CHILDREN’S INTERPRETATION OF THE KOREAN REFLEXIVE PRONOUNS
CAKI AND CAKI-CASIN

DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE
UNIVERSITY OF HAWAI’I IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

IN

LINGUISTICS

MAY 2014

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CHAPTER I
INTRODUCTION

There is no doubt that normally-developing children acquire their native language effortlessly and rapidly, universally and without error despite there being significant variation from language to language with respect to particular structures. One notable example of differences among languages comes from reflexives: Languages differ in the domain within which the antecedent of a reflexive can be located and in the factors that affect the interpretation of a reflexive. For example, the English reflexive seeks its antecedent within a minimal clause, which is the syntactic domain that affects the antecedent reference. Previous studies have found that native English-speaking children come to know that the English reflexive seeks an antecedent in the minimal domain by the remarkably young age of 3 years (Chien & Wexler, 1990).

Unlike English, Korean has several reflexives, two of which are the focus of this dissertation: *caki* and *caki-casin*. When it occurs in direct object position, *caki-casin* patterns with the English reflexives: It seeks its antecedent within a minimal clause, and no other factor affects its interpretation. However, the reflexive *caki* can take an antecedent outside a minimal clause (even outside a sentence) as well as one inside a minimal clause. Moreover, various kinds of verbal semantic information affect the interpretation of *caki*, making *caki* different from both the Korean *caki-casin* and reflexives like those in English and other similar languages.

This dissertation investigates whether native Korean-speaking children aged 4 to 6 have already come to know the properties of *caki* and *caki-casin*. It first explores whether children (and adult controls) allow long-distance antecedent interpretation for *caki* and not for
Further, it examines the effects of verbal semantics on the interpretation of caki and caki-casin in child and adult populations.

This dissertation offers a novel approach to the acquisition of reflexives. First, it explores whether children distinguish between caki and caki-casin despite their phonological similarity and infrequent exposure to either form: A search of the Child Language Data Exchange System (CHILDES) database (MacWhinney, 2000) revealed no utterances that contained either caki or caki-casin in caregivers’ speech (However, it must be acknowledged that the current CHILDES corpus for child Korean is very small—12 files, from 2;0.13 to 2;3.09—of speech from a mother-child dyad). Second, it explores whether children learning Korean are sensitive to semantic properties of a clause-mate verb\textsuperscript{1} that follows the reflexive pronoun. Previous studies (Jakubowicz & Olsen, 1988, and Olsen, 1992 on Danish; Hyams & Sigurjónsdóttir, 1990 and Sigurjónsdóttir & Hyams, 1992 on Icelandic) have reported that children are able to use this sort of information for the interpretation of reflexives in SVO languages, in which the verb occurs prior to the reflexive pronoun whose interpretation it influences. However, to date, no study has addressed this question for an SOV language.

\textbf{1.1 Organization}

This dissertation is organized as follows. Chapter 2 first lays out the theoretical background on anaphor binding. It also provides a description of how the two Korean reflexives, caki and caki-casin, differ from each other in terms of the domains in which they can search for an antecedent and the role of semantic information in sentence-level and

\footnote{\textsuperscript{1} The term “clause-mate verb” refers to a verb that occurs within the same clause as the reflexive in question. In what follows, the reflexive will typically be in the embedded clause of a biclausal sentence, and thus the clause-mate verb is the embedded verb.}
Chapter 3 begins with an overview of some previous acquisition studies on reflexives in various languages. It then reviews previous Korean acquisition studies on \textit{caki} and \textit{caki-casin}, with an evaluation of the studies’ strong and weak points. Chapters 4 and 5 present the motivation, research questions, the predictions of the present study, and details and results of a norming study. Chapters 6 and 7 constitute the main body of the dissertation where the methods and the results of the experiments are presented. Chapter 8 concludes the dissertation by providing a summary of the results and discussing the implications of the findings.

\footnote{By “discourse binding,” I mean a situation in which the antecedent for the reflexive pronoun lies in discourse outside the sentence containing the reflexive.}
CHAPTER II
LINGUISTIC BACKGROUND

This chapter discusses the role of syntax and semantics in the interpretation of the Korean reflexives caki and caki-casin. I will first explain the structural difference between the two reflexives. I will then discuss how they differ from each other in terms of syntactic domain and the extent to which they are affected by semantic factors, semantic properties of the clause-mate verb.

2.1 Interpretation of Korean Reflexives

Across languages, there are two types of reflexives, simplex (e.g., Dutch zich, Korean caki) and complex (e.g., Dutch zichzelf, Korean caki-casin) (Reinhart & Reuland, 1993), and it has been noted that the two reflexives are different from each other in their syntactic properties (Pica, 1987). This section introduces the syntactic properties associated with the Korean simplex reflexives caki and complex reflexive caki-casin. In Section 2.1.1, the two reflexives are compared in terms of the possibility of being bound long-distance (henceforth, LD) vs. locally, as well as the possibility of sentence-internal binding vs. sentence-external discourse binding. In Section 2.1.2, the two reflexives are compared in terms of whether the meaning of verbs affects the interpretation of caki and caki-casin.

2.1.1 Domains for the antecedent interpretation of caki and caki-casin.

2.1.1.1 Sentence-internal interpretation within Binding Theory. The issue of how languages encode and interpret reflexives has been studied extensively in terms of syntactic restrictions. Within the traditional generative Government and Binding (GB) framework

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3 One popular proposal on structural difference between simplex and complex reflexive is this: The simplex reflexive selects the head of DP, while the complex reflexive is composed of two heads, DP and NP (Reuland, 2001, p. 479).
(Chomsky, 1981), Binding Principle A, stated in (1), assumes that reflexives are syntactically
distinct from other kinds of referential expressions (e.g., pronouns or lexical nouns).

(1) Binding Principle A

A reflexive is bound in its governing category.

(Chomsky, 1981, p. 188)

Binding requires co-indexation as well as c-command. A reflexive and its antecedent are co-
indexed when they share the same reference. C-command (Reinhart, 1976) is a structural notion
that has been proposed to be unique to language. There are various definitions of c-command,
but suffice it to say that c-command obtains between two elements when a node that
immediately dominates the first also dominates (immediately or otherwise) the second. The
application of c-command to reflexives can be seen in (2), in which the NPs Sheep and Cow
both c-command the reflexive pronouns.

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4 The concepts of Binding and Governing Category are described by Chomsky (1981):
(i) Governing Category
    \[ \beta \text{ is a governing category for } \alpha \text{ if and only if } \beta \text{ is the minimal category containing } \alpha, \text{ a } \]
    \[ \text{governor of } \alpha, \text{ and a SUBJECT accessible to } \alpha \]
(ii) Binding
    \[ \alpha \text{ binds } \beta \text{ iff } \alpha \text{ and } \beta \text{ are coindexed and } \alpha \text{ c}-\text{commands } \beta, \text{ where coindexing requires non-} \]
    \[ \text{distinctness in features} \]
Why then does himself take only the NP cow as its antecedent? The traditional answer is the domain within which an English reflexive pronoun must find an antecedent (its ‘governing category’) corresponds to the minimal clause containing both the reflexive pronoun and a subject—hence the embedded clause in (2). Thus, Sheep cannot be the antecedent because it lies outside the governing category.

In contrast to the English reflexives, the Korean reflexive caki has less restrictive governing category. The governing category for caki is any clause that contains a subject, even the matrix, root clause (b). That is, caki is a reflexive that allows—and, indeed, prefers—a LD antecedent\textsuperscript{5} in the matrix clause, as seen in example (3):\textsuperscript{6}

\textsuperscript{5} The LD antecedent preference of caki in a biclausal sentence has received confirmation from both corpus (Kang, 1998) and experimental (Choi & Kim, 2007) studies.

sheep-NOM cow-NOM self-ACC draw-PST-COMP say-PST-SES

‘Sheepi said that Cowi drew selfij.’

Note that in (3), the reflexive caki can refer to the embedded clause subject so ‘cow,’ a local antecedent, as well as the matrix clause subject yang ‘sheep,’ an LD antecedent, which is preferred (Choi & Kim, 2007; Kang, 1998, among many others).

On the other hand, as example (4) shows, the other Korean reflexive, caki-casin, allows only the local antecedent so ‘cow’ in a biclausal sentence, in the same manner as the English reflexive does. Thus, there exists a difference in the domains in which the two Korean reflexives, caki and caki-casin, look for an antecedent.


Sheep-NOM Cow-NOM self-ACC draw-PST-COMP say-PST-SES

‘Sheepi said that Cowj drew selfij.’

One account for the variation of governing categories across different reflexives is the Governing Category Parameter (Manzini & Wexler, 1987). It was initially proposed to explain the crosslinguistic differences of governing categories which vary from language to language in the interpretation of reflexives. For example, the parametric differences between English reflexives and Korean reflexive caki (p. 422) are described in (5).7

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6 This dissertation uses the following notations to indicate the preference of a reflexive between two antecedents: (i) x>y means that the antecedent x is preferred over the antecedent y; (ii) x=y refers to no preference between two possible antecedents, x and y.

7 Wexler and Manzini (1987) introduce five different parametric values for the locality variation: (i) subject; or (ii) an Infl; or (iii) a Tense; or (iv) a referential Tense; or (v) a root Tense. The Subset Principle concerns these parametric values, which we will be introduced in Chapter 3.
(5) **Governing Category Parameter (GCP):** \(a\) is a governing category for \(b\) iff \(a\) is the minimal category which contains \(a\) and has:

a. a subject (e.g., English reflexives and Korean *caki-casin*)

b. a root Tense (e.g., Korean reflexive *caki*)

What seems more difficult for native Korean children (vs. native English children) is this: Native Korean must set up two different parameters for the two different reflexives, *caki* and *caki-casin*, while native English children set up only one parameter for the English reflexives.

So far, our discussion of the two Korean reflexives *caki* and *caki-casin* has been restricted to patterns in which the antecedent occurs within the sentence. We turn now to cases where the potential antecedent occurs outside of the sentence containing the reflexive.

2.1.1.2 *Sentence-external discourse binding.* Under some circumstances Korean permits an extra-sentential discourse interpretation for *caki* (Cho, 1996; Han & Storoshenko, 2012; Kang, 1988; Kim, 2000, among many others). A case in point is (6a) and (6b).
   Sheep-NOM joyfully laugh-PST-SES
   ‘Sheep_i laughed a lot.’

   So-ka_j caki-lul_i,s_j wusikyey kuly-ess-ki ttaymwun-i-lay-yo.
   Cow-NOM self-ACC comically draw-PST-COMP because-be-REP-SES
   ‘(It is) because Cow_j drew self_i,s_j comically.’

   Sheep-NOM joyfully laugh-PST-SES
   ‘Sheep_i laughed a lot.’

   So-ka_j caki-casin-lul_i,s_j wusikyey kuly-ess-ki ttaymwun-i-lay-yo.
   Cow-NOM self-ACC comically draw-PST-COMP because-be-REP-SES
   ‘(It is) because Cow_j drew self_i,s_j comically.’

Note in particular that in the discourse context in (6a), a local option that co-occurs in a sentence with the reflexive caki is available. However, the reflexive not only allows the local antecedent so ‘cow’, but also allows the extra-sentential LD antecedent yang ‘sheep’ in the previous sentence (O’Grady, 1987, 2013). This example, considered as a case of discourse binding, sheds light on the fact that even in discourse binding, the interpretation of caki is sensitive to the existence of two antecedents: It is discourse bound with its LD antecedent in the previous sentence and it also can take a sentence-internal local antecedent.

In contrast to caki, the discourse in (6b) demonstrates that the binding domain of caki-casin is limited to the local antecedent (i.e., the local subject so ‘cow’), suggesting that the

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8 Native Korean informants provided the judgment that the Korean reflexive caki has an extra-sentential LD antecedent preference. To the best of my knowledge, however, no study to date has examined the antecedent preference of caki at the discourse level.

9 Kang (1988, p. 419) argues that reflexives prefer to be interpreted within the sentence level; in order for the LD interpretation to be made, a strong discourse context is required.
interpretation of caki-casin does not allow an antecedent across a sentence boundary. The observed variation between the reflexives with respect to whether they allow an extrasentential LD antecedent in discourse binding supports the view that the two reflexives are substantially different from one another.\(^\text{10}\)

### 2.1.2 Semantic factors involved in the interpretation of caki and caki-casin.

In addition to the difference in the domain in which each reflexive finds an antecedent, now, in this section, we will look at one factor, semantic properties of the clause-mate verb, that affects the selection of that antecedent: Specifically, it indicates that when you have verb X, a local antecedent is preferred, but when you have verb Y, a LD antecedent is preferred, even though in both cases it is possible for the other nominal to be the antecedent. The two Korean reflexives differ in regard to whether their interpretation can be affected by semantic factors such as the choice of a clause-mate verb. It has been claimed that there is an interaction between the choice of antecedent of the reflexive and semantic properties of the clause-mate verb (Cho, 2006; Choi & Kim, 2007; Han & Storoshenko, 2012). In particular, one piece of evidence comes from the fact that although caki manifests a default preference for a (sentence-internal) LD antecedent (Kang, 1998; Kim & Yoon, 2008), this preference can be mitigated by the choice of clause-mate verb, thereby allowing caki to be bound locally as well as at a distance, as shown

\(^{10}\) The existence of discourse binding is generally assumed in Japanese as well (Kuno, 1987; Sells, 1987), as demonstrated in the following example (Sells, 1987, p. 455):

(i) a. Taroo-wa\(_i\) totemo kanasigat-tei-ta.  
   Taroo-TOP very sad-PST-SES  
   ‘Taroo, was very sad.’

   b. Yosiko-ga\(_j\) Takasi-ga\(_k\) zibun-o\(_j\)\(_j\) hihansita noni bengosi-nakat-ta kara-da.  
   Yosiko-NOM Takasi-NOM self-ACC criticized though defend-not-PST because-COP  
   ‘(It is because) Yosiko\(_j\) did not defend (him) though Takasi\(_k\) criticized himself\(_j\)\(_j\).’

