) and (10) must be mentioned as counterexamples to the rule of Disjoint Reference. I will later consider modifying the rule, such that we define it as follows:

**Disjoint Reference II**

(34) Mark k₄ as noncoreferential with a full NP subject.

Consequences of such a modification will be discussed. But first, I will examine the consequences of the rule as first formulated in (32), that k₄ cannot refer to any full NP.

Recall the sentences (25), (26), and (27) in section 2.3. Disjoint Reference will correctly mark assertive complement subjects as noncoreferential with the higher subject. Recall sentence (28), where Disjoint Reference must be blocked from applying to an assertive complement nonsubject and a higher subject. The Specified Subject Condition will block Disjoint Reference from applying to them, since the complement contains a subject.

The Specified Subject Condition

No rule can involve X and Y in

...X...[α...Y...]...X...

where α contains a subject distinct from Y and not controlled by X.
The Tensed-S Condition will block Disjoint Reference from applying in all other cases (excluding assertive complements), where coreference must be allowed between an NP and a $k'i$. The modified Tensed-S Condition is as follows: 

No rule may involve $X$ and $Y$ in 

$$\ldots X \ldots [\alpha \ldots Y \ldots]$$

where $\alpha$ is an embedded $S$, unless $\alpha$ is a complement of an assertive predicate.

In cases like the following, therefore, where no assertive complement is involved, the Tensed-S Condition will block the rule of Disjoint Reference from applying, and it is possible for the two subjects to be coreferential, even if one is a nonreflexive pronoun and the other is a full NP.

(35) a. John$_1$-i ikyoss-il t'e, $k'i$-nin cowa-het-ta. 
    NM won SM when he NM 'happy was

When John$_1$ won, he$_1$ was happy.

b. $k'i$-ka ikyoss-il t'e, John$_1$-in cowa-het-ta.
    he NM won when NM happy was

When he$_1$ won, John$_1$ was happy.

(36) a. John$_1$-i iki-n kos-il $k'i$-ka $^{*}$mit-nin-ta
    NM won SM that-AM he NM {believes
    puin-han-ta
    denies

That John$_1$ won, he$_1$ *believes/denies.

b. $k'i$-ka iki-n kos-il John$_1$-i $^{*}$mit-nin-ta
    he NM won-SM that-AM NM {believes
    puin-han-ta
    denies


That he₁ won, John₁ *believes/denies.

(35) has an adverbial clause, and subjects in such sentences are not subject to Disjoint Reference. In (36), an assertive predicate, mit-ta 'to believe', is contrasted with a nonassertive, puín-ha-ta 'to deny'. Disjoint Reference is blocked from applying in the latter case.

The problem with this analysis is that there is no way to block the rule of Disjoint Reference from applying to a matrix nonsubject and an assertive complement subject in sentences like (37). Consider the following example:

      NM to he{j} NM won comp. said
      John₁ told Peter₁ that he₁ won.

      NM won comp. NM him to said
      (That Peter₁ won, John₁ told him₁.)

The problem is that coreference must be allowed between Peter and kṭ and there is no way to block Disjoint Reference from applying to these two NP's. The Specified Subject Condition cannot apply, because there is no specified subject in the complement other than the NP involved in coreference. The Tensed-S Condition does not hold, because sentences in (37) have an assertive complement, as can be seen from the fact that kṭ must be marked as noncoreferential with John in (37a), presumably as a result of Disjoint Reference.

One solution may be to reformulate the rule of Disjoint Reference as suggested in (34). To repeat (34),

(34) Mark kṭ as noncoreferential with a full NP subject.
**Disjoint Reference II**

(34) Mark $\mathbf{ki}$ as noncoreferential with a full NP subject.

Disjoint Reference will not apply to cases where a matrix nonsubject and an assertive complement subject are involved and either is a $\mathbf{ki}$. According to Disjoint Reference II, the Specified Subject Condition is still needed to account for cases like the following:

(38) a.

\[
S_1
\]

\[
S_2 \quad \text{John}_{i-1} \quad \text{mal-het-ta}
\]

\[
S_3 \quad \text{Ann}_{j-1} \quad \text{senkak-han-ta-kow}
\]

\[
S_1 \quad \text{NP} \quad \text{NP} \quad \text{V}
\]

\[
S_2 \quad \text{NP} \quad \text{NP} \quad \text{V}
\]

\[
S_3 \quad \text{NP} \quad \text{NP} \quad \text{V}
\]

\[
\text{kî}_{i-ka} \quad \text{ap}_{i- ta-kow}
\]

\[
\text{he}_{1} \quad \text{NM} \quad \text{sick} \quad \text{comp.}
\]

John$_i$ said that Ann$_j$ thinks that he$_i$ is sick.
(38) b.

(*He_i said that Ann_j thinks that John_i is sick.)

John_i said that Ann_j thinks that he_i is sick.

In (38), k4 can be coreferential with John, even though they are both subjects and even though both involve assertive complements. Note that Ann is the specified subject here.

The prediction is that when there is an intervening nonsubject, the rule of Disjoint Reference is not blocked. Here, there is dialect difference. For one dialect, any NP, subject or nonsubject, can block the rule of Disjoint Reference. In another, only a specified subject
blocks the rule.

(39) a.

\[
S_1 \\
\downarrow \quad \downarrow \\
NP \quad NP \quad V \\
\downarrow \quad \downarrow \\
S_2 \quad John_{1-1} \quad mal\text{-}het\text{-}ta \\
\downarrow \quad \downarrow \\
NP \quad NP \quad V \\
\downarrow \\
S_3 \\
\downarrow \\
NP \quad N \\
\downarrow \\
V \\
\downarrow \\
Z \quad k\dot{\iota}_{4-\text{ka}} \\
he_{1} \quad N \quad M \\
\downarrow \\
pucilon\text{-}ha\text{-}n\text{-}kos\text{-}i \\
hard\text{-}working \quad comp.\text{-}NM
\]

(That he_{1} is hard\text{-}working surprised Ann_{j} John_{1} said.)

(39) b.

\[
S_1 \\
\downarrow \quad \downarrow \\
NP \quad NP \quad V \\
\downarrow \quad \downarrow \\
S_2 \\
\downarrow \\
k\dot{\iota}_{4-\text{ka}} \quad mal\text{-}het\text{-}ta \\
he_{1} \quad N \quad M \\
\downarrow \quad \downarrow \\
S_3 \\
\downarrow \\
NP \\
\downarrow \\
NP \\
\downarrow \\
V \\
\downarrow \\
Z \quad John_{1-1} \\
NM \\
\downarrow \\
pucilon\text{-}ha\text{-}n\text{-}kos\text{-}i \\
hard\text{-}working \quad comp.\text{-}NM
\]

John_{1} said that it surprised Ann_{j} that he_{1} is hard working.

Since caki and k\dot{\iota} can corefer, regardless of whether either is a subject, the following sentences are grammatical. That is, when the intervening NP is caki, regardless of whether caki is a subject or a nonsubject, caki can refer to k\dot{\iota}, and k\dot{\iota} can refer to the higher NP.
(40) a.

\[
\begin{array}{c}
S_1 \\
\downarrow \\
NP \\
NP \\
\downarrow \\
N \\
NP \\
\downarrow \\
N \\
S_3 \\
\downarrow \\
NP \\
N \\
\downarrow \\
V \\
\end{array}
\]

\[
\text{John}_1 \text{-i} \text{ mal-het-ta} \\
\text{he}_1 \text{ NM} \text{ said} \\
\text{caki}_1 \text{-ka} \text{ senkak-han-ta-kow} \\
\text{he}_1 \text{ NM} \text{ thinks comp.} \\
\text{ki}_1 \text{-ka} \\
\text{he}_1 \text{ NM} \text{ is comp.} \\
\text{ap}_1 \text{-ta-kow} \\
\text{is comp.}
\]

John\textsubscript{1} said that he\textsubscript{1} thinks that he\textsubscript{1} is sick.

(40) b.

\[
\begin{array}{c}
S_1 \\
\downarrow \\
NP \\
NP \\
\downarrow \\
N \\
NP \\
\downarrow \\
N \\
S_3 \\
\downarrow \\
NP \\
N \\
\downarrow \\
V \\
\end{array}
\]

\[
\text{John}_1 \text{-i} \text{ mal-het-ta} \\
\text{he}_1 \text{ NM} \text{ said} \\
\text{caki}_1 \text{-li} \text{ kwelop}_1 \text{in-ta-kow} \\
\text{him AM disturbs comp.} \\
\text{ki}_1 \text{-ka} \\
\text{he}_1 \text{ NM} \text{ is comp.-NM} \\
\text{ap}_1 \text{-n-kos-i} \\
\text{sick SM comp.}
\]

John\textsubscript{1} said that it disturbs him\textsubscript{1} that he\textsubscript{1} is sick.

I have discussed how the Specified Subject Condition is operative in sentences involving assertive complements with a specified subject intervening between a k\textsubscript{4} and a full NP subject. Even if the rule of Disjoint Reference is modified to the form in (34), the problem for simple sentence cases remains. There is no way to block coreference
in sentences like (9) and (11).

I have discussed how the noncoreference of \(_{ki}\) and a full NP can be formalized within an interpretive framework, using the rule of Disjoint Reference and Chomsky's Conditions. Some problems with this analysis remain unsolved at the time of this writing. They require further research and thought.

2.5.1 In this section, I will discuss when the repetition of a full NP results in grammaticality, and when it results in ungrammaticality. The following sentences show that repetition of a full NP in sentences with a complement or a relative clause is bad. It can also be seen that preposing the complement or the head NP improves the sentences.

I NM to NM stupid comp. said

(I told John\(_{i}\) that John\(_{i}\) is stupid.)

Note that if \(_{ki}\) were in the complement, it could be coreferential with John. If we assume there to be a Disjoint Reference rule for full \(_{ki}\)'s, sentences like (41) can be accounted for. No "Condition" will block Disjoint Reference from applying to (41), since there is no specified subject, and the complement is assertive. Recall that the Tensed-S Condition holds only for nonassertives.

Further examples of Disjoint Reference of full NP's follow:

NM won SM that-NM AM surprised

(That Harry\(_{i}\) won surprised Harry\(_{i}\).)
    NM AM loves SM that-NM AM surprised

(That Mary₁ loves John₂ surprised John₂.)

(42) and (43) show that whether the complement NP is a subject or an
object, when it is repeated in the matrix clause, it must be disjoint
in reference. (42) and (43) will not be thrown out by DRII because
nowlle-ke-ha-ta 'surprise' is not assertive.

The following sentences show that repetition of a full NP is better
when the object NP precedes the subject NP and the sentence is in the
OSV order.

    NM NM stupid comp. thinks

    John₁ thinks that John₁ is stupid.

    NM stupid comp. NM thinks

(That John₁ is stupid, John₁ thinks.)

The following sentences with a relative clause also shows that the
order OSV improves such a repetition.

    NM NM likes SM house AM bought

    John₁ bought the house that John₁ liked.

    NM likes SM house AM NM bought

(The house that John₁ liked, John₁ bought.)

If either of the NP's is an object and the other repeated NP is a sub-
ject, that is, if the two identical NP's have different grammatical
relations, the sentence is better. (46) is better than (45b) even in SOV order.

(46) *[Mary₁-ka tulyowoḥa- n ᵛalanaj-i] icenin Mary₁-il
   NM afraid of SM person NM anymore AM
cʰowcʰa-tani-ci-an-nín-ta.
   does not follow

(The man that Mary₁ was afraid of hasn't been following Mary₁ anymore.)

The following sentence shows that the Specified Subject Condition does not block Disjoint Reference of the full NP's as it does with a full NP and a k fscanf(3).

   NM    NM  AM loves SM that-AM did not know

(John₁ didn't know that Maryj loved him₁.)

The following sentence shows that the Tensed-S Condition does not block Disjoint Reference either.

   NM    NM  rich is that-AM denied

John₁ denied that John₁ is rich.

(48) does not have an assertive complement, and we would expect the Tensed-S Condition to block Disjoint Reference, if the full NP's behaved like NP and a k fscanf(3). Therefore, the principles governing Disjoint Reference of full NP's must be different from those governing a full NP and a k fscanf(3), namely the "Conditions."

Repetition of a full NP is allowed in coordinate structures where the first occurrence of the NP is indefinite and the second occurrence
is definite. Where both occurrences of the NP are definite or indefinite, the sentences are only marginally acceptable.

(49) a. Mary, ka ows-šl p'al-kow, Harry, ka ows-šl telyot-ta.
    NM clothes-AM washed and j NM clothes-AM ironed

Mary, washed some clothes, and Harry, ironed those clothes.

b. ??Mary, ka ows-šl p'al-kow, Harry, ka ows-šl telyot-ta.
    NM clothes-AM washed-and j NM clothes-AM ironed

Mary, washed some clothes, and Harry, ironed some clothes.

c. ??Mary, ka kî ows-šl p'al-kow, Harry, ka kî ows-šl
    the clothes-AM washed and j NM the clothes-AM
telyot-ta.
    ironed

Mary, washed the clothes, and Harry, ironed the clothes.

It has been shown that the rule of Disjoint Reference of full
NP's cannot be blocked by the "Conditions" which were shown to hold
for kî. A sentence was improved when the object NP is preposed so
that the sentence is in an OSV order or if the full NP's do not have
the same grammatical relations (subject and nonsubject), as in (46).

2.6 Summary

The coreference possibilities of the non-reflexive pro-form have
been examined, in various structures. When it occurs as a subject, kî,
like caki, cannot refer to a nongenitive clausalmate kî. Both complex
and coordinate structures showed that only kî in subject positions is
subject to Primacy. In sentences with assertive complements, no anaphoric
linkage is possible between the matrix subject and the complement
subject if one of these is a nonreflexive pro-form and the other is a full NP. I discussed the possibility of formalizing these coreference restrictions on $k^4$ by the rule of Disjoint Reference and Chomsky's conditions within the model of an interpretive theory. The problem with the formulation of Disjoint Reference in (32) was that there is no way to block the rule from applying to a matrix nonsubject and an assertive complement subject in sentences like (30). Moreover, this rule will incorrectly mark as disjoint in reference, two clausemates neither of which is a subject, as in (9) and (10). The rule accounts for all other coreference possibilities in simple sentences such as (1), (2), (3), (4), (9), and (10). Sentences with genitives within a clause require the A-Over-A Principle to block Disjoint Reference, such as sentences from (11) to (15).

The Specified Subject Condition will correctly block the rule from applying to an assertive complement nonsubject and a higher subject, as in (28). The Tensed-S Condition will block Disjoint Reference from applying to all other cases where coreference must be allowed between NP and $k^4$, such as in (35) or in (36), where no assertive complements are involved.

If the rule of Disjoint Reference is formulated as in (34), the Specified Subject Condition will be redundant in cases like (28). The problem with this new formulation is that there is no easy way to block coreference between a $k^4$ subject and a clausemate. There is no way to block coreference in sentences like (9) and (10). Thus, at present, I have found no single condition which satisfactorily covers all of the coreference blocking cases involving a subject.
Footnotes to Chapter Two

1. X is used when some speakers accept the sentence, and some don't.
   The speakers' judgments depend on the semantics of the sentence,
   to some extent. For instance, all the speakers I have checked with
   like the following sentence.

   \[ \text{Kí₁-\'ll ke-ka Jún₁-ulowputho towmank-kat-ta.} \]
   \[ \text{his gen. dog-NM from ran away} \]
   (His dog ran away from John.)

   The informants told me that it is likely that John's dog will run
   away from John.

2. Recall that this is also true of a caki-subject. (Chapter 1)

3. Chapter 1, section 1.12, pp. 95 - 98

4. Within a relative clause, no subject of direct object anaphoric
   to the head noun may occur as kí. An indirect object-kí is
   marginally acceptable, a lowput\textsuperscript{h}o-phrase is better, and an
   etehesoho-phrase is best. This hierarchy holds also for caki.
   On the whole, a caki in a relative clause can refer better to the
   head noun than kí.

5. Preposed caki-l±l is better than preposed kí-l±l.

6. Kí-l±l preposing is not done ordinarily, unless some emphasis or
   contrast is intended, but the sentence is OK.

7. Like caki, kí shows a contrast between a nonsubject and a subject
   with respect to the Primacy Constraint in coordinate structures.

8. Langacker (1969) and Ross (1967) make different predictions about
   the effect of Primacy in their analysis of English pronominalization.
   Langacker predicts that in a coordinate structure, only "precedes"
is the relevant notion in Primacy and that even if a pro-form is subordinated, if it precedes its anaphor in a coordinate structure, Primacy will be violated. Ross, on the other hand, predicts that even in a coordinate structure, if a pro-form is subordinated, it can precede its anaphor.

The following sentence in Korean seems to be consistent with Ross' prediction, and to provide counterevidence to Langacker's formulation.

Either Mary$_i$ will buy the house$_R$, he$_j$ likes, or John$_j$ will buy it$_R$.

The above sentence is grammatical, and is in accord with Ross' predictions. Note that the subject-$_k$ does not violate Primacy, $k$ is subordinated within a relative clause, and does not command John.

9. The verbs which take the kow-complement and the tense contrasts are relevant here, and they may also be classified as assertive predicates.
Assertive and nonassertive predicates have been distinguished by Joan Hooper, on the basis of semantic criteria. See Hooper, J. (1975). The other assertive predicates that are relevant in Korean consist of nonfactives like the following: powkwow-ha-ta 'to report', cucank-ha-ta 'to claim', pal-on-ha-ta 'to assert' or 'to remark'. A factive like al-ta 'to know' does not behave like an assertive, if we use it in the sense of 'to know a fact', but it does behave like an assertive, if we use it as 'to feel about something' or 'to believe'.

10. From now on, I will give only three-sentence paradigms, leaving implicit the sentences violating Primacy. Among the starred sentences, there is the following order of growing worseness:

   a > b > c

Ken Hale observed for Navajo that the complements of assertive predicates like say, think, and want allow application of extraction rules that are not allowed in other types of embedded sentences. (See Kaufman, E. (1975) Theoretical Responses to Navajo Questions, MIT dissertation. Hale pointed out to me that the phenomenon in Navajo is exactly parallel to the Korean case, where only these assertive complements allow the rule of Disjoint Reference to apply (cf. section 3.4 below).

11. Assertive predicates also obey the K4-Nonsubject Constraint in Japanese, according to my native informants, Mrs. Ogura, Mr. Oshima, and Mr. Ono.

12. Susumu Kuno has suggested to me that k4 may be used in a speaker-oriented discourse context, but not in a subject-oriented discourse context. The sentences with assertive predicates can be made
speaker-oriented, according to Kuno, if we use verbs like the following: erroneously believe, must believe, does not believe, etc. However, none of my 10 or so Korean informants distinguished such a difference with the Kí-Nonsubject Constraint. Nonetheless, the factor suggested by Kuno can probably be shown to influence anaphoric linkages in some cases. This is a topic which must await future research.

13. The rule of Disjoint Reference is mentioned in Noam Chomsky (1973) and (1975). The application of this rule to the Korean non-reflexive pronoun was suggested to me by Chomsky (personal communication).

14. Chomsky notes (personal communication) that there are some cases, a small subclass in English, which are counterexamples to the rule of DR:

\[ \text{John}_1 \text{ saw a snake near him}_1. \]

15. The most recent formulation of the Specified Subject Condition can be found in "Conditions on Rules of Grammar," p. 15.

16. This modification of the Tensed-S Condition for Korean was suggested to me by Chomsky (personal communication). Chomsky pointed out that there seems to be a parallel between English nontensed clauses and the Korean assertive complements with respect being transparent to the rule of DR.

\[ *\text{John}_1 \text{ believes him}_1 \text{ to be smart.} \]

17. If the rule of Disjoint Reference in effect takes a kí and marks it noncoreferential with an NP, the A/A will block the rule from applying to a genitive, because the highest NP-node must be taken, and we get coreference as needed.
3. The $\emptyset$-Pro-Form

3.1 Preview

In this chapter, I will be concerned with the conditions that restrict coreference possibilities of the pro-form $\emptyset$. I will examine simple sentences, subordinating structures, and coordinate structures. Possible anaphoric linkages will be discussed with respect to what grammatical relations $\emptyset$ can bear with its anaphor in these structures. That is, I will examine whether $\emptyset$ in all NP positions can refer to an anaphor in all NP positions. I will discuss whether $\emptyset$ obeys Primacy and whether notions like 'command' are relevant in defining anaphoric possibilities of the $\emptyset$-pro-form. The A-Over-A Principle will be shown to be involved in explaining why $\emptyset$ may refer downward into an adverbial clause but not into other subordinate clauses like complements or relative clauses. The notion of 'hierarchical closeness' will be shown to play an important role in $\emptyset$'s choice of an anaphor, when more than one possible anaphor occurs in the sentence. It will be shown that $\emptyset$, like caki, also obeys the Like-Anaphor Constraint. In coordinate structures, it will be shown that when more than one $\emptyset$ occurs in a conjunct, the anaphor of the leftmost $\emptyset$ must occur to the left of the anaphor of the rightmost $\emptyset$. No clause can contain 2 $\emptyset$'s that are coreferential. For this study, I assume that the rule of $\emptyset$ coreference is an interpretive rule. The problems with this analysis will be discussed in the final section.
3.2 Anaphoric Relations of the $\emptyset$-Pro-Form

Although $\emptyset$ can refer outside of the sentence, in this chapter, I will be concerned with coreference possibilities of $\emptyset$ within a sentence. Distributional properties of $\emptyset$ will be discussed in terms of various structural configurations. Two conditions, (1) Primacy and (2) the A-Over-A Principle will be shown to be necessary in trying to account for the distribution of $\emptyset$ in certain structures.

3.2.1 No $\emptyset$ may have a clausemate anaphor. This holds true of NP's in all positions.

(1) $^{*}$John$_{i}$-1 $\emptyset$_{1} $^{\text{p}_{\text{h}}$an-het-ta. $^{\text{NM}}$criticized

(*John$_{i}$ criticized $\emptyset$_{1}.)

John$_{i}$ criticized himself$_{i}$.

(2) $^{*}$\emptyset$_{1}$ John$_{i}$-41 $^{\text{p}_{\text{h}}$an-het-ta. $^{\text{AM}}$criticized

(*\emptyset$_{1}$ criticized John$_{i}$.)

John$_{i}$ criticized himself$_{i}$.

(3) $^{*}$John$_{i}$-1 $\emptyset$_{1} $^{\text{s}_{\text{owksakyot}}$ta. $^{\text{NM}}$whispered

(*John$_{i}$ whispered to $\emptyset$_{1}.)

John$_{i}$ whispered to himself$_{i}$.

(4) $^{*}$John$_{i}$-ulowput$_{h}$ o $\emptyset$_{1} ke-ka towmank-kat-ta. $^{\text{from}}$1 dog $^{\text{NM}}$ran away

(*From John$_{i}$, $\emptyset$_{1}'s dog ran away.)

John$_{i}$'s dog ran away from him$_{i}$. 
(5) *John₁-
₁ ke-ka ṅ₁ towmank-kat-ta.
gen. dog-NM ran away

(*John₁'s dog ran away from ṅ₁.)