In the discourse, the Japanese reflexive zibun is identified with Taroo, which is located outside the sentence in which zibun appears, suggesting that Japanese allows discourse binding.
in (7a) and (7b). Here we first consider only sentence-internal local/LD binding, but we will consider discourse binding below.

(7) a. Yang-\(i\)i [So-ka\(j\) caki-lul,\(s_j\) hochulhay-ss-tako] malhay-ss-eyo.

Sheep-NOM Cow-NOM self-ACC summon-PST-COMP say-PST-SES

‘Sheep\(i\) said that Cow\(j\) summoned self\(i,\(s_j\).\’

b. Yang-\(i\)i [So-ka\(j\) caki-lul,\(s_j\) swumkye-ess-tako] malhay-ss-eyo.

Sheep-NOM Cow-NOM self-ACC hide-PST-COMP say-PST-SES

‘Sheep\(i\) said that Cow\(j\) hid self\(i,\(s_j\).’

In (7a), the clause-mate verb hochulhay- ‘summon’ favors an interpretation in which caki is coreferential with the LD antecedent (i.e., the subject of the matrix clause); in (7b), in contrast, the meaning of the verb swumkye- ‘hide’ favors the local subject reading of the reflexive. The contrast between (7a) and (7b) suggests that there are indeed differences in how an antecedent is chosen depending on the predicates that caki co-occurs with.

The significant role of the clause-mate verbs in determining an antecedent for caki is further supported by a recent experiment that used eye-tracking (Choi & Kim, 2007). Here are the actual test sentences (8a-b) they used in the study.
(8) a. Halwu-nun Hoysawen-i, [annaywen-i, pyelankan
One day-TOP Businessman-NOM helper-NOM suddenly
_self-ACC avoid-PST-COMP say-PST-SES

‘One day, a businessman \(i\) said that a helper \(j\) suddenly avoided self \(i,\_j\).’

b. Halwu-nun Hoysawen-i, [annaywen-i, pyelankan
One day-TOP Businessman-NOM helper-NOM suddenly
_self-ACC boast-PST-COMP say-PST-SES

‘One day, a businessman \(i\) said that a helper \(j\) suddenly boasted about self \(i,\_j\).’

(Choi & Kim, 2007, p. 264, Ex. 2&3)

The only difference between (8a) and (8b) is the verb in the embedded clause: In particular, note that _kwasihay_ ‘boast’ in (8b) favors a local binding interpretation for _caki_, as compared with _hoyphihay_ ‘avoid’ in (8a). Choi & Kim sentences where _caki_ can be naturally bound by a LD antecedent (i.e., the matrix subject), as in (8a), had fast reading times overall (first-pass and re-reading). However, when the embedded verb favored coreference with the local antecedent, as in (8b), the participants lingered significantly longer when they reached the embedded locally oriented verb region (i.e., mean reading time difference at the embedded verb region: boast-type verbs 909ms vs. avoid-type verbs 1071ms). Choi and Kim (2007) interpreted this as evidence that the default preference of _caki_ is the LD antecedent. The fast reading time with LD antecedent indicates that participants expect _caki_ to have a LD antecedent. When it doesn’t, the parser has to revise its initial LD interpretation to the local interpretation and that is why they linger in the disambiguating region (the embedded verb) \(F_i(1,18) = 14.44, p = .01; F_2(1, 19) = 5.21, p = .03\).
Now, turning back to the issue of lexical effects on the choice of an antecedent, consider examples (9a) and (9b) in which caki has been replaced by caki-casin. Here we might expect the semantic properties of the clause-mate verb to have a similar effect as when the reflexive is caki.

(9) a. Yang-i, [So-ka\textsubscript{j} caki-casin-lul\textsubscript{ij} hochulhay-ss-tako] Sheep-NOM Cow-NOM self-ACC summon-PST-COMP malhay-ss-eyo. say-PST-SES

‘Sheep\textsubscript{i} said that Cow\textsubscript{j} summoned self\textsubscript{ij}.’


‘Sheep\textsubscript{i} said that Cow\textsubscript{j} hid self\textsubscript{ij}.’

In both (9a) and (9b), the reflexive caki-casin takes the local antecedent so ‘cow’, even though the meaning of the verb in (9a) should lead it to take the LD antecedent. This indicates that for caki-casin, the verb does not create a bias towards the choice of either the LD or local antecedent.

So far, the lexical effect on determining a within-sentence antecedent has been discussed. Crucially, the same lexical effect holds for the choice of an extrasentential antecedent for each reflexive in discourse binding. Consider, for example, (10a-b) and (11a-b):
(10) a. Yang-\textsubscript{i} kyengchalse-ey ka-ss-eyo.
Sheep-\textsubscript{NOM} police station-\textsubscript{LOC} go-\textsubscript{PST-SES}
‘Sheep\textsubscript{i} went to the police station.’
So-ka\textsubscript{j} caki-lul\textsubscript{i,j} hochulha-yss-ki ttaymwun-i-\textsubscript{lay}-yo.
Cow-\textsubscript{NOM} self-\textsubscript{ACC} summon-\textsubscript{PST-COMP} because-be-\textsubscript{PST-SES}
‘(It was) because Cow\textsubscript{j} summoned self\textsubscript{i,j}.’
b. Yang-\textsubscript{i} maywu nolla-ss-eyyo.
Sheep-\textsubscript{NOM} so surprise-\textsubscript{PST-SES}
‘Sheep\textsubscript{i} was so surprised.’
So-ka\textsubscript{j} caki-lul\textsubscript{i,j} swumky-ess-ki ttaymwun-i-\textsubscript{lay}-yo.
Cow-\textsubscript{NOM} self-\textsubscript{ACC} hide-\textsubscript{PST-COMP} because-be- \textsubscript{PST-SES}
‘(It was) because Cow\textsubscript{j} hid self\textsubscript{i,j}.’

(11) a. Yang-\textsubscript{i} kyengchalse-ey ka-ss-eyo.
Sheep-\textsubscript{NOM} police station-\textsubscript{LOC} go-\textsubscript{PST-SES}
‘Sheep\textsubscript{i} went to the police station.’
So-ka\textsubscript{j} caki-casin-lul\textsubscript{i,j} hochulhay-ss-ki ttaymwun-i-\textsubscript{lay}-yo.
Cow-\textsubscript{NOM} self-\textsubscript{ACC} summon-\textsubscript{PST-COMP} because-be- \textsubscript{PST-SES}
‘(It was) because Cow\textsubscript{j} summoned self\textsubscript{i,j}.’
b. Yang-\textsubscript{i} maywu nolla-ss-eyyo.
Sheep-\textsubscript{NOM} so surprise-\textsubscript{PST-SES}
‘Sheep\textsubscript{i} was so surprised.’
So-ka\textsubscript{j} caki-casin-lul\textsubscript{i,j} swumky-ess-ki ttaymwun-i-\textsubscript{lay}-yo.
Cow-\textsubscript{NOM} self-\textsubscript{ACC} hide-\textsubscript{PST-COMP} because-be- \textsubscript{PST-SES}
‘(It was) because Cow\textsubscript{j} hid self\textsubscript{i,j}.’
In (10a), *caki* is strongly linked to the extra-sentential LD antecedent because of the meaning of the verb *hochulhay-* ‘summon’ (one does not normally summon oneself). In contrast, in (10b), the verb *swumky-* ‘hide’ favors the local antecedent interpretation; thus, the antecedent of *caki* in (10b) is coreferential with the local subject *so* ‘cow.’ In the case of *caki-casin* (11a-b), however, the choice of the verb does not play a role in the interpretation—only the local antecedent is possible in both cases.

As we have seen, the choice of the clause-mate verb appears to play a role in the interpretation of a reflexive not only in a biclausal sentences, but also in discourse binding. Moreover, the clause-mate verb’s effect is exactly the same in discourse binding as within-sentence binding: the interpretation of *caki* is modulated by the type of clause-mate verb, whereas *caki-casin* does not show any such sensitivity.

To sum up, this section has discussed ways of differentiating the two Korean reflexives, *caki* and *caki-casin*, by looking at the location of a potential antecedent, and by looking at whether semantic properties of the clause-mate verb influence the interpretation of the reflexive. Table 2.1 below summarizes this.

<table>
<thead>
<tr>
<th>Table 2.1 Interpretations of caki and caki-casin</th>
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<tr>
<td><strong>Local Antecedent</strong></td>
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<td>Permitted, disfavored</td>
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<td><strong>Long Distance, within sentence Antecedent</strong></td>
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<td>Discourse antecedent</td>
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<td><strong>Within-sentence binding sensitive to clause-mate verb</strong></td>
</tr>
<tr>
<td>Discourse antecedent sensitive to clause-mate verb</td>
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</table>
As Table 2.1 clearly shows, the two Korean reflexives, caki and caki-casin, have different binding properties. In particular, caki-casin patterns like English reflexives in that it is affected by only a syntactic factor (i.e., antecedent domain) for the selection of an antecedent; however, caki is affected by both syntactic and semantic factors (i.e., semantic properties of the clause-mate verb).

There have been various attempts to give an adequate account of Korean reflexives. In particular, the attempts have concentrated on the status of caki, whose pattern of antecedent interpretation is different from the pure reflexives in English. Even though no unified account has yet been offered, by and large, these approaches to the problem of caki can be divided into four groups. In the first approach, caki is treated as a LD reflexive, under Principle A of Binding Theory (Gill, 2005; Kim, 1999; Progovac, 1993; Sohng, 2004; Yang, 1989). The second approach treats caki as a pronoun like s/he in English in that it can freely take an antecedent beyond the sentence (Cole, Hermon, & Sung, 1990). The third treats caki as a pronominal anaphor that has both pronominal and anaphoric features. The main thrust of this argument is that caki is a reflexive that requires an antecedent within a sentence, and at the same time, a pronoun that should be free in the minimal domain (Lee, 1987). Finally, there is an approach that treats caki as a logophoric pronoun\textsuperscript{11}, where its antecedent is the individual whose thought, speech, or point of view is represented in the sentence (Cole & Sung, 1994; Im, 1987; Yoon, 1989).

As these conflicting views demonstrate, the status of caki remains unresolved. This dissertation does not adopt any one of these four theories, although it acknowledges that caki has properties of both reflexives and pronouns. Putting the four theories aside, this dissertation

\textsuperscript{11} It has been known that logophoric pronouns are different from ordinary pronouns in terms of the syntactic rules which govern them. For example, ordinary pronouns are subject to the Binding Principle B (Chomsky, 1981) which a pronoun shouldn’t be bound in its binding domain, but logophoric pronouns allow a local antecedent (Kishida, 2011).
is restricted to whether children can discriminate between the two reflexives and the examination of their various properties.
CHAPTER III
ACQUISITION OF BINDING

This chapter reviews relevant research on the acquisition of binding in various languages in terms of the Subset Principle, a learning strategy of Universal Grammar that has received much attention in the acquisition literature on reflexives. It illustrates both compatible and incompatible findings relating to the predictions of the Subset Principle and then proposes that the Subset Principle alone does not fully account for the acquisition of binding, exploring the role of semantic properties of the clause-mate verb. It then presents a critical review of previous research on the acquisition of Korean caki and caki-casin. Finally, the issues that call for further research are discussed.

3.1 Acquisition of the Reflexive in Various Languages

3.1.1 The studies on syntactic domains: The Subset Principle. One of the core questions in the acquisition of binding is how children come to acquire the binding properties of their individual language. In order to answer this question, researchers have largely focused on identifying and accounting for the similarities and differences of the binding phenomena in various languages. One possible answer to the question, and one that is typically assumed, is that binding properties of each language are acquired through a learning strategy called the Subset Principle (Berwick, 1985; Wexler & Manzini, 1987), which holds that children first begin by acquiring the most restrictive, smallest grammar—a subset—and then broaden that
grammar to a superset when faced with positive evidence\textsuperscript{12} in the input that the target grammar is different.

With respect to the acquisition of the LD reflexive (e.g., \textit{ziji} in Chinese or \textit{caki} in Korean), one idea was that the Subset Principle “predicts that children learning Chinese or Korean should take the local antecedent for the reflexive \textit{ziji} or \textit{caki} as unmarked” (Chien, Wexler, & Chang, 1993, p. 230), and that therefore “there would be a stage in which the Korean child only chooses the local value for the antecedent of the reflexive” (Lee & Wexler, 1987, p. 4). That is, this Subset Principle predicts a developmental pattern for the acquisition of the LD reflexives: First, children seek the reflexive’s antecedent in a local domain, that is, inside the clause where the reflexive occurs, because local binding is a subset of the superset that includes LD binding. Second, if a language permits reflexive antecedents in the LD domain, children will come to accept the LD interpretation later, after their knowledge of the binding domain is changed through input.

In the case of English-speaking children, whose language allows only local binding, the binding domain remains local because input does not trigger the expansion of the domain to include LD binding. By contrast, in languages such as Chinese, Danish, Icelandic, Japanese, and Korean that allow both local and LD binding, children pass through two stages. First, there is a stage in which only local interpretations of reflexives are permitted. Second, there is a gradual broadening to permit LD interpretations as the children receive more input.

\textsuperscript{12} The Subset Principle is concerned with the role of positive and negative evidence in child language acquisition (Berwick, 1985; Wexler & Manzini, 1987). From a theoretical standpoint, it has been claimed that negative evidence is not systematically effective in language acquisition: e.g., it does not help children to correct an overgeneralized grammar (Pinker, 1989; Wexler, 1978; Wexler & Culicover, 1980, among many others). The more relevant source of language data is positive evidence alone. In terms of acquisition of the reflexive with respect to the Subset Principle, the Lexical Parameterization Hypothesis (Manzini & Wexler, 1987) claims that what children need to learn is merely the lexical properties of individual anaphora. The binding domain for Principle A is parameterized separately for each anaphor in a given language.
However, a question arises (as noted by William O’Grady, personal communication): What if children learning these languages are exposed to the sentences exemplifying the LD interpretation from early in life? In principle, nothing rules out the possibility of resetting the parameter immediately, in which case there will be no discernible stage in which only the local interpretation is allowed.

The results of previous studies on the acquisition of binding have been mixed with respect to the predictions of the Subset Principle. While some studies’ results seem to be compatible with the Subset Principle (Chien, Wexler, & Chang 1993 on Chinese; Okabe, 2008 on Japanese), the results of others are not (Jakubowicz & Olsen, 1988 and Olsen, 1992 on Danish; Hyams & Sigurjónsdóttir, 1990 and Sigurjónsdóttir & Hyams, 1992 on Icelandic). One account for the incompatible results might be that there are other factors that interact with the Subset Principle. The next section addresses this issue.

3.1.2 Previous acquisition studies testing syntactic domains. Chien and Wexler (1990) reported that the acquisition of English reflexives follows the prediction of the Subset Principle. They conducted a series of experiments to examine children’s knowledge of the local interpretation of the English reflexive. The study consisted of three act-out tasks (two Simon-Says games and one party game), and a yes/no judgment task. In the act-out experiments, children aged 2;6 to 6;6 were asked to perform the action in the sentences they heard, which had two potential antecedents, as shown in Example (12).

(12) a. Kitty$_i$ says that Sarah$_j$ should point to herself$_{i/j}$.
    
    b. Snoopy$_i$ says that Adam$_j$ should point to himself$_{i/j}$.
Notice that the examples match the gender of the matrix subject (e.g., *Kitty*), and the embedded subject (e.g., *Sarah*), preventing the children from using gender as a cue to find the antecedent of the reflexive. The overall results of the three experiments showed that children were able to correctly select the local antecedent at a young age (3;6–4 yrs: 80% correct; 4;6–5 yrs: 90% correct) and that, by around age 6, this learning was completed.

In the subsequent yes/no comprehension judgment experiment, children were presented with a picture and then asked a comprehension question, as in example (13) and Figure 3.1.

(13) This is Mama Bear; this is Goldilocks.

Is Mama Bear touching *herself*?

*Figure 3.1.* Sample picture from Chien and Wexler (1990).

The results showed that even 3-year-olds responded correctly at high rates (negative target response: 96.97%; positive target response: 92.80%). That is, the results of both the act-out tasks and the comprehension task demonstrated that children know that the English reflexive selects the antecedent in a local domain from around the age of 3 years, which suggests that children first begin by generating the smallest grammar, in this case, the grammar that permits only a local antecedent.

In a similar vein, Otsu (1981) found that English-speaking children rely on structural relations (i.e., c-command) to find the antecedent. He conducted a study in which 60 English-
speaking children aged 3;1–7;1 completed an act-out task. The children heard short stories and were asked to use toys to perform an action from the story (i.e., “Show me who tickled who”). A test sentence from the experiment is given in (14).

(14) *The elephant, next to the hippo, tickled himself.*

In the sentence, there are two possible antecedents of the reflexive: *the elephant* and *the hippo*. The children manifested a strong tendency (71%–83% of the time) to choose the subject NP as the antecedent of the reflexive, which suggests that their interpretation of the reflexive is adult-like (Otsu, 1981). Essentially, this shows that children ignore the linearly closer antecedent, and pick the antecedent that c-commands the reflexive, thereby obeying the structural constraints on binding.

Children’s adult-like knowledge in interpreting the antecedent of the English reflexive has also been attested from studies using on-line, time-sensitive techniques. Two recent eye-movement-during-listening studies examined children’s on-line comprehension of the English reflexive. First, Sekerina, Stromswold, and Hestvik (2004) tested 16 English-speaking children aged from 4;9 to 7;10 to examine children’s on-line comprehension of the English reflexive. In the experiment, which employed a forced-choice picture selection task, participants heard four sentences, as in (15). They were then shown two pictures (see Figure 3.2), one that depicted the sentence-internal referent interpretation and another that depicted the sentence-external referent interpretation, and were asked to point out the picture that correctly described the situation in the sentence they had heard.
Preamble: In these pictures, you see a boy, a man and a box.

Fixation: Now look at the cross.

Request: Now point to the picture where the boy has placed the box behind himself.

Follow-up: Now point to the boy with the cap on.

Figure 3.2. Sample picture from Sekerina, Stromswold, and Hestvik (2004).

Pointing responses and eye movements in the picture selection task were analyzed. The results of the analysis of pointing responses revealed that the children overwhelmingly preferred the local antecedent (i.e., the boy) in 94% of the cases (adults: 97%). The analysis of the eye-movement data compared the proportion of fixations on the picture consistent with the sentence-internal interpretation to the proportion of fixations on the picture consistent with the sentence-external interpretation. For the children, the percentage of fixations on the picture showing the local antecedent at the critical region (2475 ms), which begins at the onset of the reflexive, was 61%, while for adults it was 65%. The region was further divided into two segments—segment I: 2475-3475ms and segment II: 3475-4475ms. The proportion of correct fixations to the local antecedent during the first segment was 57% and during the second segment was 62% (adults: 63% and 69% respectively). All in all, the results of the analysis of the children’s moment-by-moment processing revealed that although the children read slowly,
they were able to correctly interpret the reflexive, indicating that children’s on-line processing of the reflexive is adult-like.

Clackson, Felser, and Clasher (2011) conducted an online processing experiment with 40 English-speaking children aged 6 to 9. In the study, a sentence accompanied by a picture was presented to the children, as shown in (16) and Figure 3.3.

(16)  *Peter,* was waiting outside the corner shop. He watched as *Mr. Jones* bought a huge box of popcorn for *himself* over the counter.

*Figure 3.3. Sample picture from Clackson, Felser, and Clasher (2011).*

The test sentences in (16) contain two potential antecedents for the reflexive *himself*, the non-local antecedent *Peter* and the local antecedent *Mr. Jones*. Of the two antecedents, the former does not satisfy the c-command relation in respect to the reflexive, while the latter does. The study analyzes the children’s eye fixations on the two possible antecedents when they hear the reflexive, during a time window of 0 ms to 1800 ms. The children seemed to temporarily consider the non-local competitor as the possible antecedent for the reflexive, with their looks during the first 700 ms going to the picture of *Peter* in response to hearing the reflexive. However, after 700 ms, their looks to the local antecedent, *Mr. Jones*, increased remarkably and remained stable through the rest of the time window of the target region. Considering the children’s ultimate interpretation with regard to the reflexive, they were apparently sensitive to
the locality component of Principle A—the English reflexive takes an antecedent within the same minimal clause.

The Subset Principle has also been attested with children whose native languages allow LD interpretation for reflexives. Okabe (2008) conducted an experiment with 28 Japanese-speaking children (age 4 to 6) and 5 native adult control to test whether they could interpret sentences containing the LD reflexive zibun ‘self’ in an adult-like way—allowing both antecedents, but preferring the interpretation with the LD antecedent. The study employed a Truth Value Judgment Task (Crain & Thornton, 1998, henceforth, TVJT) with two different types of stories: LD antecedent–favoring stories and local antecedent–favoring stories. Short picture-stories were presented to the children and then followed by a test sentence, such as that in (17).

(17) Buta-wa_i[[kuma-ga_j zibun-no_i,s_j keeki-o
Pig-TOP bear-NOM self-GEN cake-ACC

tabe-ta]-no]-o
mi-ta.
eat-PST-ACC see-PST

‘The pig i saw that the bear_j ate self's_i,s_j cake.’

For (17), the LD antecedent-favoring story displayed the bear eating the pig’s big cake while the pig was looking at the scene; the local antecedent-favoring story showed the bear eating his own cake while the pig was looking at the scene. Overall, the study’s results showed that in interpreting the reflexive zibun, the children accepted the two readings at different rates for the

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13 This is one of the experiments in Okabe’s dissertation, which explored the acquisition of biclausal structures in Japanese. Although the main focus of the dissertation was not to examine children’s comprehension of the LD reflexive, their sensitivity to the LD binding properties of the reflexive zibun ‘self’ in biclausal constructions was investigated.
two different types of stories (i.e., for LD antecedent–favoring stories, the children chose the
LD antecedent 71% of the time; for local antecedent–favoring stories, they chose the local
antecedent 93% of the time). Based on the study’s results, Okabe (2008) argued that the
children had a slight bias toward the local antecedent over the LD antecedent for zibun.

However, what is also noteworthy is the data from adults: Okabe further suggested a
parallel adult preference for the local antecedent over the LD antecedent, based on the data from
the five adults. They favored the LD antecedent 80% of the time for LD subject–favoring stories,
and the local antecedent 100% of the time for local subject–favoring stories. Although the
number of adults is not large enough to make a generalizable claim based on their data, the
result is attention-grabbing because zibun is generally thought to have an LD antecedent
preference (Abe, 1997; Katata, 1991). It is therefore surprising that the adults manifested a local
antecedent preference for zibun, which is expected to take the LD antecedent. In fact, the adults’
local antecedent preference found in this experiment suggests that the same preference on the
part of Japanese children says nothing about whether the children first pass through a stage in
which they are more restrictive, accepting only the local binding of reflexives, and then progress
to a stage in which they accept the non-local setting. Accordingly, for these reasons, it is unclear
whether the results reported for Japanese children support the Subset Principle.

Children’s preference for the local antecedent was also attested in a study by Chien,
Wexler, and Chang (1993). They investigated the acquisition of the Chinese LD reflexive ziji
‘self’ with 80 Chinese children between the ages of 3 and 8. See (18) and Figure 3.4, for an
example of test items.
A yes/no judgment task was followed by the test sentences: The children saw cartoon pictures, and then they were expected to answer “yes” or “no” to a question about the picture (e.g., “Mickey mouse dreamed that Gorilla is holding self’s picture, yes or no?”). The results showed that the children strongly accepted the local interpretation about 75% of the time and they accepted the LD interpretation about 41% of the time, showing the preference for the local interpretation.

However, the adult controls in Chien, Wexler, and Chang’s study also preferred the local interpretation (87%) over the LD interpretation (39%). This parallel adult result suggests that we cannot attribute children’s performance to a delay in setting the parameter. In fact, the strong preference of adults for a local antecedent for \textit{ziji} is quite curious in that \textit{ziji} is generally thought to be an LD reflexive, with a strong preference for the LD interpretation over the local...
interpretation. That is, as in Okabe’s (2008) study, the local antecedent preference in children is due to universal constraints on the binding of reflexives or not remains an open question.

Su (2004) also investigated the acquisition of the Chinese LD reflexive ziji ‘self’. She conducted a TVJT with 25 native Chinese children aged 4;2–5;6, along with adult native speakers as controls. Su reported the same strong local preference both in children and adults, where the children had a significantly lower acceptance rate (4%) for the LD antecedent than the adults (27%). However, the acceptance rate (27%) of adults is still very low given that ziji is thought to be an LD reflexive, with a strong preference for the LD interpretation over the local interpretation. That is, still, the question with regard to the preference for the local antecedent was not answered.

A possible account for the question is there may be extraneous factors intervening in the interpretation of the LD reflexive ziji in Chien, Wexler, and Chang’s (1993) and Su’s (2004) and even in Okabe’s (2008) studies. The next section addresses this issue with a review of studies that have examined the interaction of various factors in the interpretation of reflexives. In particular, it focuses on the influence of verb meaning in the interpretation of reflexives.