John₁'s dog ran away from him₁.

3.2.2 The Primacy Constraint

(6) a. John₁-
NM Mary₁-
AM salank-ha-
AM kow ṅ₁ Jane₉-
AM loves and ṅ₁

John₁ loves Mary₁, and he₁ admires Jane₉.

b.* ṅ₁ Mary₁-
AM salank-ha-
AM kow John₁-
NM

Jane₉-
AM loves

samow-han-ta.

(*He₁ loves Mary₁, and John₁ admires Jane₉.)

(7) a. John₁-
NM Mary₁-
AM salank-ha-
AM kona, t'ownin

Either John₁ loves Mary₁, or he₁ must be admiring Jane₉.

b.* ṅ₁ Mary₁-
AM salank-ha-kona, t'ownin John₁-
NM

Jane₉-
AM loves

samow-ha-l-kos-i-ta.

Either he₁ loves Mary₁, or John₁ must be admiring Jane₉.)
The following sentence shows that Primacy is obeyed in sentences with a complement.

*(8)

(*He wanted to say that the building fell on Harry.)

Harry wanted to say that the building fell on him.

The sentences with primacy violations in coordinate and subordinating structures with complements need an outside reading for the anaphor of Ø.

3.2.2 Ø occurs freely as far as grammatical relations are concerned. Ø is coreferential with an NP where Primacy is satisfied.
I will assume here (as in Chapter 2) the theory of grammar presented in Chomsky (1975). In this section, I will illustrate what coreference possibilities exist for $\emptyset$ with respect to its distribution in various NP positions.

First, I will show that $\emptyset$ occurring as a subject, direct object, indirect object, or an object of a postposition inside a complement can refer to a higher subject.

(9) a. John$_i$-i [ $\emptyset$ pata-low ka-ki-lîl ] palan-ta. 
     NM  sea to go-comp.-AM wants

John$_i$ wants to go to the sea.

b. John$_i$-i [ $\emptyset$ i pata-low ka-l-su-it-ta-nîn kos-îl ] 
     NM  sea to go able SM comp.-AM

âîsim-han-ta. 
     doubts

John$_i$ doubts that he$_j$ can go to the sea.

A $\emptyset$-direct object may refer to a higher subject. $c^h$owte-ha-ta

'to invite' requires a direct object. $c^h$inku-ka $c^h$owte-het-ta.

('A friend invited."

(10) Mary$_i$-ka [ Bob$_j$-i $\emptyset$ i c$^h$owte-he-cu-ki-lîl ] palan-ta. 
     NM  NM  invite comp. AM wants

Mary$_i$ wants Bob$_j$ to invite her$_i$.

A $\emptyset$-indirect object may refer to a higher subject.

(11) Mary$_i$-ka [ Bob$_j$-i $\emptyset$ i p$^h$yonci-lîl s'o-cu-ki- ] palan-ta. 
     NM  NM  letter AM write-ben.-comp. wants

Mary$_i$ wants Bob$_j$ to write her$_i$ a letter.

A $\emptyset$-object of a postposition may refer to a higher subject.

(12) [Usuha-n haksenktîl-i $\emptyset$ i tani-nîn kos-î] MIT$_i$-nîn 
     outstanding students-NM i attend-SM comp.-NM i NM
     calanksîlowot-ta. 
     was proud of

MIT$_i$ was proud of the fact that good students attended it.
More than one $\emptyset$ may not appear as clausemates.

(13) a. *John $\_i$ Bill $\_i$ eke [ ne-ka $\emptyset$ $\_i$ $\emptyset$ yeki-het-ta- ]
    NM to I NM [ $\_i$ ] [ $\_i$ ] talked comp.
    mal-het-ta.
said

(*John $\_i$ told Bill $\_i$ that I had talked to $\emptyset$ about $\emptyset$)

b. *John $\_i$ Bill $\_i$ eke [ ne-ka $\emptyset$ $\_i$ $\emptyset$ til-ot-ta$\_i$ kow ]
    NM to I NM [ $\_i$ ] [ $\_i$ ] heard comp.
    mal-het-ta.
said

(*John $\_i$ told Bill $\_i$ that I had heard from $\emptyset$ about $\emptyset$)

The above sentences illustrate $\emptyset$ occurring in all NP positions
referring upward to a subject from a complement. In the following,
I will continue to show that $\emptyset$ occurring in these NP positions within
a complement may refer to a higher direct object.

A $\emptyset$-subject may refer to a higher direct object.

(14) a. Mary $\_i$-ka Peter $\_i$-lîl [ $\emptyset$ sukce-lîl ha-towlowk ]
    NM AM homework-AM do comp.
    soltûksik$^h$ yot-ta.
persuaded

Mary $\_i$ persuaded Peter $\_i$ to do his homework.

b. Ne-ka Peter $\_i$-lîl [ $\emptyset$ ikyot-ta-kow ] soltûksik$^h$ yot-ta.
    I NM AM won comp. persuaded

I persuaded Peter $\_i$ that he $\_i$ had won.

c. [ $\emptyset$ iki-n kos-i ] Peter $\_i$-lîl nowlle-ke-het-ta.
    wqn-SM comp.-NM AM surprised

That he $\_i$ won surprised Peter $\_i$.

A $\emptyset$-direct object may refer to a higher direct object.

(15) [ Peter $\_i$-ka $\emptyset$ ch'owte-ha- n kos-i ] Mary $\_i$-lîl kop-cun-ta.
    NM invited SM comp.-NM AM frightens

That Peter $\_i$ invited her frightened Mary $\_i$. 
(16) [Peter₁-ka Ø j kɪlim-ɪl powyo-cun- kos-i ] Mary₁-lɪl
NM picture-AM show ben. comp.-NM AM
cɪlkop-ke-het-ta.
    made cheerful

That Peter₁ showed her, the picture made Mary₁ cheerful.

A Ø-object of a postposition may refer to a higher direct object.

(17) [Usu-ha-n haksenktɪl-ɪ Ø i tani-nɪn kos-i] MIT₁-lɪl
    outstanding students NM i attend-SM comp.-NM AM

hwalpala-ke mantɪl-ot-ta.
lively comp. made

That good students attended it, made MIT₁ lively.

The verb tani-ta 'to attend' takes the e 'to, in' postposition.

Anaphoric relations of Ø with a higher direct object have been
examined. Now I will continue by looking at higher indirect objects.

A Ø-subject may refer to a higher indirect object.

(18) a. Mary₁-ka Peter₁-eke [ Ø j cɪp-e ka-la-kow ]
NM j to j home to go comp.

myonknyonk-het-ta.
    commanded

Mary₁ commanded Peter₁ to go home.

I NM to stupid NM neg.- comp. said

I told Henrietta₁ that she₁ wasn't stupid.

No special rule for Equi seems to be necessary—the a-sentences in
(9), (14), and (18) which are done by Equi in other languages,
are produced by a rule which will also do the b-sentences, which
usually aren't done by Equi.
A ø-direct object may refer to a higher indirect object.

     NM(comp.) to message came

The message came to Bill that John invited him.

A ø-indirect object may refer to a higher indirect object.

     Mary-eme allyot-ta. to made known

The postman informed Mary that Peter sent her a gift.

A ø-object of a postposition may refer to an indirect object.

(21) John₁-i ø acik ka-1-ci molil t'e, k1-nín MIT-e wonso-ɪì pownet-ta.
     NM yet go comp. not know when he³ NM to application-AM sent

(When John still didn't know whether he was going there,
he sent application forms to MIT.)

Anaphoric relations between a ø within a complement and a matrix indirect object have been examined. (20) has an adverbial clause.

Now I will show these possibilities with a higher object of a postposition.

A ø-subject may refer to a higher object of a postposition.

(22) [ ø kwikuk-he-ta-kow] simmun-i John-etehešo net-ta.
     returned home comp. newspaper-NM about reported

(The newspaper reported about John that he returned.)

A ø-direct object may refer to an object of a postposition.

(23) [ Uli-ka ø pankmun-ha-1 su-it-towlowk] Mikuk-eso we NM visit able be comp. U.S. from
     ch owc ownk-i wat-ta.
     invitation-NM came

(The invitation came from the States that we could visit ø.)
(24) [Uli-ka ₁ φ₁ solyu-l₄₁ kil₄ φ₁ powne-ya-twen-ta₄ kow ]
we NM forms AM soon send must comp.

MIT₄-lowputₖ popped yollak-₁ wat-ta.
from message-NM came

(The message came from MIT₄ that we have to send φ₁ the forms
soon.)

A φ-object of a postposition may refer to another higher object
of a postposition.

we NM attend SM comp.-NM at recorded is

It is recorded at MIT₄ that we attended it₁.

In (24), φ would be MIT-e in a full form of the sentence. The
reason why I have not been able to give examples with other objects
of postpositions occurring as φ was that most verbs can occur without
them and be grammatical. There is no evidence of a φ.

To sum up, it has been shown that φ in any NP position within a
complement may refer to any NP in the matrix sentence. However, the
reverse is not true.

No matrix φ may refer to a complement anaphor.

(26) a. *[John₁₋₁ ap₄₁₋₄ n kos-₁ ] φ₁ kwerowp₄ yot-ta.
NM sick SM comp.-NM disturbed

That John₁ is sick disturbed him₁.

b. *[John₁₋₁ ap₄₋₄-ta-kow ] φ₁ allyo-cot-ta.
NM sick comp. was made known

(*That John₁ was sick was made known to him₁.)

It was made known to John₁ that he₁ was sick.
3.2.4 In this section, I will discuss coreference possibilities of  in sentences with adverbial clauses. Unlike complements, it will be shown that  may occur in the matrix clause and refer to an anaphor in the adverbial clause. First, I will show that a -pro-form for any type of NP may refer upward to any type of NP.  refers to a subject in (26).

(26) a. Mary
_\text{1-ka} \text{ap}^h_1-1 \text{t'e, } \emptyset_1 \text{pyonkwon-e ipwon-han-ta.} \text{NM sick SM when hospital in goes in}

When Mary\textsubscript{1} is sick, she\textsubscript{1} gets hospitalized.

b. \emptyset_1 \text{ap}^h_1-1 \text{t'e, Mary}_1 \text{ka pyonkwon-e ipwon-han-ta.} \text{hospital in goes in}

When she\textsubscript{1} is sick, Mary\textsubscript{1} gets hospitalized.

A -direct object refers to a subject.

(27) a. Mary\textsubscript{1-ka} Boston-e ow-myon, John\textsubscript{j-1} \emptyset\textsubscript{j} \text{owte-ha-1-kos-i-ta.} \text{NM to comes-if}

If Mary\textsubscript{1} comes to Boston, John\textsubscript{j} will invite her\textsubscript{j}.

b. John\textsubscript{j-1} \emptyset\textsubscript{j} \text{owte-ha-myon, Mary}_j \text{ka Boston-e} \text{ow-1-kos-i-ta.} \text{invite if NM to}

If John\textsubscript{j} invites her\textsubscript{j}, Mary\textsubscript{j} will come to Boston.

In (27a), -direct object in the matrix clause refers to a subject of an adverbial clause. In (27b), -direct object in the adverbial clause refers to a higher subject.

A -indirect object may refer to a subject.

(28) a. Peter\textsubscript{i-ka} p\textsuperscript{h}yonci-l\textsubscript{141} \emptyset\textsubscript{i} powne-myon, Mary\textsubscript{j-ka} cowa-ha-1-kos-i-ta. \text{letter AM j sends if}

will be happy.
If Peter$_i$ sends a letter to her$_j$, Mary$_j$ will be happy.

b. Mary$_j$-ka werowo-ha-myon, Peter$_i$-ka p'yonci-lìl
   NM is lonely if NM letter AM
   Ø$_j$ powne-l::kos-i-ta.
   will send

If Mary$_j$ is lonely, Peter$_i$ will send a letter to her$_j$.