3.1.3 Previous acquisition studies testing semantic factors. Studies on Danish children’s acquisition of the Danish LD reflexive sig ‘self’ provide evidence in support of the Subset Principle (Jakubowicz & Olsen, 1988) as well as evidence for the role of lexical properties of verbs in the interpretation of sig (Olsen, 1992). The interpretation of sig varies depending on the nature of the verb that occurs with the reflexive and the finiteness of the embedded clause (Jakubowicz, 1994). When sig co-occurs with a verb denoting an action that need not affect the theme argument (e.g., criticize, respect, love, talk to, point to) in a nonfinite embedded clause, it allows both the LD and the local antecedent, with the preference of the LD antecedent, and the reflexive in this case patterns like a pure pronominal. In contrast, if sig
occurs with a verb denoting an action that affects the theme argument (e.g., *wash, brush, cover, defend, protect*) in a finite embedded clause, the local interpretation of the reflexive is only legitimate and it is characterized as a pure anaphor. Consequently, Danish *sig* acts like a pronominal anaphor that has the features [+anaphoric, +pronominal] rather than a pure anaphor (Bickerton, 1987; Chomsky, 1982, among many others).

Jakubowicz and Olsen (1988) attested the prediction of the Subset Principle. They conducted a sentence picture-matching task with Danish children ages 3;0–3;5. An example of the constructions used in the experiment is given in (19).

(19) Minnie$_i$ beder$_j$ Ida om at pege på sig$_{ij}$

Minnie asks Ida to point at self

‘Minnie asks Ida$_j$ to point at self$_{ij}$.’

The results showed that although adults had a 100% acceptance for LD binding, only 7% of the children accepted the LD antecedent. This clear difference between Danish adults and children suggests that a strong local antecedent preference is initially in place in the acquisition of the Danish reflexive *sig*. The study further observed a developmental pattern as children mature, with the rate of choosing the LD antecedent increasing to 70% by age 9, an observation that supports the Subset Principle.

Olsen (1992) examined the role of the lexical constraints of verbs in the interpretation of *sig*. She tested 20 Danish children aged 3;0–9;11 with two different linguistic contexts—one context including an ‘affectedness verb’ in a finite embedded clause (i.e., only allowing a local antecedent) and the other context involving a ‘nonaffectedness verb’ in a nonfinite embedded clause (i.e., allowing both LD and local interpretations). Two elicited production tasks were
employed: Children were shown a picture that depicted an action with one of the two types of verbs, and then asked the question in (20).

(20) Hvad er det X beder Y om at göre?

‘What is X asking Y to do?’

The study found that, in the nonaffectedness verb–nonfinite embedded clause condition (i.e., allowing both LD and local interpretations), young children produced sentences with the LD sig fairly rarely (3 yrs: 5%; 4 yrs: 0%; 5 yrs: 2%). The oldest children in the study, the 9-year-olds, produced the LD sig only 30% of the time, and even adults also showed relatively low production of sentences with the LD sig (38%). In both the adults’ and the children’s data, the LD sig was replaced with a pronoun or the name of the matrix subject. In contrast, in the affectedness verb–finite embedded clause condition (i.e., only allowing a local antecedent), even children around 3 years old produced sentences consistent with the local interpretation, using sig productively (although percentages of sentences with sig varied according to the verb: e.g., comb 60%; dry 98%; shave 85%; wash 50%). These results show behavior beyond the predictions of the Subset Principle because the Subset Principle predicts children’s early local interpretation for reflexives. Note that sig was rarely used in the nonaffectedness verb–nonfinite embedded clause condition. If the Subset Principle alone had played a role, there should have been no difference in the use of sig between the two conditions.

The findings from the research of Jakubowicz and Olsen (1988) and Olsen (1992) reveal that Danish children are sensitive to structural properties as well as to the interaction of lexical verbs and finiteness in their interpretation of the reflexive sig. It is noteworthy that such syntactic and semantic interactions are also attested in the interpretation of the Icelandic reflexive sig.
In Icelandic, the verbal category of mood in the complement clause (i.e., subjunctive, infinitive, and indicative) influences the interpretation of a reflexive pronoun in that clause. For example, when the reflexive *sig* occurs with a verb such as *raka* ‘shave’ in a subjunctive or infinitive clause, it takes either an LD antecedent or a local antecedent. However, in an indicative sentence, *sig* must take a local antecedent. Example sentences are given in (21).

(21) a. Jón$_i$ segir ad Pétur$_j$ rak-i *sig$_{ij}$*

   John says that Peter shaves-SUBJ *self*

   ‘John$_i$ says that Peter$_j$ shaves self$_{ij}$.’

b. Jón$_i$ segir Pétur$_j$ ad rak-a *sig$_{ij}$*

   John tells Peter to shave-INF *self*

   ‘John$_i$ tells Peter$_j$ to shave self$_{ij}$.’

c. Jón$_i$ veit ad Pétur$_j$ raka-r *sig$_{ij}$*

   John knows that Peter shaves-IND *self*

   ‘John$_i$ knows that Peter$_j$ shaves self$_{ij}$.’

In contrast, when verbs such as *gefa* ‘give’, which create a strong bias toward an LD antecedent, are used with *sig* in a subjunctive or infinitive clause, the interpretation of *sig* that favors the LD antecedent is much stronger than it is with *raka*-type verbs, as in (22a-b); *sér* is a dative case–marked reflexive.
(22) a. Jóni segir að Péturj gefi séri sj sig disk
John says that Peter gives-SUBJ self a plate.
‘John says that Peter gives self a plate.’

b. Jóni skipandi Péturj að gefa síri sj sig disk
‘John tells Peter to give-IND self a plate.’

‘John tells Peter to give self a plate.’

Note, however, that in a case where the verb gefa is used with sig in an indicative complement clause, as shown in the sentence in (23), there is an interpretation breakdown because of two competing factors. The LD antecedent is preferred by the verb gefa, while a local antecedent is preferred with the indicative clause, making the sentence very unnatural. In this case, if the local antecedent is intended, in order to make the sentence natural, the simple reflexive sig should be replaced with the complex reflexive sjálfan sig (Hyams & Sigurjónsdóttir, 1990).

(23) Jóni séri að Péturj gef-a *sér / sjálfan sig sj sig disk
John tells that Peter gives-IND self / himself a plate
‘John sees that Peter to give himself a plate.’

Along with the lexical effects of the two different verb classes on the interpretation of sig, another property of this Icelandic reflexive is of particular interest. The LD use of sig in subjunctive or infinitive clauses is distinct in the sense that sig in the subjunctive can refer to an antecedent whose perspective or point of view is represented in the sentence, indicating that sig in the subjunctive is assigned the feature [+pronominal], making it a pragmatics-dependent logophor. By contrast, the LD binding of sig in infinitive complements is not affected by pragmatics, suggesting that it is interpreted by syntactic rules. That is, the mechanism that
governs the LD use of *sig* differs depending on whether it occurs in a subjunctive complement clause or in an infinitive clause (Maling, 1984; Reinhart & Reuland, 1993; Thráinsson, 1991).

Table 3.1 summarizes the two factors, semantic properties of the clause-mate verb and mood of the complement clause in which the verb appears, that affect the interpretation of *sig*.

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<th>Table 3.1</th>
<th>Interpretation of sig</th>
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<tr>
<td><strong>Lexical information</strong></td>
<td><strong>Mood of the complement clause</strong></td>
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<td><em>raka</em> ‘shave’ verbs</td>
<td>Subjunctive</td>
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<td></td>
<td>Infinitive</td>
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<td></td>
<td>Indicative</td>
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<td><em>gefa</em> ‘give’ verbs</td>
<td>Subjunctive</td>
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<td>Infinitive</td>
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<td>Indicative</td>
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The results of Hyams and Sigurjónsdóttir’s (1990) experiment on children’s sensitivity to the lexical properties of verbs in connection with locality variation for the reflexive *sig* are particularly interesting. This study’s participants were Icelandic-speaking children ages 2;6–6 years, divided into seven groups at six-month age intervals (i.e., G1: 2;6–2;12, G2: 3;0–3;6, G3: 3;6–3;12, G4: 4;0–4;6, G5: 4;6–4;12, G6: 5;0–5;6, and G7: 5;6–5;12). An act-out task was used to test the children on their performance with *sig* in subjunctive and infinitive sentences with strongly LD antecedent–preferring verbs such as *gefa*, as in (23).

The findings of the experiment can be summarized as follows: First, across all sentence types, most of the children in the two youngest age groups, G1 (2;6–2;12) and G2 (3;0–3;6) failed to give a response to the test sentences; the data of these groups therefore did not provide reliable results. Second, however, the children between 3;6 and 6;0 clearly showed that they preferred the LD antecedent both in a subjunctive complement clause (65% to 80% of the time)
and in an infinitive clause (65% to 85% of the time). They chose the local antecedent only 20% to 30% of the time in a subjunctive complement clause and 20% to 25% of the time in an infinitive clause. Third, as the children’s age increases, their preference for the LD antecedent in both clauses also increases. The adult control participants almost all preferred the LD antecedent for sig (90% in a subjunctive clause and 97% in an infinitive clause), suggesting that the older children’s interpretation of the reflexive sig with the LD antecedent–preferring verb is similar to that of adults, although not yet completely adult-like.

In addition to their study on children’s choice of an antecedent when an LD antecedent–preferring verb is used, Sigurjónsdóttir and Hyams (1992) examined Icelandic children’s knowledge of verbs that take either an LD or a local antecedent, such as raka. The participants were 55 Icelandic children, ages 3;3–6 years, and 10 adults as a control group. The study used both an act-out task and a modified TVJT. Although both children and adults responded similarly, their response patterns differed depending on whether the clauses containing the verbs were subjunctive or infinitive. In the subjunctive, just like adults, most of the children allowed both a local and a LD reading of sig, whereas in the infinitive, most children accepted only the local interpretation (50%–72% of the time). In the indicative, which allows the local antecedent only, 70%–100% of the responses consistently preferred the local interpretation for sig.

The studies on Icelandic children’s acquisition of the reflexive show that the Subset Principle alone is not sufficient to account for the results. Nevertheless, taken as a whole, they show that Icelandic children recognize that the choice of antecedent varies according to the particular verb, suggesting that children indeed know the significant role of semantic properties of the clause-mate verb effects in interpreting the reflexive. Furthermore, even young Icelandic children demonstrated their sensitivity to verbs’ lexical properties, interpreting sig correctly as either a pronominal anaphor or as a pure reflexive at the initial stage of grammatical development.
Numerous studies on languages that allow a reflexive to take an LD antecedent as well as a local antecedent have tried to verify whether children prefer local binding, as the Subset Principle predicts. Table 3.2 summarizes the results of the studies on children’s and adults’ interpretations for the reflexives.

Table 3.2
Results of the studies on reflexive antecedent interpretations in child and adult language

<table>
<thead>
<tr>
<th>Language</th>
<th>Interpretation of a monomorphic reflexive</th>
<th>Adults</th>
<th>Children</th>
<th>Children’s Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japanese</td>
<td>Local antecedent</td>
<td>Local antecedent</td>
<td>4:00–6:00</td>
<td></td>
</tr>
<tr>
<td>(Okabe, 2008)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chinese</td>
<td>Local antecedent</td>
<td>Local antecedent</td>
<td>3–8</td>
<td></td>
</tr>
<tr>
<td>(Chien, Wexler, &amp; Chang 1993)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Danish</td>
<td>LD/Local antecedent</td>
<td>LD/Local antecedent</td>
<td>3:00–3:05; 3:0–9:11</td>
<td></td>
</tr>
<tr>
<td>(Jakubowicz &amp; Olsen, 1988; Olsen, 1992)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Icelandic</td>
<td>LD/Local antecedent</td>
<td>LD/Local antecedent</td>
<td>4:00–6:06; 3:3–6</td>
<td></td>
</tr>
<tr>
<td>(Hyams &amp; Sigurjónsdóttir, 1990; Sigurjónsdóttir &amp; Hyams, 1992)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As summarized in Table 3.2, the previous studies suggest that the Subset Principle holds as a default but that other factors intervene. That is, there are studies showing children’s strong local binding preference, in accordance with the Subset Principle (Chien, Wexler, & Chang, 1993, for Chinese; Okabe, 2008, for Japanese). There are also studies showing that children allow LD binding according to lexical constraints (Jakubovicz & Olsen, 1988 and Olsen, 1992 for Danish; Hyams & Sigurjónsdóttir, 1990 and Sigurjónsdóttir & Hyams, 1992 for Icelandic).

Thus, one clear finding from the previous studies is this: Children are sensitive to both structural properties and semantic properties in the interpretation of reflexives. As shown in the studies with Japanese and Chinese children, structural properties play an important role in reflexive interpretation (although we discussed that a further study to control for extraneous factors is required); at the same time, as shown in the studies with Danish and Icelandic children,
semantic factors, semantic properties of the clause-mate verb, also play an important role in reflexive interpretation.

3.2 Acquisition of Korean reflexives caki and caki-casin

3.2.1 Previous acquisition studies testing syntactic factors. In line with the acquisition studies involving other languages that allow LD binding, most acquisition studies on Korean reflexives have been devoted to exploring children’s knowledge of the structural properties of the reflexives. Studies on Korean have tested (i) whether children first pass through the most restricted subset of the parameter and then progress to include the LD setting (Lee & Wexler, 1987); (ii) whether children rely on a c-command relation in their interpretation of the binding domain (Lee & Wexler, 1987); and (iii) whether children’s interpretations of the Korean reflexives are subject to the grammatical hierarchy (Cho, 1985). Most studies focus on the interpretation of caki rather than caki-casin because the LD property of caki has been considered more intriguing for testing the theoretical predictions of the Subset Principle.