In (28a), Ø occurs in the adverbial clause and refers to the matrix subject. In (28b), Ø occurs in the matrix clause and refers to the adverbial clause subject.

A Ø-object of a postposition may refer to a subject.

(29) a. Peter$_i$-ka Ø$_j$ tani-l-t'e, MIT$_j$-nin pis'at-ta.
   NM attended when j NM was expensive
   When Peter$_i$ attended it$_j$, MIT$_j$ was expensive.

b. MIT$_j$-ka pis'a-l t'e, Peter$_i$-ka Ø$_j$ tanyot-ta.
   NM
   When MIT$_j$ was expensive, Peter$_i$ attended it$_j$.

In (29), the Ø-object of a postposition is 'MIT-e'. In (29a), Ø occurs in the adverbial clause and refers to the matrix subject. In (29b), Ø occurs in the matrix clause and refers to the adverbial clause subject.

Now let us examine in all NP positions a Ø that refers to a direct object. A Ø-subject may refer to a direct object.

(30) a. John$_i$ Mary$_j$-lìl pankmun-ha-myon, Ø$_j$ k4$_i$-eke
     NM AM visits if j him to
     comsim-ìl sa-cul-kos-i-ta.
     lunch AM buy-ben.-will

If John$_i$ visits Mary$_j$, she$_j$ will buy him$_i$ lunch.

b. Ø$_j$ k4$_i$-eke comsim-ìl sa-cu-myon, John$_i$-i Mary$_j$-lìl
   him$_i$ to lunch AM buy-ben.-if NM AM
pangmun-ha-1-kos-i-ta.
visit will

If she$_j$ buys him$_i$ lunch, John$_i$ will visit Mary$_j$.

In (30a), the Ø-subject occurs in the matrix clause and refers to the adverbial clause direct object. In (30b), the adverbial clause subject refers to the matrix clause direct object.

A Ø-direct object may refer to a direct object.

(31) a. John$_i$-i Mary$_j$-1i1 pangmun-ha-myon, k4$_i$-ka
NM AM visits if he$_i$ NM
Ø$_j$ wirow-he-cu-1-kos-i-ta.
console ben.-will

If John$_i$ visits Mary$_j$, he$_i$ will console her$_j$.

b. John$_i$-i Ø$_j$ pangmun-ha-myon, k4$_i$-ka Mary$_j$-1i1
NM visi ts if he$_i$ NM AM
wirow-he-cu-1-kos-i-ta.
console ben.- will

If John$_i$ visits her$_j$, he$_i$ will console Mary$_j$.

In (31a), the matrix Ø-object refers to the adverbial clause object. In (31b), the adverbial clause Ø-object refers to the matrix clause object.

A Ø-indirect object may refer to a direct object.

(32) a. John$_i$-i Mary$_j$-1i1 c'owte-ha-myon, k4$_i$-ka Ø$_j$
NM AM invites if he$_i$ NM
comsim-i1 sa-cu-1-kos-i-ta.
 lunch AM buy-ben.-will

If John$_i$ invites Mary$_j$, he$_i$ will buy her$_j$ lunch.

b. John$_i$-i Ø$_j$ comsim-i1 sa-cu-kow-sip$_i$-myon, k4$_i$-ka Mary$_j$-1i1
NM lunch AM buy-ben.-comp.-wants-if
he$_i$ NM AM invite will

If John$_i$ wants to buy her$_j$ lunch, he$_i$ will invite Mary$_j$. 
In (32a), the matrix $\emptyset$-indirect object refers to the adverbial clause direct object. In (32b), the adverbial clause indirect object refers to the matrix direct object.

A $\emptyset$-object of a postposition may refer to a direct object.

(33) a. $\emptyset$-i $\emptyset$-j tani-i t'ei, ne-ka MIT-j-1il kukyonyk-het-ta. 

When John$_i$ attended it$_j$, I visited MIT$_j$.

b. Ne-ka MIT-j-1il kukyonyk-hess-1il t'e, John$_i$-i $\emptyset$-j I NM AM visited SM when $\emptyset$-i NM tanyot-ta. attended

When I visited MIT$_j$, John$_i$ attended it$_j$.

In (33a), the adverbial clause $\emptyset$-object of a postposition is 'MIT-e' which refers to the matrix direct object. In (33b), the matrix $\emptyset$-object of a postposition refers to the adverbial clause direct object.

A $\emptyset$-subject may refer to an indirect object.

(34) a. $\emptyset$-i Mary$_j$-i-1il pankmun-ha-emyon, kinyo$_j$-ka John$_i$-eke AM visit if she $\emptyset$-j to

comsim-1il sa-cu-1-kos-i-ta. lunch AM buy-ben.-will

If he$_i$ visits Mary$_j$, she$_j$ will buy John$_i$ lunch.

b. John$_i$-i Mary$_j$-eke comsim-1il sa-cu-myon, $\emptyset$-j NM to lunch AM buy-ben.-if

ki$_i$-1il $\emptyset$-h owte-ha-1-kos-i-ta. him AM invite will

If John$_i$ treats Mary$_j$ to lunch, she$_j$ will invite him$_i$.

In (34a), the $\emptyset$-subject in the adverbial clause refers to the matrix indirect object. In (34b), the matrix $\emptyset$-subject refers to the adverbial clause indirect object.
A Ø-direct object may refer to an indirect object.

(35) a. John \(_i\-i\) \(\emptyset\) j pankmun-ha-myon, \(k\_i\-ka\) Mary \(_j\)-eke
NM visits if he \(_i\) NM to

\comsim-i\-il sa-cu-l-kos-i-ta.

lunch AM buy-ben.-will

If John \(_i\) visits her \(_j\), he \(_i\) will treat Mary \(_j\) to lunch.

b. John \(_i\-i\) Mary \(_j\)-eke \comsim-i\-il sa-cu-kow-sip \(_i\)-myon
NM to lunch AM buy-ben.-comp.-wants-if

\(k\_i\-ka\) \(\emptyset\) j ch'owte-ha-l-kos-i-ta.

he NM invite will

If John \(_i\) wants to treat Mary \(_j\) to lunch, he \(_i\) will invite her \(_j\).

In (35a), the adverbial clause direct object-Ø refers to the matrix clause indirect object. In (35b), the Ø-direct object in the matrix clause refers to the adverbial clause indirect object.

A Ø-indirect object may refer to a matrix indirect object.

(36) a. John \(_i\-i\) Mary \(_j\)-eke yollak-ha-myon, \(k\_i\-ka\)
NM to contacts if he \(_i\) NM

\(\emptyset\) j \comsim-i\-il sa-cu-l-kos-i-ta.

lunch AM buy-ben.-will

If John \(_i\) sends her \(_j\) a message, he \(_i\) will treat Mary \(_j\) to lunch.

b. John \(_i\-i\) \(\emptyset\) j yollak-ha-myon, \(k\_i\-ka\) Mary \(_j\)-eke
NM contacts if he \(_i\) NM to

\comsim-i\-il sa-cu-l-kos-i-ta.

lunch AM buy-ben.-will

If John contacts her \(_j\), he \(_i\) will treat Mary \(_j\) to lunch.

A Ø-object of a postposition may refer to a matrix indirect object.

(37) a. John \(_i\-i\) \(\emptyset\) j ka-pow-ki- con-e, \(k\_i\-nin\) MIT \(_j\)-e
NM go comp. before he \(_i\) NM to

wonso-i\-il pownet-ta.

application-AM sent

Before John \(_i\) went there \(_j\), he \(_i\) sent the application forms to MIT \(_j\).
b. John_{1,i} MIT_{j}e wonso-lil ness-il t'e, k_{i,nin}NM to application-AM sent-SM when he_{i}NM
acik g_{j} ka-l-ci mowllat-ta.
still go comp. did not know

When John_{i} sent the application forms to MIT_{j}, he_{i} still
didn't know whether he_{i} would be going there_{j}.

A Ø-pro-form may refer to an object of a postposition.

First, I will show cases where the Ø is a subject.

(38) a. Peter_{i}-ka MIT_{j}e tani-1 t'e, Ø_{j} pis'at-ta.
NM to attend-SM when j was expensive

When Peter_{i} attended MIT_{j}, it_{j} was expensive.

b. Ø_{j} pis'a-l t'e, Peter_{i}-ka MIT_{j}e tanyot-ta.
NM expensive-SM when NM to attended

When it_{j} was expensive, Peter_{i} attended MIT_{j}.

In (38a), Ø-subject in the matrix clause refers to the adverbial clause
object of a postposition. In (38b), the adverbial clause Ø-subject
refers to the matrix object of a postposition.

A Ø-direct object may refer to an object of a postposition.

(39) a. Peter_{i}-ka MIT_{j}e tani-1 t'e, uli-ka Ø
NM to attend-SM when we NM j
kukyork-het-ta.
visited

When Peter_{i} attended MIT_{j}, we visited it_{j}.

b. Uli-ka Ø_{j} kukyork-hess-il t'e, Peter_{i}-ka
we NM j visited SM when NM
MIT_{j}e to attended

When we visited it_{j}, Peter_{i} attended MIT_{j}.

In (39a), the matrix Ø-direct object refers to the adverbial clause
object of a postposition. In (39b), the adverbial clause Ø-direct
object refers to the matrix object of a postposition.

A $\emptyset$-indirect object may refer to an object of a postposition.

(40) a. MIT$_1$-lowput$^h_o$ yollak-i wass-ìl t'e, uli-ka
   from message-NM came-SM when we NM
   \(\emptyset\) wonso-lìl pownet-ta.
   application-AM sent

   When the message came from MIT$_1$, we sent the application
   forms there$_i$.

b. Uli-ka $\emptyset$.$\emptyset$ wonso-lìl powness-ìl t'e, MIT$_1$-lowput$^h_o$
   we NM application-AM sent-SM when from
   wonso-lìl pat-at-ta-nín yollak-i wat-ta.
   application-AM got SM message-NM came

   When we sent the application forms there$_i$, the message came
   from MIT$_1$ that it$_i$ got the forms.

In (40a), the $\emptyset$-indirect object refers downward. In (40b), the $\emptyset$-
indirect object refers upward out of the adverbial clause.

A $\emptyset$-object of a postposition may refer to another object of a
postposition.

(41) a. MIT$_1$-lowput$^h_o$ p'yonci-ka wass-ìl t'e, uli-ka
   from letter NM came-SM when we NM
   \(\emptyset\) tani-ki- low kyołkonk-het-ta.
   attend-comp.-to decided

   When the letter came from MIT$_1$, we decided to attend it$_i$.

b. Uli-ka $\emptyset$.$\emptyset$ tani-ki-low kyołkonk-hess-ìl t'e,
   we NM attend-comp.-to decided SM when
   MIT$_1$-lowput$^h_o$ p'yonci-ka wat-ta.
   from letter NM came

   When we decided to attend it$_i$, a letter came from MIT$_1$.

In (41a), $\emptyset$ is 'MIT-e' in the matrix clause and it refers to the adverbial
clause object of a postposition. In (41b), $\emptyset$ in the adverbial clause
is 'MIT-es' and it refers to the matrix object of a postposition.

As in sentences with complements, the above sentences with adver-
bial clauses have shown that any in any NP position may refer to an
NP in any position. Unlike in complements, it has been illustrated
above that in adverbial clauses, may occur in the matrix clause and
refer to a lower anaphor.

2.5 In this section, I will discuss anaphoric relations
of in coordinate structures. Cases where more than one occurs
will also be discussed.

may refer to an NP in the same position. That is, a subject-
may refer to another subject; and an indirect object , to another
indirect object.

(42) a. Bill Mary c'owte-het-ta; kilona
\text{NM} \text{AM} \text{invited} \text{but}
\text{na-nin} \emptyset \text{c'owte-ha-ci-an-at-ta.}
\text{I NM invited comp.-neg.}

Bill invited Mary, but I didn't invite her.

b. Bill Mary c'owte-het-ta; kilona
\text{NM} \text{AM} \text{invited} \text{but}
\emptyset \text{na-nin} \text{c'owte-ha-ci-an-at-ta.}
\text{I NM invited neg.}

Bill invited Mary, but he didn't invite me.

The following sentences have more than one . They show that
a -indirect object refers to another indirect object and also that a
-object of a postposition refers to another object of a postposition.

Furthermore, it must be noted that the anaphor of the leftmost must
be to the left of the anaphor of the rightmost .
(43) a. Bill₁-i na_j-eke insa-lîl het-ta; kilikow ø₁ ø̄j
    NM me_to greeted did and
    ne_j anpu-lîl mul-o-t-ta.
    my_well being a_ asked

    Bill₁ greeted me, and he_j asked me how I was.

    b. Bob₁-in hyonce MIT-e tani-kona t'ownín
        NM present j to attend either or
        ø₁ ø̄j tanyoss-lîl-kos-i-ta.
        attended presumptive

    Bob_j must be attending MIT_j at present or he_j must
    have attended it_j.

The sentences in (43) have the order subject and indirect object, and
subject and object of a postposition. The following sentence has
the order, subject and direct object.

(44) Harry₁-ka Fred_j-lîl pull-o-t-kona t'ownín ø₁ ø̄j
    NM AM called either or
    yellowak-hess-lîl-kos-i-ta.
    contacted presumptive

    Either Harry₁ must have called Fred_j or he₁ must have sent
    him_j a message.

In all of the above sentences, the anaphors must be in the same
linear order as ø's. No crossing is allowed. Thus such interpreta-
tions such as (44') are impossible:

(44') *Either Harry₁ must have called Fred_j or he_j must have
    sent him₁ a message.

    In the following sentences, a direct object-ø may refer to an
indirect object, or conversely.

(45) a. Bob₁-i ñmak-e c'wimi-ka it-kow, ø₁ ø̄j cowa-han-ta.
    NM music_j in interest--NM has and̄ ̄j likes

    Bob₁ is interested in music_j, and he₁ likes it_j.
In (45a), the \( \emptyset \)-subject refers to the preceding subject, and the \( \emptyset \)-direct object refers to the preceding indirect object. This e-postposition is used either as a to-phrase in indirect objects or in other directional phrases as in -e-tani-ta 'to attend'. In (44b), the \( \emptyset \)-postpositional phrase refers to the preceding direct object.

In the following, a \( \emptyset \)-direct object refers to a preceding subject and conversely.

(46) a. Kï siktank,\(-in\) pis'a-ta; kîlona mowtu-\( \emptyset \)-ta. 
the restaurant-NM is expensive but everyone cowa-han-ta.
likes

The restaurant is expensive, but everyone likes it.

b. Mowtu-\( \emptyset \)-ka kï siktank,\(-il\) cowa-han-ta; kîlona \( \emptyset \)-ta. 
everyone-NM the restaurant-AM likes but is expensive pis'a-ta.

Everyone likes the restaurant, but it is expensive.

Now I will discuss anaphoric relations between an object of a postposition and other NP's in a coordinate structure.

A subject-\( \emptyset \) may refer to an object of a postposition, or conversely.

(47) a. Uli-\( \emptyset \)-ka MIT\( _{-1} \)-e tani-n-ta kîlona \( \emptyset \)-ta. 
we NM to attend but is expensive pis'a-ta.

We attend MIT\( _{-1} \), but it is expensive.

b. MIT\( _{-1} \)-nîn pis'a-ta; kîlona uli-\( \emptyset \)-ka tani-n-ta. 
NM is expensive but we NM attend

MIT\( _{-1} \) is expensive, but we attend it.

In the following, a \( \emptyset \)-direct object may refer to a preceding object of a postposition, and conversely.
In the following, a Ø-indirect object may refer to a preceding object of a postposition and conversely.

The following sentences illustrate the distributional possibilities of Ø in sentences with an adverbial clause. Ø may occur below its anaphor, or above it. More than one Ø may occur as a subject anaphoric to another subject, as a direct object anaphoric to another direct object, or as an indirect object anaphoric to another indirect object.
(50)

(a) (When John\textsubscript{i} caught a fish\textsubscript{j}, he\textsubscript{i} cooked it\textsubscript{j}.)
(b) (When \emptyset\textsubscript{i} caught it\textsubscript{j}, John\textsubscript{i} cooked the fish\textsubscript{j}.)
(c) (When John\textsubscript{i} caught it\textsubscript{j}, he\textsubscript{i} cooked the fish\textsubscript{j}.)
(d) (When \emptyset\textsubscript{i} caught a fish\textsubscript{j}, John\textsubscript{i} cooked it\textsubscript{j}.)

(a) [John\textsubscript{i} - i]
(b) \emptyset\textsubscript{i}
(c) John\textsubscript{i} - i
(d) \emptyset\textsubscript{i}

(sekson\textsubscript{j} - t\textsubscript{l} AM)

(cap-ass-\textsubscript{t} t\textsubscript{e} caught SM when)

(yowli-het-ta cooked)
The following shows that if a subject and an indirect object in an adverbial clause are identical to those of the matrix clause, either or both may occur as $\emptyset$.

(51)

(a) $[\text{Tom}_i \text{-i}]_{\text{NM}} [\text{Carol}_j \text{-eke}]$ citow-lil powyoss-il t'e map AM showed SM when

(b) $[\text{Tom}_i \emptyset_j]$ (When Tom$_i$ showed the map to her$_j$, he$_i$ explained to Carol$_j$.)

(c) $[\emptyset_i \text{Carol}_j \emptyset_j]$ (When $\emptyset_i$ showed the map to Carol$_j$, Tom$_i$ explained to her$_j$.)

(d) $[\emptyset_i \emptyset_j]$ (When $\emptyset_i$ showed the map to $\emptyset_j$, Tom$_i$ explained to Carol$_j$.)
When a subject, a direct object, and an indirect object are identical to another subject, direct object, and an indirect object, respectively, any one or more may occur as $\emptyset$. 

(a) Tom$_1$  Jane$_j$  card$_k$ -l of cu-oss-4l t'e gave when
(b) Tom$_i$  Jane$_j$  card$_k$ -l of
(c) Tom$_i$  Jane$_j$  card$_k$ -l of
(d) Tom$_i$  Jane$_j$  card$_k$ -l of
(e) $\emptyset$_i  Jane$_j$  card$_k$ -l of
(f) $\emptyset$_i  Jane$_j$  card$_k$ -l of
(g) $\emptyset$_i  Jane$_j$  card$_k$ -l of
(h) $\emptyset$_i  Jane$_j$  card$_k$ -l of

mowlle  cu-ot-ta
secretly gave
(a) When Tom \_i\ gave Jane \_j\ a card \(_k\), he \_i\ gave it \(_k\) to her \_j\ in secret.
(b) When Tom \_i\ gave it \(_k\) to Jane \_j\, he \_i\ gave her \_j\ the card \(_k\) in secret.
(c) When Tom \_i\ gave the card \(_k\) to her \_j\, he \_i\ gave it \(_k\) to Jane \_j\ in secret.
(d) When Tom \_i\ gave it \(_k\) to her \_j\, he \_i\ gave the card \(_k\) to Jane \_j\ in secret.
(e) When he \_i\ gave the card \(_k\) to Jane \_j\, Tom \_i\ gave it \(_k\) to her \_j\ in secret.
(f) When he \_i\ gave it \(_k\) to Jane \_j\, Tom \_i\ gave the card \(_k\) to her \_j\ in secret.
(g) When he \_i\ gave her \_j\ the card \(_k\), Tom \_i\ gave it \(_k\) to Jane \_j\ in secret.
(h) When he \_i\ gave it \(_k\) to her \_j\, Tom \_i\ gave the card \(_k\) to Jane \_j\ in secret.

Cases of more than one Ø in coordinate structures and in subordinating structures with adverbial clauses have been demonstrated above.

3.3 The A-Over-A Principle and Upward Ø

In the preceding discussion, I mentioned the fact that Ø may refer to a lower anaphor in an adverbial clause, but that no Ø may refer to a lower anaphor in a complement. In this section, I will define the A-Over-A Principle (Chomsky, 1973) and will try to show how this principle can account for why no Ø may occur higher than its anaphor in sentences with a complement or a relative clause, but why Ø can occur higher than its anaphor in sentences with an adverbial clause. It will be shown that in the latter structural type, the structural condition of the A/A is not met.
The distributional properties of the $\emptyset$-pro-form are summarized below:

(53)

\[\begin{align*}
(a) & \quad \text{S} \\
& \quad \text{NP} \\
& \quad \text{S}_2 \\
& \quad \emptyset \\
\end{align*}\]

\[\begin{align*}
(b) & \quad \text{S}_1 \\
& \quad \text{NP} \\
& \quad \emptyset \\
\end{align*}\]

\[\begin{align*}
(c) & \quad \text{S}_1 \\
& \quad \text{NP} \\
& \quad \text{S}_2 \\
& \quad \emptyset \\
\end{align*}\]

\[\begin{align*}
(d) & \quad \text{S}_1 \\
& \quad \text{NP} \\
& \quad \emptyset \\
\end{align*}\]

\[\begin{align*}
(e) & \quad \text{S}_1 \\
& \quad \text{S}_2 \\
& \quad \emptyset \\
\end{align*}\]

\[\begin{align*}
(f) & \quad \text{S}_1 \\
& \quad \text{S}_2 \\
& \quad \emptyset \\
\end{align*}\]
As (53) shows,

$\emptyset$ cannot be related to an NP which is an island.

These distributional properties can be accounted for in terms of the A-Over-A Principle.

The A-Over-A Principle

"If a transformation applies to a structure of the form

\[
[ \alpha \quad [A \quad \quad \quad \quad ] \quad \quad ]
\]

where $\alpha$ is a cyclic node, then it must be so interpreted as to apply to the maximal phrase of the type A." 3

If $\emptyset$ is derived by a mirror-image transformation such as (54),

(54)

\[
\begin{array}{cccc}
X & NP & Y & PRO & Z \\
1 & 2 & 3 & 4 & 5 \\
1 & 2 & 3 & \emptyset & 5
\end{array}
\]

then by the A/A, it would be predicted that (55a) is a well-formed sentence and (55b) is not, contrary to fact. A transformational account of the A/A is impossible, because the A/A will not block (55a).
(55) a.

```
(55) a.  
          S_1 
            /    
           NP   NP 
             |     V  
       S_2       
        /   \       
       NP_2 V     
      / \     \     
     N   \     \     
      * Bill_i \     \     
      NM       ap^h_i-n-kos-i  
            sick SM comp.-NM  
            \                   
            kwelowp^h yot-ta  
            disturbed 
```

That Bill_i is sick disturbed him_i.

By the A/A, the rule which relates 0 to its anaphor picks NP_1 and not NP_2.  0 is not assigned its appropriate anaphor Bill and the sentence is ungrammatical.

(55) b.

```
(55) b.  
          S_1 
            /    
           NP   NP 
             |     V  
       S_2       
        /   \       
       NP_2 V     
      / \     \     
     N   \     \     
      0     \     \     
            Bill_i-il 
            kwelowp^h yot-ta  
            AM disturbed 
            ap^h_i-n-kos-i  
            sick SM comp-NM
```

That he_i is sick disturbs Bill_i.