Lee and Wexler (1987) investigated whether there is a stage when Korean children choose a local binding interpretation for the LD-preferring Korean reflexive caki. Lee and Wexler conducted an act-out task with native Korean-speaking children aged 3–6. An example item from the task is given in (24).

(24) Koyangi-ka\textsubscript{i} malha-ki-lul [Mary-ka\textsubscript{j} caki-lul\textsubscript{i,j}]
    cat-NOM       say-NMLZ-ACC     Mary-NOM        self-ACC
    mancy-ess-tako]  kulay-ss-tae
    touch-PST-COMP     that-PST-REP

‘The cat\textsubscript{i} said that Mary\textsubscript{j} should touch herself\textsubscript{i,j}.’
The study found that children chose the local antecedent of *caki* about 60% of the time at age 3;7 and almost 100% of the time between ages 4;7 and 6;6. On the other hand, adults chose the local antecedent (40%) less frequently than the LD antecedent (60%). Lee and Wexler claim that the results follow the predictions of the Subset Principle.

However, this claim seems to contradict their results in two ways. First, the young children made the local interpretation only 60% of the time. According to the Subset Principle, they would be expected to choose the local interpretation close to 100% of the time, because the Principle expects a stage when young children allow only a local antecedent. Second, the proportion of local antecedent interpretations gradually increases as the children get older (i.e., from 40% to 60%). However, the Principle predicts the opposite pattern of development: that children first pass through a stage in which only the local interpretation is permitted and gradually move on to allowing the LD interpretation. For these reasons, the results of Lee and Wexler’s study, counter to their argument, do not appear to provide supportive evidence for the Subset Principle.

It is also worth noting that the study suffers from a previously unnoticed methodological flaw. Sentences like the example in (24) were wrongly assumed to have a structure comparable to the biclausal English sentence given in the translation. In fact, in the Korean sentence, the nominalizer -*ki* is added to the verb *malha* ‘say’, transforming it into a noun (i.e., *malhaki* ‘speaking’). Thus, the phrase *koyangika malhakilul* is not a matrix clause and should be considered an adverbial phrase, translated as ‘according to Cat’ rather than ‘Cat said that…’ Consequently, the results of the study are based on inappropriate test sentences, and it is thus still unclear to what extent Korean children prefer the LD antecedent for the reflexive *caki*. Therefore, whether Korean children start with a local interpretation and gradually move on
to an LD interpretation or prefer the LD antecedent initially is a question that still remains unanswered.\footnote{Recently, Kim (2012) examined the acquisition of four Korean reflexives (age=6-7), \textit{caki}, \textit{casin}, \textit{caki-casin}, and pronoun \textit{casin}, with the example test sentence below:

Mickey-\textsc{nominative}, Minnie-\textsc{dative}, \textsc{[pro \textit{caki-eykey} \textsc{self-dative}] \textit{kong-ul} \textit{cwula-ko} \textit{malhay-yo}.

\textquote{Mickey told Minnie that (PRO) gave ball to self}'

The sentence has a methodological problem in that it was designed to test how children interpret an antecedent for \textit{caki}, but ultimately, it tested two factors at the same time, the controller of PRO and the antecedent of \textit{caki}. Thus, it does not give a clear picture with regard to the acquisition of binding in Korean.

Furthermore, the results of tests with potentially problematic stimuli exacerbated the issue. The study found that children’s preference varied according to the tasks. In particular, for example, the LD antecedent was preferred for \textit{caki} in Experiment 1 (the party game), while in Experiment 2 (the Simon-says game), the local antecedent was preferred for \textit{caki}; \textit{caki-casin} in Experiment 1 showed either equal LD and local antecedent preference or a slight LD antecedent preference, whereas in Experiment 2, the children preferred a local binding interpretation for \textit{caki-casin}. In sum, for these reasons, Kim’s (2012) study does not provide empirical evidence about the acquisition of binding in Korean.}

Leaving the methodological shortcoming aside, the results of the study are noteworthy in that the results of the children differ by group and differ from the results of the adults. First, the finding that the children differ by group is opposite to the prediction of the Subset Principle: The finding that younger children (at age 3;7) chose the local antecedent of \textit{caki} about 60\% of the time at age 3;7 while older children (between ages 4;7 and 6;6) almost 100\% of the time. An account of this asymmetry for the proponents of the Subset Principle would be the following: 4- to 6-years old are sensitive to the structural binding, c-command relation. Accordingly, they chose the local antecedent that c-commands \textit{caki}, while, the 3-year olds randomly chose an antecedent for the reflexive.

Second, the finding that the children (in particular, the children between ages 4;7 and 6;6) differ from the results of the adults supports the view that children draw only on syntactic factors in interpreting the Korean reflexive. In interpreting the LD reflexive \textit{caki}, adults treat \textit{caki} as a logophor, which would prefer an antecedent that provides the source of the information, rather than as a pure reflexive, leading them to be more likely to accept the LD
antecedent that does not c-command \textit{caki}. However, the children treat \textit{caki} as a pure reflexive, leading them to choose the local antecedent of \textit{caki} almost 100\% of the time.

Lee and Wexler (1987) further examined whether children’s local binding is subject to a minimal distance strategy or to a grammatical constraint with an experiment using sentences such as those in (25a-b).

(25) a. \textit{Mary-ka,} [Kom-\textit{i,j} choaha-nun] hama-eykey caki-uy\textsubscript{\textit{i,j}}
\textit{Mary-NOM} bear-\textit{NOM} like-\textit{REL} hippo-\textit{DAT} self-\textit{GEN}
sachin-lul chu-ess-ta.
picture-\textit{ACC} give-PST-\textit{SES}

‘\textit{Mary} gave a picture of herself\textsubscript{\textit{i,j}} to the hippo that the \textit{bear} likes.’

b. \textit{Mary-ka,i} caki-uy\textsubscript{\textit{i,j}} sachin-lul [Kom-\textit{i,j} choaha-nun]
\textit{Mary-NOM} self-\textit{GEN} picture-\textit{ACC} bear-\textit{NOM} like-\textit{REL}
hama-eykey chu-ess-ta.
hippo-\textit{DAT} give-PST-\textit{SES}

‘\textit{Mary} gave a picture of herself\textsubscript{\textit{i,j}} to the hippo that the \textit{bear} likes.’

In both example sentences, the LD matrix subject, \textit{Mary}, c-commands \textit{caki}, while the embedded subject, \textit{kom} ‘bear’ does not c-command \textit{caki}. These two sentences differ from each other in terms of the distance between the c-commanding antecedent and the reflexive \textit{caki}. In (25a), the c-commanding antecedent is far from the reflexive \textit{caki} due to the intervening relative clause including \textit{kom} ‘bear’. In (25b), the c-commanding antecedent is adjacent to \textit{caki}. The results of the experiment revealed that children’s tendency to choose the c-commanding subject was as high as 65\% to 80\% in items like (25a) and from 70\% to 98\% in items like (25b). This suggests
that the children looked for the antecedent of the reflexive *caki* on the basis of the c-command relation in the reflexive domain rather than of linear configuration.

Lee (1990) conducted a TVJT with biclausal sentences to examine the point at which the LD interpretation becomes available in child language. The sentence in (26) is an example.

\[(26) \text{Grand Papa-ka}_{i} \text{ Pinocchio-ka}_{j} \text{ caki-lul}_{i/j} \text{ kaliki-ess-tako} \]
\[
\text{Grand Papa-NOM Pinocchio-NOM self-ACC point to-PST-COMP} \\
\text{sayngkakhay-ss-ta.} \\
\text{think-PST-SES} \\
\text{‘Grand Papa, thought that Pinocchio}_{j} \text{ pointed to self}_{i/j}.’
\]

The results showed that children between 6;6 and 8;0 preferred the LD antecedent (60%–90%) over the local antecedent (40%–65%) for *caki* while adults mostly accepted both local and LD antecedents. Based on these results, Lee argues that the LD interpretation for *caki* comes to be accepted around age 6.

Another experiment that tests children’s syntactic knowledge with regard to the choice of an antecedent for the reflexive is Cho (1985), who explored whether children’s interpretation of *caki* interacts with the grammatical hierarchy (i.e., subject > in/direct object > genitive). It has been noted that when there are two NPs in a sentence, the NP higher in the hierarchy is more likely to be the antecedent for a reflexive (Cho, 1985; O’Grady, 1987). Cho conducted a question-answer comprehension task with 60 Korean children from ages 4;1 to 11;7. Three types of sentences (i.e., SO type: subject>object; GO type: genitive>object; SG type: subject>genitive), as in (27a-c), were used for test items, with each item followed by a question (e.g., “In whose room did it happen?”; “Who did the pushing?”).
The findings from the experiment indicated that, across the age range, the rate of correct interpretation for *caki* was higher in SO and SG types of sentences than in the GO type. This shows that *caki* is subject-oriented, as has been attested in many studies with children (C.M. Lee, 1973; D.W. Lee, 2010; Montrul, 2010, among many others).

### 3.2.2 Previous acquisition studies testing semantic factors

While a great deal of research has been conducted on syntax-associated factors in the acquisition and interpretation of the Korean reflexives, semantic factors have rarely been addressed. To my knowledge, Cho
(1992) conducted the only study to test semantic factors in the interpretation of the Korean reflexive *caki*.

The Korean reflexive *caki* has been described in the literature as susceptible to semantic factors such as the source of information or the logophoric center (Kuno, 1987; Sell, 1987; Yoon, 1989, among many others).\(^\text{15}\) Assuming this view, Cho (1992) tested the effect of logophoricity on the children’s interpretation of *caki*. She noted that the Korean reportive suffix *–tay* ‘be reported’ in the predicate makes the definite source of information anonymous. The prediction of the experiment was that when *–tay* is used, *caki* would be less likely to refer to a logophoric subject. See (28) for an example.

\[
(28) \quad \text{Koyangi-ka, malha-ki-lul [Mary-ka, caki-lul}_{i=j}^{\text{cat-NOM, say-NMLZ-ACC, Mary-NOM, self-ACC}}
\]

\[
\text{mancy-ess-tako]} \quad \text{kulay-ss-tay}
\]

\[
\text{touch-PST-COMP, that-PST-REP}
\]

‘The cat said that Mary_{j} should touch self_{i=j}.’

Cho conducted a question-answer task with native Korean-speaking children at ages 6;0–12;0. The results demonstrated that while adults preferred the LD antecedent (60%) over the local antecedent (40%), the children at ages 6;0–8;0 preferred the local binding interpretation (at rates of 60%–64%). At ages 10;0–12;0, the children’s interpretation pattern was adult-like, with the preference for the local binding interpretation reduced to 38% of the time. Cho claimed that the

\(^{15}\) In defining a logophor, whether the antecedent is the individual whose thought, speech, point of view, and so forth, is represented in the sentence or not is an important factor (Clements, 1975; Kuno, 1987). Specifically, logophoric antecedents can be categorized as SOURCE, CENTER, or PIVOT with the following characteristics (Sells, 1987, p. 457):

- **SOURCE**: one who is the intentional agent of the communication;
- **SELF**: one whose mental state or attitude the content of the preposition describes; and
- **PIVOT**: one with respect to whose (space-time) location the content of the proposition is evaluated.
local antecedent preference observed in the experiment can be attributed to children’s insensitivity to logophoricity, making the logophoric subject a less likely referent for caki.

However, this experiment has some flaws. First, as in Lee and Wexler’s (1987) study, the stimuli used in the experiment are not biclausal sentences. As already discussed, these test sentences should be considered monoclausal sentences including an adverbial phrase. Second, the results are compatible with the prediction of the Subset Principle. Thus, once again it is difficult to say whether the results are a reflection of the Subset Principle or of logophoricity.

3.2.3 Evaluation. Sections 3.2.1 and 3.2.2 critically reviewed the existing studies on the acquisition of Korean reflexives. In sum, first, previous research has focused more on syntactic aspects (i.e., the Subset Principle, which is the learning principle of UG; c-command relations; and grammatical relations) and less on semantic aspects of the reflexives. Second, previous research has focused more on caki and less on caki-casin. In contrast, this dissertation focuses on issues that previous research has largely ignored—children’s ability (i) to use semantic properties of the clause-mate verb in the interpretation of Korean reflexives and (ii) to distinguish caki and caki-casin. This section discusses why focusing on these issues is of theoretical interest.

As already discussed, there have been almost no studies that systematically test whether children’s interpretation of Korean reflexives is affected by semantic properties of the clause-mate verb even though, as has been pointed out in the literature, the interpretation of Korean reflexive caki is also affected by syntactic considerations (see Chapter 2). A question arises as to whether native Korean-speaking children can use semantic properties of the clause-mate verb in the interpretation of reflexives, as Danish- and Icelandic-speaking children have been shown to do. At first glance, the prediction that Korean-speaking children can use semantic properties of the clause-mate verb just like Danish- or Icelandic-speaking children seems reasonable.
However, a notable difference between Danish/Icelandic and Korean is in their word order: SVO and SOV, respectively. That is, when processing a biclausal sentence, Icelandic/Danish-speaking children encounter the verb before they come upon the reflexive pronoun, while Korean-speaking children encounter the reflexive before they come upon the verb. See (29a-b) below.

(29) a. Sub(matrix) Sub(embed) reflexive verb (embed) Verb(matrix)

John-NOM Peter-NOM self-ACC push-PAST-COMP said

‘John said that Michael beat self.’

b. Sub(matrix) verb(matrix) sub(embed) verb (embed) reflexive

Jóni segir ad Péturj gef-i sér i>j disk
John says that Peter gives-SUBJ self a plate.

‘John says that Peter gives self a plate.’

Korean speakers must interpret caki before they encounter an LD-favoring verb like mil- ‘push’ in (29a), while Danish and Icelandic speakers process sig after they encounter an LD-favoring verb like gefa ‘give’ in (29b). That is, native Korean-speaking children arguably syntactic domain information (e.g., both LD subject and local subject are identified as potential antecedents) before encountering the clause-mate verb whose semantic properties can influence the choice of antecedent. In contrast, native Danish- or Icelandic-speaking children first process the semantic properties of the clause-mate verb that affects the interpretation of the reflexive, and then process the syntactic domain information in the reflexive. No reanalysis takes place in Danish- or Icelandic-speaking children’s processing of reflexives. However, reanalysis may be
necessary in Korean-speaking children’s processing of reflexives, if the children make an initial
decision on the interpretation of the reflexives and the semantic properties of the following
clause-mate verb is not compatible with their initial decision.

Trueswell, Sekerina, Hill, and Logrip (1999) reported that children have little or no
ability to revise initial parsing commitments. If native Korean-speaking children make an initial
decision on the interpretation of *caki*, and the semantic properties of the following clause-mate
verb is not compatible with that decision, can the children revise their initial commitment? No
study to date has investigated to what extent children who are native speakers of SOV languages
use semantic properties of the clause-mate verb for the interpretation of reflexives.

Second, there is little research on *caki-casin*, as opposed to *caki*, in the acquisition
literature. A question arises as to whether children can come to know the difference between
*ca*ki and *caki-casin* in biclausal sentential binding and discourse binding. It is noteworthy that
the two forms look similar at the surface level. Crucially, children experience infrequent
exposure to *caki* and *caki-casin* in either biclausal sentential binding or discourse binding
contexts. A search of the Child Language Data Exchange System (CHILDES) database
(MacWhinney, 2000) revealed no utterances that contained either *caki* or *caki-casin* in
caregivers’ speech.16 If the child learns from the input, they need some input, and as CHILDES
shows, there is no input (at least with respect to reflexives). This strongly indicates that the
chances of finding an antecedent bias being induced by the input are very low. So how does the
child even form a generalization? And if they do, surely they must do so late in their
development because of the paucity of data.

Two questions shed light on language development and language acquisition. The first
question is concerned with whether children’s reflexive interpretation patterns are the same
across languages. If the patterns are the same (regardless of languages), native Korean-speaking

16 However, as discussed previously, I acknowledge that the sample size is very small.
children at ages 4–6 should show the same sensitivity to semantic factors as Icelandic-speaking children at ages 4–6 (Hyams & Sigurjónsdóttir, 1990; Sigurjónsdóttir & Hyams, 1992). The second question is concerned with whether native Korean-speaking children at ages 4–6 come to know the properties of *caki* and *caki-casin* in spite of infrequent input exposure.

The next section explains research questions and the predictions of the present study. It also explains how this research experimentally investigates the research questions (i.e., whether the interpretations of *caki* vs. *caki-casin* are subject to syntactic and semantic factors).
CHAPTER IV

PRESENT STUDY

This chapter first outlines the motivation for this study, and then presents specific research questions and hypotheses. Section 4.1 concerns the motivation for this dissertation. Section 4.2 presents research questions and hypotheses.

4.1 Motivation for the Dissertation

The dissertation aims to provide new experimental data on native Korean-speaking children’s interpretation of Korean reflexive pronouns in biclausal sentences and in discourse. In particular, it examines the influence of two factors on the reflexives’ interpretation. The first is the type of reflexive (caki vs. caki-casin), focusing on the domain within which the reflexives are interpreted. In addition to investigating whether Korean children know the distinct properties of caki and caki-casin, as described in Chapter 2, the dissertation explores whether the interpretation of caki (but not caki-casin) is influenced by semantic properties of the clause-mate verb. That is, the preference to take an antecedent can be modulated by the meaning of a verb in the embedded clause or not. Hence, in order to investigate whether native Korean-speaking children use semantic properties of the clause-mate verb for the interpretation of caki vs. caki-casin, the effect of the choice of clause-mate verb, of which three types are investigated: (i) verbs that seem to favor reflexive antecedents that are outside the clause, such as the subject of a main higher clause, or a discourse topic outside the sentence (henceforth, distant antecedent–biased verbs [DAV]); (ii) verbs that favor a local antecedent that is a subject in an embedded clause in a biclausal sentence (henceforth, local antecedent–biased verbs [LAV]); and (iii) some verbs that impose no preference for either an LD antecedent or a local antecedent (henceforth, neutral verbs).
Although it has been reported that semantic properties of the clause-mate verb plays an important role in children’s interpretation of the reflexive (e.g., Hyams & Sigurjónsdóttir, 1990; Olsen, 1992; Sigurjónsdóttir & Hyams, 1992), such factors have not been systematically tested with respect to the interpretation of reflexives by native Korean-speaking children. Lastly, I also investigate to what extent the patterns of children’s reflexive interpretations are different from the patterns of adults’ interpretations.

4.2 Research Questions and Hypotheses

The specific research questions motivating the present study are as follows:

1) Does the type of reflexive (i.e., caki vs. caki-casin) affect the reflexive interpretation in a biclausal sentence and in a discourse in native Korean-speaking children?

2) Does the type of clause-mate verb (i.e., DAV vs. LAV) induce a particular bias towards the choice of one or the other antecedent in native Korean-speaking children?

3) Do native Korean-speaking children have the same interpretation as adults for caki and caki-casin?

This dissertation hypothesizes that children are adult-like in the interpretation of reflexives, with respect to two factors: (i) reflexive type in a biclausal sentence and in discourse and (ii) choice of clause-mate verb. The following shows the hypothesis and prediction based on each factor.
• Factor 1: Reflexive type

- Hypothesis: Children are like adults in the interpretation of reflexives. The effect of reflexive type will be evident in the children’s choice of an antecedent in biclausal sentences and in discourse.

- Prediction: If the hypothesis is confirmed, children will know that the two reflexives are distinct from one another in terms of locality; all other things being equal, their interpretation of caki will allow either a LD (main clause subject in a biclause; extrasentential discourse topic) or a local antecedent, whereas their interpretation of caki-casin will allow only a local antecedent both in sentence-level binding and in discourse-level binding, as shown in Table 4.1.

<table>
<thead>
<tr>
<th>Reflexive type</th>
<th>Caki</th>
<th>LD antecedent</th>
<th>Local antecedent</th>
</tr>
</thead>
<tbody>
<tr>
<td>(neutral verbs)</td>
<td>caki-casin</td>
<td>*</td>
<td>✓</td>
</tr>
</tbody>
</table>

*Note. ✓ = possible; * = impossible

• Factor 2: Lexical effect (the choice of a clause-mate verb)

- Hypothesis: Children are like adults in the interpretation of reflexives. The effect of the clause-mate verb will be evident in children’s choice of antecedent for caki, but not caki-casin.

- Prediction: If the hypothesis is confirmed, caki will favor a LD antecedent (main clause subject in a biclausal sentence; extra-sentential discourse topic) with a DAV and a local antecedent with a LAV. In contrast, caki-casin will always take a local antecedent. These predictions are summarized in Tables 4.2 and 4.3.
Table 4.2  
**Possibility of a LD antecedent (i.e., main clause subject in a biclause; extra-sentential discourse topic)**

<table>
<thead>
<tr>
<th></th>
<th>caki</th>
<th>caki-casin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distant antecedent–biased verbs (DAV)</td>
<td>✓</td>
<td>*</td>
</tr>
<tr>
<td>Local antecedent–biased verbs (LAV)</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

*Note.* ✓ = possible; * = impossible

Table 4.3  
**Possibility of a local (clause-mate) antecedent**

<table>
<thead>
<tr>
<th></th>
<th>caki</th>
<th>caki-casin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distant antecedent–biased verbs (DAV)</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Local antecedent–biased verbs (LAV)</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

*Note.* ✓ = possible; * = impossible

To test each of these three hypotheses, two sets of TVJT experiments were designed. The first set of experiments examines sentence-level binding by using biclausal test sentences; the second set examines discourse-level binding by using pairs of monoclausal test sentences, in particular types of contexts. Specifically, Experiments 1 and 2 examine the interpretation of the reflexive type (*caki* vs. *caki-casin*) in two distinct discourse contexts (distant antecedent–favoring context vs. local antecedent–favoring context). The details and results of these experiments are presented in Chapter 6. Experiments 3 and 4 test the interaction of reflexive types and verb types (distant antecedent–biased verbs vs. local antecedent–biased verbs), again in two different discourse contexts (distant antecedent–favoring context vs. local antecedent–favoring context). The details and results of these experiments are presented in Chapter 7. The verbs used in the experimental stimuli were categorized into the three verb types based on the results of an
acceptability judgment task with native-speaker adults \((n = 32)\), which is presented in Chapter 5.

A summary of the experimental design is presented in Table 4.4.

<table>
<thead>
<tr>
<th>Experiment</th>
<th>Binding domain</th>
<th>To be tested in each experiment</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sentence-level</td>
<td>• Reflexive type ((caki \text{ vs. } caki\text{-casin}))</td>
<td>TVJT</td>
</tr>
<tr>
<td>2</td>
<td>Discourse-level</td>
<td>• Reflexive type ((caki \text{ vs. } caki\text{-casin}))</td>
<td>TVJT</td>
</tr>
<tr>
<td>3</td>
<td>Sentence-level</td>
<td>• Reflexive type ((caki \text{ vs. } caki\text{-casin})) (\text{ and }) Verb type (DAV vs. LAV)</td>
<td>TVJT</td>
</tr>
<tr>
<td>4</td>
<td>Discourse-level</td>
<td>• Reflexive type ((caki \text{ vs. } caki\text{-casin})) (\text{ and }) Verb type (DAV vs. LAV)</td>
<td>TVJT</td>
</tr>
</tbody>
</table>
Chapter 5 presents a norming study that was conducted in order to inform the selection of the verbs (i.e., distant antecedent-biased verbs, local antecedent-biased verbs, and neutral verbs) used in the experimental items.

5.1 A Norming Study: Determining Verb Types

5.1.1 Design. As illustrated in Chapter 2, the meaning of the clause-mate verb influences the choice of an antecedent of caki (Cho, 2006; Choi & Kim, 2007; Han & Storoshenko, 2012). This chapter introduces the design and results of an acceptability judgment task (AJT) that investigates which verbs pattern as distant antecedent verbs, which pattern as local antecedent verbs, and which verbs pattern as neutral verbs.

The AJT crucially capitalizes on a feature of caki that restricts the reference of its antecedent to third person subjects (Choi & Kim 2007; Kang, 1998; Kim & Yoon, 2008). For example, in a bi-clausal sentence in which one subject is third person and the other subject is first person, caki takes the third person subject only, no matter whether it is the matrix or embedded subject.
(30) a. 3rd person matrix subject and 1st person embedded subject

Sheep-NOM I-NOM  self-ACC  push-PST-COMP  say-PST-SES

‘Sheep_i said that I_j pushed self_ij.’

b. 1st person matrix subject and 3rd person embedded subject

I-NOM  Sheep-NOM  self-ACC  push-PST-COMP  say-PST-SES

‘I_i said that Sheep_j pushed self_ij.’

In (30a-b), the only eligible antecedent for caki is yang ‘sheep’, the third person subject. Thus, caki refers to the LD antecedent in (30a) and to the local, clause-mate antecedent in (30b). However, note that the verb milta ‘push’ in the embedded clause in (30a-b) strongly encourages an LD antecedent interpretation – it is pragmatically less likely that someone would push themselves, and so a local antecedent is dispreferred. A difficulty in processing is expected in (30b) because the verb milta ‘push’ encourages the LD antecedent interpretation, while the only possible interpretation is the clause-mate antecedent. Thus there are at least two non-syntactic factors that influence the selection of antecedent of caki: third person restrictions, and pragmatic preference for a local vs. long distant antecedent.

This fact allows us to strategically manipulate the person features of the matrix and embedded subjects to probe the antecedent preference of the verb. For example, if the matrix subject is third person and the embedded subject is first person, then a sentence with a verb that favors an LD antecedent (DA V) will be judged as highly acceptable, while a sentence with a verb that favors a local antecedent (LA V) will be rated low because the local antecedent is in the first person and is not a possible antecedent. Conversely, when the matrix subject is in the first person and the embedded subject in the third person, then a sentence with a verb that favors an
LD antecedent will be rated very low because that matrix (first person) subject is not a permissible antecedent. However, a sentence with a verb that favors the local antecedent will be rated as highly acceptable because the local antecedent is in the third person and is a possible antecedent. For example, if a verb prefers an LD antecedent (i.e., DAV), the acceptability rating will be high when the LD subject is third person while it will be low when the LD subject is first person. If a verb prefers a local antecedent (i.e., LAV), the acceptability rating will be high when the subject of the embedded clause is third person, but low when the subject of the embedded clause is first person. If a verb is neutral in taking an LD or local antecedent, the acceptability rating will be high regardless of whether the third person subject is in a matrix position or an embedded position. That is, the AJT ratings classify DAV, LAV, and neutral verbs.