The A/A does not block 0 from being related to Bill, because it is dominated by the highest NP node in S_1.
Now let us examine a sentence with a relative clause. It was discussed briefly in Chapter One that Korean relativization involves deleting the target NP within the relative clause by the head noun. In order to distinguish $\emptyset$ inside a relative clause which results from relativization from other $\emptyset$'s, I will use $\emptyset_R$ for any $\emptyset$ resulting from this process.

The following sentence shows that a $\emptyset$ occurring in the matrix clause cannot refer to an anaphor inside a relative clause. The A/A will not block (56a), if we assume a mirror-image transformational rule to generate it.

(56)

\[
S_1 \rightarrow NP_1 \rightarrow S_2 \rightarrow NP \rightarrow V \\
\ | \ \\ \\
NP | NP | V \\
\ | \\
N | N | salam$_R$ \_\_NM \\
\ | \\
*$\_\_N$M | $\_\_R$ | t'elyot-ta \\
\ | \\
\ | \\
hit | \\
\ | \\
| \\
(t'eli-n \_\_SM) \\
\ | \\
hit | \\
\ | \\
(\_\_R whom $\_\_N$M $\_\_R$ hit, hit $\emptyset$)
The A/A will block the interpretive rule from relating $\emptyset$ to John in (56), because there is a higher NP-node dominating John. The interpretive rule is a rule which seeks an anaphor of $\emptyset$, and not a rule that tries to look for $\emptyset$ that can refer to a particular NP. Such is the nature of the interpretive rule assumed here. We are not concerned with $\emptyset_R$ referring to salam 'person', because this is a fact about relativization.

By the A/A, we would predict that $\emptyset$ can refer to an NP within an adverbial clause.

(57)

(If I invite John, he will come.)

The A/A does not block the subject NP of $S_1$ from being related to John, the object NP of $S_2$, because there is no NP node above John.
The A/A would predict the following sentences to be ungrammatical.

*(58)

\[
S_1 \quad S_2 \quad S_3
\]

\[
NP_2 \quad NP \quad NP_3 \quad V
\]

\[
NP \quad N \quad NP \quad N \quad N
\]

\[
st - \text{ka} \quad \text{ai-ka} \quad \text{c'ek-\text{it-ta}} \quad \text{book-AM is reading}
\]

\[
\text{Mary}_1 \text{-ka} \quad \emptyset \quad \text{salank-ha-nin} \quad \text{ki'\text{-ka}} \quad \emptyset_1 \quad \text{cu-\text{\text{-l}}}
\]

\[
\text{NM} \quad \text{SM} \quad \text{NM} \quad \text{give-SM}
\]

(*The child that Mary loves is reading the book that he is going to give her.)*

The A/A blocks \emptyset in S_3 from referring to Mary in S_2: it will only allow the higher node, NP_2 to be chosen.

The following ungrammatical sentence is also blocked by the A/A.

*(59)*

\[
S_1 \quad S_2 \quad S_3
\]

\[
NP \quad NP \quad V
\]

\[
NP \quad N \quad NP \quad V
\]

\[
\text{John}_1 \quad \text{Mary}_1 \quad \text{cuki-n-kos-\text{-i}} \quad \text{ki'-ka} \quad \emptyset \quad \text{miwo-ha-nin kos-\text{-i}}
\]

\[
\text{NM} \quad \text{AM killed comp. he} \quad \text{NM} \quad \text{hate SM comp.-AM}
\]

(*That John murdered Mary proved that he hated her.)*

The A/A blocks \emptyset in S_3 from referring to Mary in S_1, because the higher NP-node must be chosen.
The following sentence with a relative clause and a complement also shows that the A/A predicts its ungrammaticality.

*(60)

*S 1
  NP 1
    S 2
      NP
        V
          S 2
            NP
              V
                S 2
                  NP
                    NP
                      NP
                        NP
                          V
                            NP
                              N
                                N
                                  N
                                    V
                                      NP
                                        N
                                          N
                                            V
                                              NP
                                                N
                                                  N
                                                    V
                                                      NP
                                                        V
                                                          NP
                                                            N
                                                              N
                                                                V
                                                                  NP
                                                                    N
                                                                      N
                                                                        V

(*The person who loves Mary proved that he respects her.)

Coreference of $\emptyset_j$ with Mary in $S_1$ is blocked by the A/A. $\emptyset$ must refer to NP.

The A/A also predicts that genitives cannot be anaphors of $\emptyset$.

(61)

*S 1
  NP 1
    S 2
      NP
        V
          S 2
            NP
              V
                NP
                  NP
                    NP
                      NP
                        NP
                          NP
                            NP
                                NP
                                    NP
                                        NP
                                            NP
                                                NP
                                                    NP
                                                        NP
                                                            NP
                                                                NP
                                                                    NP
                                                                        NP

Ann's parents said that they / *she is sick.

By the A/A, the highest node NP must be chosen as the anaphor of $\emptyset$. 

3.4 ∅ Chooses the Hierarchically Closest Anaphor Only

Like caki, ∅ chooses the hierarchically closest anaphor. Unlike caki, however, ∅ can only refer to the hierarchically closest anaphor, and does not admit of a number of possible antecedents, showing preferences for some of these over others.

(62)

Joe_{i} \text{-ka senkak-han-ta}
NM thinks

Peter_{j} \text{-ka an-ta-kow}
NM knows comp.

Joe_{i} thinks that Peter_{j} knows that he_{j} has cancer.
The following sentence shows that subadjacency is violated.\(^4\)

Ø can refer to an NP beyond the kat-ta-ko 'is likely' clause which occurs immediately above Ø.

(63)

\[
\begin{array}{c}
S_1 \\
\downarrow \\
NP \\
\downarrow \\
S_2 \\
\downarrow \\
NP \\
\downarrow \\
N \\
\downarrow \\
Joe_{1-ka} \\
\downarrow \\
NM \\
\downarrow \\
mal-het-ta \\
\downarrow \\
said \\
\end{array}
\]

\[
\begin{array}{c}
S_3 \\
\downarrow \\
NP \\
\downarrow \\
N \\
\downarrow \\
\theta_i \\
\end{array}
\]

\[
\begin{array}{c}
\downarrow \\
kat-ta-kow \\
\downarrow \\
seems comp. \\
\downarrow \\
likely \\
\end{array}
\]

\[
\begin{array}{c}
\downarrow \\
ka-l-su-iss-il-kos \\
\downarrow \\
be able to go \\
\downarrow \\
comp. \\
\end{array}
\]

Joe\(_i\) said that it seems likely that he\(_i\) will be able to go.

I have discussed the fact that the distribution of Ø cannot be accounted for by a transformation, and that its distribution is consistent with the A/A.

That hierarchical closeness is more important than linear closeness is supported by the following coordinate structure.
(62) S
  \[\begin{array}{c}
  \text{S}_1 \\
  \text{NP} \\
  \text{N} \\
  \emptyset \text{ mani mok-ot-ta} \\
  \{i\}\text{ lot ate} \\
  \{*j\} \\
  \text{S}_2 \\
  \text{NP} \\
  \text{V} \\
  \text{S}_3 \\
  \text{kow} \\
  \text{and} \\
  \text{S}_5 \\
  \text{NP} \\
  \text{V} \\
  \text{NP} \\
  \text{mas-i-cowa-} \\
  \text{so} \\
  \text{S}_4 \\
  \text{NP} \\
  \text{V} \\
  \text{cake-i} \\
  \text{S}_6 \\
  \text{NP} \\
  \text{N} \\
  \text{Jane}_j \text{-i} \\
  \text{manti-} \\
  \text{N} \\
  \text{made} \\
  \text{SM} \\
  \text{John}_i \text{-i} \\
  \text{pe-ka kowp h at-} \\
  \text{hungry was} \\
  \end{array}\]

Since John\textsubscript{i} was hungry and the cake Jane\textsubscript{j} baked was good, he\textsubscript{i} ate a lot.

3.5 An Explanation within the Interpretive Theory and Problems

Since we have seen that the transformational approach cannot account for the distribution of \emptyset, let us try to understand the predictions of the interpretive approach. If we assume there to be a Disjoint Reference rule for \emptyset, like the one for k\# (discussed in Chapter 2), then we predict that \emptyset will refer to an anaphor in sentences involving an assertive complement only, since the modified Tensed-S Condition will block Disjoint Reference from applying across an assertive complement. The problem with this approach is that \emptyset can refer out of either assertive or non-assertive complements to the hierarchically closest
anaphor. If we assume a coreference rule, we predict there to be no coreference between $\emptyset$ and a higher anaphor involving an assertive complement, because once again, the Tensed-S Condition will block the coreference rule from applying in such a sentence. Another problem arises for the Coreference rule approach.

Assume there to be an interpretive rule of the following type:

\[(63) \quad Z, \emptyset, X, NP, Y\]
\[1 \quad 2 \quad 3 \quad 4 \quad 5\]

2 and 4 are coreferential.

Condition: There is no NP$_a$ which dominates 4 and does dominate 2.

This is a mirror image rule, and $\emptyset$ and NP may occur in either 2 or 4.

The problem with such a rule is that the Specified Subject Condition (Chomsky, 1973 and 1975) does not hold, contrary to prediction. The Specified Subject Condition will incorrectly block the above interpretive rule in cases like the following:

\[(64)\]

```
S₁
  NP
    NP
      N
        John₁-i
            NP
              N
                Mary₁-ka
                    NP
                      N
                        j
                    \emptyset
                \j
                      pip'an-het-ta-kow
                        criticized
                          comp.
            \j
                      mal-het-ta
                        said
```

John$_1$ said that Mary$_j$ criticized him$_j$. 
If we choose the Disjoint Rule approach, the Specified Subject Condition will incorrectly allow the following kind of ungrammatical linkage.

(65)

$S_1$

$NP$

$N$

Peter$_j$-ka

$NP$

$N$

John$_i$-i

$NP$

$N$

(empty set)

$V$

an-ta-kow

$V$

mal-het-ta

said

$NP$

$NP$

$V$

$an-ta-kow$

$ap^i-n-kos-il$

sick

comp.-AM

Peter$_j$ said that John$_i$ knows that he$_i$ is sick.

The problems within the Interpretive Theory arise from the fact that the "Conditions" are not consistent with our predictions. In fact, they bring about wrong results.

Before I conclude this section, I will mention that we have no way of knowing whether $\emptyset$ is a trace or a null element, because $\emptyset$ is controlled in the following sentences (Chomsky, 1973 and 1975). If $\emptyset$ is controlled, it cannot be a specified subject, by definition.
John said that he thinks he is smart.
3.6 Ø as Interpreted by a Late Stylistic Rule\textsuperscript{5}

An alternative explanation for anaphoric possibilities of Ø and its distributional properties is that Ø is interpreted by a late stylistic rule. This hypothesis is supported by the fact that Ø can occur freely, except for the A/A or Primacy in certain structures, only when we try to look for the anaphor of Ø inside a sentence. There is no problem, if we assume the anaphor of Ø to occur outside of the sentence, or within a speaker's consciousness.

Semantic influence may influence Ø's coreference possibilities. Such an influence may overrule Ø's closest anaphor preference.

(67) Pihenki sako-eso cwein\textsubscript{1} j sal-a-nam- kow, kyonk\textsuperscript{h} al-in\textsubscript{j}

airplane crash in criminal-NM survived and policeman-NM\textsuperscript{1}

cuk-oso Ø usim-il \textsuperscript{h} t'ot\textsuperscript{h} ilyot-ta.
died-since \{*\} laugh-AM laughed aloud

In the airplane crash, the criminal \textsubscript{1} survived, and the policeman \textsubscript{j} died, so he \textsubscript{j} laughed aloud.