Table 5.1 summarizes the norming study’s conditions, which vary the person of the matrix subject and the embedded subject in biclausal sentences with DAV, LAV, and neutral verbs.
Table 5.1
Outline of the norming study

<table>
<thead>
<tr>
<th>Verb type</th>
<th>Person in the matrix subject and in the embedded subject</th>
<th>Expected results (acceptability)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAV</td>
<td>3rd-1st condition</td>
<td>Highly acceptable compared to that of 1st-3rd condition</td>
</tr>
<tr>
<td></td>
<td>1st-3rd condition</td>
<td>Less acceptable compared to that of 3rd-1st condition</td>
</tr>
<tr>
<td>LAV</td>
<td>3rd-1st condition</td>
<td>Less acceptable compared to that of 1st-3rd condition</td>
</tr>
<tr>
<td></td>
<td>1st-3rd condition</td>
<td>Highly acceptable compared to that of 3rd-1st condition</td>
</tr>
<tr>
<td>Neutral verbs</td>
<td>3rd-1st condition</td>
<td>Equally highly acceptable in both 3rd-1st condition and</td>
</tr>
<tr>
<td></td>
<td>1st-3rd condition</td>
<td>1st-3rd condition</td>
</tr>
</tbody>
</table>


5.1.2 Participants. A total of 32 native Korean adult speakers (age range = 21 to 27) participated in the experiment. All were college students recruited from universities in Seoul, South Korea.

5.1.3 Materials. Two types of bi-clausal sentences including accusative-marked caki in the embedded clause were used as test items: third person LD matrix subject with first person local embedded subject (henceforth, 3rd-1st condition) and first person LD matrix subject with third person local embedded subject (henceforth, 1st-3rd condition), as in (30a-b). Ten verbs (i.e., milecwuta ‘push’, tulecwuta ‘lift’, ccochakata ‘chase’, swumta ‘hide’, pyencanghata ‘disguise’, kkwumita ‘make up’, kulita ‘draw’, kalikhita ‘point’, anta ‘hug’, and kkocipta ‘pinch’) were used in both sentence types, which created 20 experimental items. In addition to the 20 test items, there were two practice items and 40 fillers. The 40 filler items consisted of

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There are some other possible verbs besides the ten used in the experiment that could be used to test how verbs influence the selection of an antecedent for a reflexive. However, I selected the verbs that were judged to be familiar to young children (Lee, Kwon & Jeong, 1980).
20 acceptable sentences and 20 unacceptable or low-acceptability sentences for a balance with the test items. A complete set of all test items can be found in Appendix A.

The presentation of the test items was randomized. Two versions of the AJT were created, with the order of the items in one reversed in the other. Half of the participants were given the sentences in the initial randomized order, while the other half were given the sentences in reversed randomized order. A six-point Likert scale was used for the acceptability ratings. An example of a target sentence used in the experiment is shown in (31):

Sheep-NOM I-NOM self-ACC push-PST-COMP say-PST-SES

‘Sheep i said that I pushed self i*j.’

Very unnatural

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Very unnatural</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

18 Two sets of filler items are seen in (i) and (ii).

(i) a. Ku sensayngnim-un haksayng-i motwu hwullyungha-tako sayngsakhay-ss-eyo
the teacher-TOP students-NOM all good-COMP think-PST-SES
‘The teacher thought all the students were good.’

b. */? Ku sensayngnim-un haksayng-i hwullyungha-tako motwu sayngsakhay-ss-eyo
the teacher-TOP students-NOM all good-COMP all think-PST-SES
‘The teacher thought all the students were good.’

(ii) a. Chelswu-nun hyeng-hanthey yeyppun khatu-lul ponay-ss-eyo
Chelswu-TOP brother-DAT pretty postcard-ACC send-PST-SES
‘Chelswu sent a pretty postcard to the brother.’

b. ? Chelswu-nun hyeng-ul yeyppun khatu-lul ponay-ss-eyo
Chelswu-TOP brother-ACC pretty postcard-ACC send-PST-SES
‘Chelswu sent the brother a pretty postcard.’

Of the four example fillers, (ia) and (iia) are acceptable sentences. However, in particular, the sentence in (ib) has low acceptability or is unacceptable due to the mismatch of agreement between the quantifier motwu ‘all’ and its antecedent ku sensayngnim-un ‘the teacher’. (iib) is a double object construction, which is allowable in Korean, but less acceptable than the dative construction in (iia).
5.1.4 Procedure. The AJT was a “paper and pencil” type test in which the sentences to be judged were presented to the participants as a whole. The participants were individually tested in a quiet room. They read instructions explaining the goal and the procedure of the experiment, and then completed two practice trials. They were then given the list of sentences and asked to rate the naturalness of each sentence on a scale of 1 (very unnatural) to 6 (very natural). The task lasted less than 20 minutes.

5.1.5 Results. Every participant answered consistently on the fillers, and thus no participant's data were excluded from the analysis. This section first discusses the criteria that are used to identify the three types of verbs. It then presents the results of the acceptability ratings and divides the verbs into the three types.

First, to decide what was acceptable or unacceptable, I applied 3.5 as a cut-off because it is the midpoint of the 6-point Likert scale. For the decisions on the three verb types, see Table 5.2.

<table>
<thead>
<tr>
<th>Acceptability rating</th>
<th>DAV</th>
<th>LAV</th>
<th>Neutral verbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd-1st condition</td>
<td>acceptable (over 3.5)</td>
<td>unacceptable (below 3.5)</td>
<td>acceptable (over 3.5)</td>
</tr>
<tr>
<td>1st-3rd condition</td>
<td>unacceptable (below 3.5)</td>
<td>acceptable (below 3.5)</td>
<td>acceptable (over 3.5)</td>
</tr>
</tbody>
</table>

Table 5.2 shows that (i) a verb is considered DAV when participants rated sentences involving the verb at over 3.5 (i.e., acceptable) in the 3rd-1st condition but below 3.5 (i.e., unacceptable)
in the 1st-3rd condition; that (ii) a verb is considered LAV when participants rated sentences involving the verb at over 3.5 in the 1st-3rd condition but below 3.5 in the 3rd-1st condition; and that (iii) a verb is considered neutral when participants rated sentences involving the verb at over 3.5 in both conditions. Table 5.3 shows the results.

Table 5.3
Mean ratings of the potential target verbs

<table>
<thead>
<tr>
<th>Items</th>
<th>Mean Ratings</th>
<th>Mean Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3rd-1st condition</td>
<td>1st-3rd condition</td>
</tr>
<tr>
<td>milecwuta ‘push’</td>
<td>5.1 (SD = .818)</td>
<td>2.4 (SD = .948)</td>
</tr>
<tr>
<td>tulecwuta ‘lift’</td>
<td>4.9 (SD = .963)</td>
<td>2.2 (SD = .738)</td>
</tr>
<tr>
<td>eechochakata ‘chase’</td>
<td>5.1 (SD = .734)</td>
<td>2.3 (SD = .902)</td>
</tr>
<tr>
<td>swumta ‘hide’</td>
<td>2.8 (SD = 1.078)</td>
<td>4.2 (SD = 1.221)</td>
</tr>
<tr>
<td>pyencanghata ‘disguise’</td>
<td>2.9 (SD = 1.088)</td>
<td>4.2 (SD = 1.221)</td>
</tr>
<tr>
<td>kkwumita ‘make up’</td>
<td>2.7 (SD = 1.148)</td>
<td>4.4 (SD = 1.134)</td>
</tr>
<tr>
<td>kulita ‘draw’</td>
<td>5.2 (SD = .767)</td>
<td>4.2 (SD = 1.091)</td>
</tr>
<tr>
<td>kalikhita ‘point’</td>
<td>5.1 (SD = .801)</td>
<td>4.1 (SD = 1.058)</td>
</tr>
<tr>
<td>anta ‘hug’</td>
<td>5.1 (SD = .707)</td>
<td>4.3 (SD = 1.061)</td>
</tr>
<tr>
<td>kkocipta ‘pinch’</td>
<td>5.0 (SD = .803)</td>
<td>3.8 (SD = .950)</td>
</tr>
</tbody>
</table>

Note: Rating is on a scale of 1-6 where 1 is very unnatural and 6 is very natural.

Table 5.3 indicates that the acceptability ratings differed in the two conditions according to the verbs. For example, for the verb milecwuta ‘push’, participants gave higher ratings when it was used in the 3rd-1st condition (5.1), and lower ratings when it occurred in the 1st-3rd condition (2.4), which indicates that the verb is a DAV. In contrast, for the verb kkwumita ‘make up’, the acceptability rating is 2.7 (within the range of unacceptable) for the 3rd-1st condition, but 4.4
(within the range of acceptable) for the 1st-3rd condition, which indicates that the verb is a LAV. For the verb *kulita* ‘draw’, the acceptability rating is 5.2 (within the range of acceptable) in the 3rd-1st condition, and 4.2 (within the range of acceptable) in the 1st-3rd condition, which suggests that the verb *kulita* ‘draw’ is a neutral verb. The overall results for all 10 verbs are further broken down by the three types in Figures 5.1–5.3.

![Figure 5.1 Acceptability ratings of DAV; error bars represent standard errors.](image)

As can be seen in the figure, the DAV category included three verbs: *milecwuta* ‘push,’ *tulecwuta* ‘lift,’ and *cochakata* ‘chase’. The ratings of the sentences with these verbs and a 3rd person LD antecedent are all over 3.5 (5.1, 4.9, and 5.1 respectively), whereas when the sentence has the 3rd person in the embedded subject, the acceptability ratings are 2.4 for *milecwuta* ‘push’, 2.2 for *tulecwuta* ‘lift’, and 2.3 for *cochakata* ‘chase’ (out of 6). The ratings of the sentences with a 3rd person LD antecedent and a 3rd person local antecedent were compared using a paired samples *t*-test, which shows that there is a difference in the acceptability of the DAV in the two sentence types: \( t_1(31) = 15.736; p < .001; t_2(2) = 9.945; p < .01 \).
Figure 5.2 shows the ratings of three LAV: *swumta* ‘hide’, *pyencanghata* ‘disguise’, and *kkwumita* ‘make up’. These three verbs are consistently rated below 3.5 when the sentences have a 3rd person LD antecedent (2.8 for *swumta* ‘hide’; 2.9 for *pyencanghata* ‘disguise’; 2.7 for *kkwumita* ‘make up’) and over 3.5 points when there is a 3rd person local antecedent (4.2 for *swumta* ‘hide’; 4.2 for *pyencanghata* ‘disguise’; 4.4 for *kkwumita* ‘make up’). A paired samples t-test showed a significant difference in acceptability ratings between the two antecedent conditions. It is worth noting that these verbs take a BODYPART as their direct object. Safir (1996) proposes that anaphoric dependencies denote relations (SELF and identity relation), by investigating an array of anaphoric atoms including SAME, BODYPART, OTHER, OWN, and MET(onymy) (which includes SELF). These anaphoric atoms influence the interpretation of reflexives and pronominals. For example, the English counterpart of BODYPART anaphora are “almost always considered idiomatic and which always involve an overt pronominal that is bound by a coargument” (p. 582). See (ia-c) for examples.

(i) a. John raised her/his hand.
   b. John opened her/his eyes.
   c. John batted *her/his eyes.

(Safir, 1996, p. 582, Ex.45a-c)
$t$-test confirms that there is a significant difference in the acceptability of sentences with these verbs according to where the 3rd person antecedent occurs: ($t_1(31) = -8.285; p < .001; t_2(2) = 98.271; p < .001$).

Note that the overall acceptability of LAVs seems to be lower than that of DAVs, and the difference in conditions (black versus white bars) is less than with the DAVs. This is likely to be accounted for by the property that $caki$ manifests a default preference for an LD antecedent (Choi & Kim, 2007; Yang, 1983). That is, although the LAVs in the embedded clause favor a local interpretation for the reflexive, it must compete with the LD-preferring property of the reflexive, indicating that a readjustment from the LD antecedent preference to the local antecedent interpretation is called for. This leads to the overall lower acceptability of LAVs, which take a local antecedent as the result of a process of readjustment, whereas DAVs easily take the LD antecedent. In addition, the low acceptability of LAVs also causes the rating gap between a 3rd person LD antecedent and a 3rd person local antecedent to be smaller with LAVs than with DAVs.
Figure 5.3 Acceptability ratings of the neutral verbs; error bars represent standard errors.