In (67), we see a case where semantics allows a more distant anaphor to be chosen.

Semantic influence can also be seen in the following sentence, where Ø chooses a hierarchically farther anaphor.
John<sub>i</sub> thinks that his<sub>i</sub> parents<sub>j</sub> do not know that he<sub>i</sub> is living with Mary<sub>k</sub>.

That Ø cannot refer to pumowtil 'parents' is related to assumptions about the world. If we assume that the parents live with Mary, it is not probable that they do not know about this fact. Therefore, the sentences in (68) make sense only if Ø refers to the hierarchically farther John.
There is an apparent counterexample to the A/A which results also from such assumptions about the world. In the following sentence, $\emptyset$ refers to an anaphor in violation of the A/A, because there is no other possible anaphor in the sentence to which $\emptyset$ can refer.

(69)

The fact that $\text{Mary}_i$ was sleeping proved that $\text{she}_i$ didn't commit murder.
Where more than one possible anaphor occurs, the semantics of the verb may influence \( \emptyset \)'s choice of an anaphor.

(70) \[ \emptyset \text{ } \text{cim-}i\text{-}l \text{ } \text{pat-}i\text{-}l-\text{kos-}i\text{-}l-\text{a-kow} \] Bob,\text{ }i \text{ } \text{Tom,}j\text{-}eke \text{calank-het-ta.} \]
\( \{*j\} \) package-AM get will comp. \( i^{\text{NM}} \text{ } j \) to showed off

Bob\text{}\text{ }i showed off to Tom\text{}\text{ }j that he\text{}\text{ }i will get a package.

(71) \[ \emptyset \text{ } \text{cim-}i\text{-}l \text{ } \text{pat-}i\text{-}l-\text{kos-}i\text{-}l-\text{a-kow} \] Bob,\text{ }i \text{ } \text{Tom,}j\text{-}eke
\( \{*j\} \) package-AM get will comop. \( i^{\text{NM}} \text{ } j \) to
allyo-cu-ot-ta.

informed-ben.

Bob\text{}\text{ }i did Tom\text{}\text{ }j the favor of informing him\text{}\text{ }j that he\text{}\text{ }j will be getting a package.

In this section, I have shown that hierarchical distance plays an important role in \( \emptyset \)'s choice of an anaphor, although it was also shown that subjacency does not hold when NP-less clauses intervene between \( \emptyset \) and its anaphor. Finally, I have briefly discussed how pragmatics or beliefs about the world may influence coreference possibilities of \( \emptyset \).

3.7 Summary

In this chapter, I have demonstrated that \( \emptyset \) may be coreferential with an NP in any position if the following conditions are satisfied:

1. no clausemate anaphor, (2) no more than one \( \emptyset \) within a clause,
(3) the A/A, and (4) \( \emptyset \)-coreference with the hierarchically closest anaphor.

In coordinate structures, I have shown that \( \emptyset \) obeys Primacy, just as in subordinating structures with complements. The A/A
explains why $\emptyset$ cannot refer downward into a complement or a relative clause from the matrix clause, but may into an adverbial clause. In subordinating structures, $\emptyset$ was shown to refer to the hierarchically closest anaphor. In structures in which the $\emptyset$-containing sentence is coordinate with the sentences containing possible anaphors, it was shown that hierarchical closeness is more important than linear closeness. Any number of NP-less clauses may intervene between $\emptyset$ and its anaphor. Problems with a transformational rule for $\emptyset$ and an interpretive rule were presented. A suggestion was made to regard $\emptyset$-interpretation as a late stylistic rule. Beliefs about the world were shown to influence $\emptyset$'s choice of an anaphor.
Footnotes to Chapter Three

1. That no crossing of anaphors for more than one $\emptyset$ is allowed when these $\emptyset$'s occur as clusemates can be seen in a sentence such as the following, where trying to force crossing by the pragmatics of the sentence results in ungrammaticality.

(a) *Ann-i iki- n kos-i Bill-41 nowlle-ke-he-so
\[ i^{\text{NM}} \text{ won SM comp.-NM } j^{\text{AM}} \text{ surprised since} \]
\[ j^{\emptyset} \emptyset_1 \text{ cukyot-ta} \]
\[ j^{\emptyset} \emptyset_1 \text{ killed} \]

Since the fact that Ann won surprised Bill, he killed her.

2. I owe these insights to Ken Hale (personal communication).


4. Chomsky (1973), and Chomsky (1975)

5. This hypothesis has been suggested to me by Ken Hale (personal communication).
4. The Interaction of ᵈ, ᵇ, and Ø

4.1 Preview

In this chapter, I will propose a hierarchy of emptiness for the proforms. Primacy will be redefined on the basis of this hierarchy. Williams' "Pairwise Antecedency Constraint" will be examined with respect to nets of anaphoric linkages in Korean, and it will be shown that such a constraint is also needed in Korean. I will discuss some evidence which suggests that there is a hierarchy of tolerance for ambiguity among the proforms. The claim will be made that the following hierarchy of decreasing tolerance exists:

\[ \text{ṇ} \succ \text{cākì} \succ \emptyset \]

Finally, it is shown that when ᶏ and cākì occur together in a sentence, cākì's choice of an anaphor is restricted by its preference for the hierarchically closest anaphor, but that ᶏ's isn't. The generalization that is captured in the interpretive approach that I have taken in this study is briefly discussed.

4.2 The Hierarchy of Emptiness

In this section, I will discuss the hierarchy of emptiness among the three proforms: ᶏ, cākì, and Ø. It will be shown that there exists the following increasing order of emptiness:

\[ \text{ṇ} \prec \text{cākì} \prec \emptyset \]. Evidence will be given from the Primacy Constraint. In sentences with a nonassertive complement, the following possibilities exist for two coreferential NPs:
A case in point is provided by the sentences in (2).
Peter₁ doesn't know that he₁ is sick.
The same facts obtain in other cases involving Primacy: subjects and NP's in following adverbial clauses, relative clauses, or coordinate clauses. Thus we see that it is necessary to redefine Primacy in terms of emptiness as follows:

(3) **The Primacy Constraint**

If in some class of contractions, $NP_a$ must bear one precedence relation to $NP_b$, then $NP_a$ must not exceed $NP_b$ in emptiness.

It has been shown in Chapter 3, section 3.4.1 that a full NP, when identical to another in the same sentence, is ordinarily disjoint in reference. (2) shows that a proform may be coreferential with another identical proform in the same sentence, if Primacy is observed.

4.3 **The Pairwise Antecedency Constraint**

It will be discussed that Williams' "Pairwise Antecedency Constraint" is needed for anaphoric linkages in Korean. Williams (1971) defines this constraint as follows:

(4) **The Pairwise Antecedency Constraint**

"In order for an anaphoric element (pronoun, etc.) to belong to a network and for a sentence to be grammatical, the element must participate in an antecedency relation with every other node in the network."

This constraint is needed to block sentences of the following type:
In (5), even though \textit{caki} can refer to \textit{John}, and \textit{k4} can refer to \textit{John}, there cannot be any coreferential chain among all of the three anaphors, since \textit{caki} cannot refer to \textit{k4} by Primacy. The sentence therefore, is ungrammatical, because there is one bad linkage. Williams' constraint is what is necessary to throw out a net like (5).

Another sentence illustrates that we need the same constraint.
The linkage *kt - John is what makes the net in (6) bad, because it violates Primacy again. Caki - John and caki - *kt are both good linkages.

On the other hand, we have the following counterexamples to Williams' constraint. In the following sentences, we have one linkage which would be bad if it occurred in isolation, but which forms a good net, together with the other linkage(s).
(7) (*When he said that Peter was tired, actually, he was not tired.)

(8) (When Peter said that he was tired, actually, he was not tired.)
In (7) and (8), the k+ and Peter in S₁ and S₂ meet the structural description of Disjoint Reference II of Chapter 2 so they should be disjoint in reference. But the entire net in both sentences is well-formed and all the NP's are coreferential, thus violating Williams' constraint. The following sentences also violate the constraint:

(9) a. John said
    mal-het-ta

    S₁
    NP
    NP
    V
    John₁
    NM
    said

    S₂
    NP
    NP
    V
    senkak-han-ta-kow
    thinks comp.
    John₁
    NM

    S₃
    NP
    N
    cak₁-ka
    he₁ NM

    V
    ikyo-ta-kow
    won comp.

John₁ said that he¹ thought that he₁ won.
Caki and Ø cannot corefer, because Ø commands its anaphor, which is precluded by A/A, as discussed in Chapter 3, section 2.3. Thus without $S_1$, (9a) would be bad. However the net as a whole is good and all of the NP's are coreferential. Ø – John and caki – John are good linkages.

(9) b.

(*He$_1$ said that he$_1$ thought that John$_1$ won.)

Here again, Ø cannot refer to John by the A/A, but once again.
the entire net is well-formed and we have a grammatical sentence violating Williams' constraint.

The following sentence also has a bad linkage, but the net as a whole is well-formed and this also violates the PAC.

(10)

\[
S_1 \quad S_2 \quad S_3
\]

\[
NP \quad NP \quad kow\quad and
\]

\[
NP
\]

\[
Bill_{-1} \quad il-\quad il\quad cal \quad ha-well \quad does
\]

\[
NP
\]

\[
chink\quad han-het-ta\quad praised
\]

\[
S_4
\]

\[
NP \quad PP \quad V
\]

\[
NP
\]

\[
N
\]

\[
N
\]

\[
∅_R
\]

\[
∅_1
\]

\[
hakow \quad kac_{h1}
\]

\[
together \quad with
\]

\[
salam_{-1} \quad person_{NM}
\]

\[
il-ha-nin \quad work_{SM}
\]

\[
Bill_{1} \quad works \quad well, \quad and \quad the \quad person_{r} \quad who \quad works \quad with \quad him_{1}, \quad praised \quad him_{1}.
\]
In (10), Bill in S_2 can be coreferential with Ø_1 in S_3 or Ø_1 in S_4. But Ø_1 in S_4 cannot refer to Ø_1 in S_3, because of A/A. The complete net of Bill and both Ø_1's are well-formed, however, and violates Williams' constraint.

In this section, I have defined Williams' "Pairwise Antecedency Constraint," and have discussed where it is needed and some counterexamples to this constraint. At present, I have not been able to achieve a satisfactory reformulation of the PAC.

4.4 The Hierarchy of Tolerance for Ambiguity

In this section, I will discuss what types of ambiguity are avoided and what types are tolerated by ki, caki, and Ø. I will suggest that there is a hierarchy of tolerance for ambiguity in the following decreasing order: ki > caki > Ø

In the following sentences, ki shows more ambiguity than caki, although ki prefers a nonsubject. Caki can refer only to a subject. Ø can refer to neither of the NP's it commands.

(11) a. John_i-1 Bill_j-1 manass-11 tte
     NM AM met SM when
     ki j> i -nin pap'at-ta.
     he j> i NM was busy

     When John_i met Bill_j, he_j> i was busy.

b. John_i-1 Bill_j-1 manass-11 tte, caki_i-1-nin
     NM AM met SM when he_{j} NM
     pap'at-ta.
     was busy

     When John_i met Bill_j, he_{j} was busy.
c. John$_i$ met Bill$_j$ when
    manass-$_i$ tte
    AM met AM when
    \( \emptyset \)
    pap'at-ta.
    \( \{^*_i\} \)
    was busy
    \( \{^*_j\} \)
    
    When John$_i$ met Bill$_j$, he \( \{^*_i\} \) was busy.
    \( \{^*_j\} \)

In (11a), \( k^i \) may be ambiguous, but prefers the nonsubject. In
(11b), \( caki \) must refer to the subject. (11c) shows that \( \emptyset \) cannot
refer to either because more than one possible anaphor occurs, although
ordinarily, \( \emptyset \) may refer to an NP in an adverbial clause.

The following sentences show that \( k^i \) can tolerate ambiguity when
more than one nonsubject occurs, but not \( caki \) and \( \emptyset \).

(12) a. Ne-ka Peter$_i$-eke Bill$_j$ eteheso
    I NM to about
    yeki-ness-$_i$ tte, \( k^i \)-n\( \tilde{n} \) ap'at-ta.
    talked SM when he \( \{^j\} \) NM was sick

    When I talked to Peter$_i$ about Bill$_j$, he \( \{^j\} \) was sick.

b. *Ne-ka Peter$_i$-eke Bill$_j$ eteheso
    I NM to j about
    yeki-ness-$_i$ tte, caki$_i$-n\( \tilde{n} \) ap'at-ta.
    talked SM when he \( \{^j\} \) NM was sick

*When I talked to Peter$_i$ about Bill$_j$, he \( \{^j\} \) was sick.

c. *Ne-ka Peter$_i$-eke Bill$_j$-eteheso
    I NM to about
    yeki-ness-$_i$ tte, \( \emptyset \) ap'at-ta.
    talked SM when \( \{^j\} \) was sick

*When I talked to Peter$_i$ about Bill$_j$, he \( \{^j\} \) was sick.
The following sentences show that in sentences with more than one embedding, caki may be two ways ambiguous, but $\emptyset$ cannot be ambiguous. That is, caki can refer to two higher NP's, but $\emptyset$ can refer only to the hierarchically closest NP. Caki tolerates more ambiguity than $\emptyset$.

(13) a. Paul said that Bill knows that he is sick.
(13) b.

\[
\begin{array}{c}
S_1 \\
NP \\
N \\
Paul_i \quad -i \\
NM \\
S_2 \\
NP \\
N \\
Bill_i \quad -i \\
NM \\
S_3 \\
NP \\
V \\
am-ta-kow \\
 knows \, comp. \\
ap^{h-n-kos-il} \\
sick \, comp. -AM \\
\emptyset \{i\} \\
\{*j\} \\
V \\
mal-het-ta \\
said \\
\end{array}
\]

Paul \_j said that Bill \_i knows that he is sick. 
\[
\{i\} \\
\{*j\} \\
\]

In sentences with more than one embedding, recall from Chapter 1 that \textit{caki} can refer ambiguously to up to 3 higher NP's in sentences with complements, but in a decreasing order of preference. In a similar context, \textit{k4} has no such decreasing preference: all anaphors are equally ambiguous.
John\textsubscript{k} denied that Paul\textsubscript{j} does not know that Bill\textsubscript{i} heard that he\textsubscript{j} won.

When more than one possible anaphor occurs in a coordinate structure, no proform can be used.

(15) a. *John\textsubscript{i} - in TV-1\textsubscript{i} pow-kow Bill\textsubscript{j} - in

\text{NM} \quad \text{AM} \text{ watch and} \quad \text{NM} \quad 

chek-\textsubscript{1} ilk-kow \quad k\textsubscript{i} - nin ch\textsubscript{1} gowot-ta

book AM read and he\textsubscript{j} NM was happy

*John\textsubscript{i} watched TV, and Bill\textsubscript{j} read a book, and he\textsubscript{j} was happy \textsubscript{j}
(15) b. **John₁-in TV-1-ta pow-kow Billⱼ-in
NM AM watch and NM
chek-ta 1lk-kow cakiᵢ-n-in chilgowot-ta.
book AM read and he [j] NM was happy

**John₁ watched TV, and Billⱼ read a book, and he was
happy.

Note that (15b) with caki is worse than (15a) with kᵢ and that
the following coordinate structure with ∅ is even worse:

(16) ***John₁-i 1lt'änk-ha-kow Billⱼ-i
NM first became and NM
itink-het-ta; kilona amuto ∅ chinkchan-haci-an-at-ta.
second became but no one [i] praised

***John₁ became first, and Billⱼ became second, but no one
praised him [i]

Neither of the following conjoined NP's may refer to kᵢ, much less to
caki.

a. John₁ kwa Peterⱼ-ka ssawoss-ta tte *kᵢ **cakiᵢ-ka
and NM fought SM when he [j] he [j] NM
ikyot-ta.
won

When John₁ and Peterⱼ fought, he [j] won.

and NM fought and he [j] he [j] NM won

John₁ and Peterⱼ fought, and he [j] won.

I have observed that kᵢ prefers a nonsubject when it has a choice,
and that caki must refer to a subject when it has a choice. Aside
from such a distinction, I have argued for the following hierarchy
of tolerance for ambiguity: kᵢ > caki > ∅.
Evidence was cited from cases with more than one nonsubject. $K_{\sharp}$ could refer to any nonsubject ambiguously, or to more than one non-subject commanding it, but not caki and $\emptyset$, when these nonsubjects occur in the same sentence. $\emptyset$ cannot refer ambiguously to more than one NP in an adverbial clause from a matrix clause. Sentences with three embedded clauses show that whereas caki has a decreasing order of preference with increasing hierarchical distance, $K_{\sharp}$ is equally ambiguous among all possible anaphors. $\emptyset$, on the other hand, can refer only to the hierarchically closest anaphor. Finally, it was shown that none of the proforms tolerates ambiguity in a coordinate structure, but that $K_{\sharp}$ was less sensitive to this prohibition than caki and caki less than $\emptyset$. Neither of the conjoined NP's may refer to a proform.

4.5 Caki - $K_{\sharp}$ Interaction

When caki and $K_{\sharp}$ occur together in the same sentence with more than one anaphor, caki's choice of an anaphor is determined by hierarchical closeness, but $K_{\sharp}$'s is not. $K_{\sharp}$ has no preference for hierarchical distance. Here again, we can see that caki is less ambiguous than $K_{\sharp}$. 
(17) a. 

\[ S_1 \]

\[ S_2 \]
\[ S_3 \]
\[ S_4 \]

John\(_i\) heard SM when

caki he\[i\] -ka ikyot-ta-kow

(When John\(_i\) heard that he\(_i\) had won, he\(_i\) found out that Bill\(_j\) had lost.)

In (17a), caki can refer only to the hierarchically closest anaphor, John, and not to Bill. K\(^i\) cannot refer to Bill, because of Primacy. Thus K\(^i\) can refer only to John. (17a) is in an SOV-SOV order. The following S is in the order SOV-OSV.
(17) b. 

When John$_i$ heard that he$_i$ won, he$_i$ found out that Bill$_j$ had lost.

In (17b), caki can refer only to the hierarchically closest NP, John, but kì may refer either to John or to Bill.

The sentences in (17) have shown that caki refers only to the hierarchically closest anaphor. $S_2$ is an adverbial clause, and it is different from a complement. This is a counterexample to the algorithm developed in Chapter 1, which I don't know how to explain at present.

The following sentences are also counterexamples to the
generalization that caki prefers a hierarchically closest anaphor. They show that caki can refer to a hierarchically farther anaphor, even when there is a hierarchically closer one to which caki can refer. Caki can refer to an anaphor out of its clause even when there is a clausemate anaphor.

(18)

(When Bill_i criticized him(self) that John_j cried.)
The following sentence shows that caki's preference for the hierarchically closest anaphor may be overruled by a stronger constraint like the $\text{k}^+$-Nonsubject Constraint, which may never be violated. Below, caki is referring to a hierarchically farther anaphor, because of a $\text{k}^+$-NP linkage which caki does not refer to, but bypasses, as though this $\text{k}^+$-NP linkage is not a domain of possible coreference with caki.

(19)

Now I will present some problems which I do not know how to explain. It was mentioned in Chapter 1 that caki prefers referring upward to referring downward. The following sentence shows a violation of this preference.

(20)

When John\textsubscript{i} criticized him\textsubscript{j}, Bill\textsubscript{j} hid the fact that he cried.

The following sentence seems to be violating the preference conditions that caki must refer to Bill when \textsubscript{k\textsuperscript{i}} is referring to John. I do not have a satisfactory explanation for such a case. There are many other puzzling cases which cannot be accounted for within the theory developed here, but I must leave them for future researchers.
(21)

Bill\textsubscript{j} hid the fact that John\textsubscript{i} cried when he criticized him.

4.6 Summary

In this final chapter, I have argued that there is a hierarchy of emptiness in the following increasing order: \( k_i \leq caki \leq \emptyset \).

This hierarchy was discussed in terms of Primacy. I also observed that Williams' "Pairwise Antecedency Constraint" is needed in general
to explain the well-formedness of nets with more than one anaphoric linkages, despite the fact that there appear to be some counterexamples to this constraint. It was shown that the following hierarchy of decreasing tolerance for ambiguity exists among proforms:

$k^4 > caki > \emptyset$. Finally, I discussed how caki's preference for the hierarchically closest anaphor influences the possible anaphoric linkages when it occurs with $k^4$ and more than one possible anaphor.

4.7 General Conclusion

In this study, I have attempted to account for the distribution and coreference possibilities of $k^4$, caki, and $\emptyset$ within the framework of an Interpretive Theory. The basic motivation for such an analysis was the idea that the Base rules can, and indeed must, generate these three proforms in all NP positions. Since the Base rules are sufficient to generate all the proforms, transformations are rendered superfluous.

I have also pointed out some problems with this analysis and much further research is needed to gain a better insight into the nature of and a possible solution to these problems.
Footnotes to Chapter Four

1. If a subject and a nonsubject, next clause up, command \( \emptyset, \emptyset \)
prefers the subject.

\[
\begin{align*}
S_1 & \rightarrow \text{null} \\
S_2 & \rightarrow \text{NP} \quad \text{NP} \quad \text{V} \\
& \quad \text{NP} \quad \text{V} \\
& \quad \text{NP} \quad \text{NP} \\
& \quad \text{N} \quad \text{N} \\
& \quad \text{John}_i \quad \text{Peter}_j \quad \text{pankmun-het-ta} \\
& \quad \emptyset_i \rightarrow j \\
& \quad \text{ap}_i \quad \text{t'e} \\
& \quad \text{Sick}_i \quad \text{when} \\
\end{align*}
\]

(When he \( i > j \) was sick, John \( i \) visited Peter \( j \).)
APPENDIX -- A Guide to Korean Transcriptions

The sequence ow in orthography represents \([o]\) phonetically.
\(c\) corresponds to \([ə]\).
\(č\) is phonetically \([č]\).
\(čʰ\) is aspirated.
\(čʰ\) is tense.
\(č\) is voiceless.

A general voicing rule applies to voiceless consonants in inter-sonorant position.

/s/ or /t/ gets palatalized to \([š]\) or \([č]\), respectively, before /i/ or /y/.

/l/ becomes \([r]\) in inter-sonorant position.

For other major phonological rules in Korean, refer to W.-C. Kim (1973) "The Vowel and Consonant System of Korean", unpublished MIT paper.
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I was born on February 16, 1949, in Seoul, Korea where I spent my early childhood. I left Korea at the age of six when my father was transferred to Japan on business. I attended Stella Maris International School during the period of 1955 - 1967. After graduating from Stella Maris, I attended Barnard College in New York from the fall of 1967. However, in 1968, I returned to Seoul, Korea to continue my undergraduate education in Ewha Woman's University. I graduated from Ewha in February, 1972.

In the fall of 1972, I began my graduate studies in linguistics at MIT. During my first year, I was partially supported by the Fulbright grant and partially by the Department of Linguistics. For the remaining period of graduate study, I was a research assistant.