As shown in Figure 5.3, the ratings for the verbs in the category of neutral verbs are all over the 3.5 cut-off point. These verbs are *kulita* ‘draw’, *kalikhita* ‘point’, *anta* ‘hug’, and *kkocipta* ‘pinch’. However, a paired samples t-test shows that an LD antecedent interpretation sounds significantly more natural than a local antecedent interpretation for these verbs ($t_1(31) = 9.092; p < .001; t_2(3) = 10.976; p < .002$). This does not indicate that the verbs are in the DAV category. Rather, it reflects that *caki* is a reflexive with a slight preference for the LD interpretation (Choi & Kim 2007; Kang, 1998; Kim & Yoon, 2008). The fact that the neutral verbs are distinct from the DAV is shown in the following analysis: The ratings of the neutral verbs with a third person local antecedent condition were significantly different from those of the DAV with a third person local antecedent ($t_1(31) = 15.000; p < .001; t_2(5) = -11.360; p < .001$).^{20}

^{20} The neutral verbs are also different from the LAV: The ratings of the neutral verbs with third person LD antecedent were significantly different from those of the LAV with third person LD antecedent ($t_1(31) = 16.175; p < .001; t_2(5) = -33.824; p < .001$).
5.1.6 Discussion. Overall, the results of the acceptability rating study reveal that the acceptability ratings for the 3rd-1st and the 1st-3rd conditions differ depending on type of clause-mate verb. As expected for the DAV in the 3rd-1st condition, the participants rated these sentences as highly acceptable. By contrast, the LAV in the 1st-3rd condition was accepted at higher rates than in the 3rd-1st condition. With regard to the neutral verbs, they were rated highly in both the 3rd-1st and the 1st-3rd conditions. It is clear that in Korean, the information of the verbs interacts with the person-feature in regulating the off-line interpretation of caki, resulting in different acceptability ratings. Results from the off-line acceptability judgment task also provide evidence that in this, Korean is like Icelandic (Hyams & Sigurjónsdóttir, 1990) and a number of other European languages, which, as far as I know, had not previously been noted.
CHAPTER VI
ANTECEDENT DOMAINS

This chapter presents experiments examining children’s interpretation of the two reflexives, \textit{caki} and \textit{caki-casin}, in sentence-level and discourse conditions. Section 6.1 explores whether native Korean-speaking children’s antecedent choices differ according to reflexive types in biclausal sentences. Section 6.2 examines whether native Korean children allow extra-sentential discourse binding for the two reflexive types. The results of the two experiments are summarized and discussed in Section 6.3.

6.1 Experiment 1: Intra-sentential binding

6.1.1 Participants. Twenty-nine monolingual Korean native-speaker children (mean age $= 5;7$; age range $= 5;1-6;2$) and 30 native-speaker adult controls participated in this experiment. Data from two children, one five-year-old, and one six-year-old, were excluded from the analyses because their accuracy rates on the fillers were within the range of chance. The remaining 26 children and all 30 adult controls answered at least 10 of the 12 filler questions correctly (83%). All children were attending a kindergarten in Seoul, Korea at the time of testing.

6.1.2 Procedure. A TVJT (Crain & Thornton, 1998) was employed to test participants’ judgments on the target sentences. In the TVJT, the participants heard stories that were accompanied by pictures via PowerPoint and were then asked to decide whether a given test sentence accurately described the story, by responding ‘true’ or ‘false’. ‘True’ indicated that the statement matched the story, and ‘false’ that the statement did not match the story. Each child was tested individually in a quiet room; the entire test session for each child did not exceed 20 minutes.
6.1.3 Materials. A 2 x 2 design was created for the TVJT, varying the type of reflexive
(caki vs. caki-casin) and two contexts (LD antecedent context vs. local antecedent context). Two
contextual pairs were designed to match the long distance reading of the reflexive (LD
antecedent context) or the local reading of the reflexive (local antecedent context). For example,
for a test sentence like *Duck said that Bee pointed to self*, the LD context illustrates the *Bee*
(subject of the sentence in which the reflexive occurs) pointing to the *Duck* (the subject of the
matrix clause, and thus a more distant antecedent, see Figure 6.1). In contrast, the local
antecedent context depicts the *Bee* pointing to him/herself (see Figure 6.2). The figures also
explain what each response type, ‘true’ or ‘false’, indicates in terms of antecedent interpretation.
**LD antecedent context**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Here are Duck and Bee.</td>
<td>Bee is doing something.</td>
</tr>
<tr>
<td>Blindfolded Rupy asks Duck what is going on.</td>
<td></td>
</tr>
</tbody>
</table>

**Test sentence**


Duck-NOM Bee-NOM self-ACC pointed to-PST-COMP say-PST-SES

‘Duck, said that Bee, pointed to self,.’

**Response type and antecedent interpretation**

True = LD antecedent interpretation (i.e., Duck, said that Bee, pointed to Duck,)

False = Local antecedent interpretation (i.e., Duck, said that Bee, pointed to Bee,)

*Figure 6.1.* Sample pictures (with texts) of LD antecedent context with *caki/caki-casin.*
**Local antecedent context**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Here are Fox and Dinosaur. Dinosaur is doing something.

Blindfolded Rupy asks Fox what is going on.

**Test sentence**

Yewu-ka<sup>i</sup> konglyong-<i>j</i> caki/caki-casin-lul<sub>i</sub><i>j</i> kalihy-ess-tako malhay-ss-eyo.

Fox-NOM Dinosaur-NOM self-ACC pointed to-PST-COMP say-PST-SES

‘Fox<sub>i</sub> said that Dinosaur<sub>j</sub> pointed to self<sub>i</sub>.’

**Response type and antecedent interpretation**

True = Local antecedent interpretation (i.e., Fox<sub>i</sub> said that Dinosaur<sub>j</sub> pointed to Dinosaur<sub>j</sub>)

False = LD antecedent interpretation (i.e., Fox<sub>i</sub> said that Dinosaur<sub>j</sub> pointed to Fox<sub>i</sub>)

*Figure 6.2.* Sample pictures (with texts) of local antecedent context with *caki/caki-casin*

Thus a ‘true’ response indicated a LD antecedent interpretation in the LD context, but a local interpretation in the local context, and vice versa for false responses.

Each child was tested on a total of 26 stories: 2 warm-ups, 12 experimental stories, and 12 filler stories. The 12 experimental stories were composed of four conditions with three tokens in each. Four neutral verbs (i.e., *kulita* ‘draw’, *kalikhita* ‘point’, *anta* ‘hug’, and *kkocipta* 'speak')
‘pinch’) were used for the 12 test items, balanced for Match and Mismatch conditions. The critical and filler items were presented in a random order. Four lists were created.

6.1.4 Results. Results were analyzed in the following way. If a participant chose a ‘true’ response, s/he was considered as accepting the binding relation in the sentence exemplified by the story. A ‘false’ response was taken to mean the rejection of the binding relation in the sentence. A score of 1 was assigned to ‘true’ responses, while a score of ‘0’ was assigned to ‘false’ responses. The subjects’ responses were then averaged and a mean percentage score was calculated for each subject. Repeated measures ANOVAs and paired samples t-tests were conducted to determine the statistical significance of the data from the adult controls and the children. See Figure 6.3 for the data of the adults.

The verbs were chosen from common verbs that children know, which made it hard to find neutral verbs. I found only four such verbs. Thus, each participant encountered the four verbs three times in the test. To avoid any potential familiarity effects from multiple uses of the same verbs in a single test, different animal names were used for the three items with the same verb. In addition, the three items with the same verb in the same test varied the context and reflexive. For example, kalikhita ‘point’ was used with caki (LD context), caki (local context), and caki-casin (LD context) in List 1; caki (local context), caki-casin (LD context), and caki-casin (local context) in List 2; caki-casin (LD context), and caki-casin (local context) in List 3; and caki-casin (local context), caki (LD context), and caki (local context) in List 4.
Figure 6.3. Antecedent interpretation of *caki* and *caki-casin* depending on context (adults); error bars represent standard errors.

Figure 6.3 indicates that in the condition where the picture represented a LD interpretation, the adults accepted the LD antecedent for *caki* 91% (SD=14%) of the time, while they accepted the LD antecedent for *caki-casin* only 10% (SD=15%) of the time, suggesting that the adult native-speaker controls did not allow a LD antecedent for *caki-casin*. In the local antecedent context, the adults accepted the local antecedent 73% (SD=18%) of the time for *caki*, while they accepted the local antecedent 96% (SD=11%) of the time for *caki-casin*. In sum, overall, the adults allowed both LD interpretation and local interpretation for *caki*, but they had a slight preference for the LD interpretation (91% vs. 73 %, respectively). However, for *caki-casin*, the adults strongly favored the local interpretation.

The differences between the acceptance rates for *caki* and *caki-casin* in both contexts were analyzed with a repeated measures ANOVA: I found main effects of reflexive type ($F_1(1, 29) = 76.778, p < .001; F_2(1, 3) = 1876.223, p < .001$), context type ($F_1(1, 29) = 212.002, p < .001; F_2(1, 3) = 179.704, p < .001$), and an interaction between reflexive type and context type
\( (F_1(1, 29) = 338.490, p < .001; F_2(1, 3) = 506.336, p < .001) \). The main effects of reflexive type and context type are due to the low acceptance rate (10%) of the condition using \textit{caki-casin} and a LD antecedent context (i.e., collapsed across the contexts, acceptance rates are over 80% for \textit{caki} vs. under 60% for \textit{caki-casin}; collapsed across the reflexives, the acceptance rates are over 80% for local-antecedent contexts vs. under 60% for the LD antecedent contexts). The interaction effect comes from the fact that in the LD antecedent context, the adult participants allow (even prefer) \textit{caki} but disallow \textit{caki-casin}. A paired sample \( t \)-test, a planned comparison, was conducted to find out the extent to which the differences between the LD antecedent context and the local antecedent context with \textit{caki} (i.e., 91% vs. 73%) and between the LD antecedent context and the local antecedent context with \textit{caki-casin} (i.e., 10% vs. 96%) were significant. The difference between LD and local binding of \textit{caki} was significant (\( t_1(29) = 4.287, p < .001; t_2(3) = 11.878, p < .01 \)) and the results with \textit{caki-casin} in two contexts were significant (\( t_1(29) = -27.893, p < .001; t_2(3) = -18.642, p < .001 \)).

As for the children, the results were similar, although not quite as stark. See Figure 6.4 for the data of the children, with discussion below.
Figure 6.4. Antecedent interpretation of *caki* and *caki-casin* depending on context (children); error bars represent standard errors.

Figure 6.4 indicates that the children accepted *caki* in the LD contexts 76% (SD=20%) of the time, allowing the LD interpretation. However, their acceptance rate for *caki-casin* in the LD antecedent contexts was merely 27% (SD=16%). This shows that the children knew that LD interpretation was not allowed for *caki-casin*. In addition, the children allowed both LD interpretation and local interpretation for *caki*, showing a slight preference for the LD interpretation (76% and 60%; SD=13%, respectively), much like the adults. However, for *caki-casin*, the children had a strong preference for the local interpretation 73% (SD=16%) of the time.

A repeated measures ANOVA showed significant main effects of reflexive type ($F_1(1, 25) = 47.573, \ p < .001$; $F_2(1, 3) = 11.298, \ p = .044$) and context type ($F_1(1, 25) = 19.890, \ p < .001$; $F_2(1, 3) = 10.675, \ p = .047$), and an interaction effect between reflexive type and context type ($F_1(1, 25) = 75.393, \ p < .001$; $F_2(1, 3) = 569.247, \ p < .001$). The main effects of reflexive type and context type are due to the low acceptance rate (27%) of the condition using *caki-casin* and the LD antecedent context (i.e., collapsed across the contexts, acceptance rates are over
60% for caki vs. around 50% for caki-casin; collapsed across the reflexives, the acceptance rates are over 60% for the local antecedent context vs. around 50% for the LD antecedent context). The interaction effect comes from the fact that in the LD antecedent context the children allow (even prefer) caki, but generally disallow caki-casin. Interactions were further analyzed with a paired sample t-test. Planned comparisons reveal that the difference between LD and locally bound caki (i.e., 76% vs. 60%) was significant ($t_1(25) = 2.900, p = .008; t_2(3) = 3.323, p = .045$), which suggests the children like caki more when the LD antecedent context is given, but they also like caki when the local context is provided. Also, the difference between LD and local binding of caki-casin (i.e., 27% vs. 73%) was significant ($t_1(25) = -10.126, p < .001; t_2(3) = -9.074, p = .003$), which means that children do not allow caki-casin in the local antecedent context.

6.2 Experiment 2: Extra-sentential discourse binding

6.2.1 Participants. The participants in this experiment were a group of 31 native Korean-speaking children (mean age = 5;6; age range = 4;8–6;2) who had not participated in the previous experiment. In addition, 40 adult native speakers served as a control group in the experiment. The data of two children (both four-year-olds) were removed from the analysis due to their poor performance with filler items, leaving the data from 29 children. All the adult participants gave correct responses on filler items 100 percent of the time.

6.2.2 Procedure and materials. The materials and procedure used in Experiment 2 were identical to those of Experiment 1, except for the test sentence type. Experiment 2 investigates extra-sentential discourse binding, so one possible antecedent is the extra-sentential LD antecedent and the other is the clause-mate local antecedent. A sample set of stories for kulita’draw’ is presented in Figures 6.3 and 6.4. In Figure 6.3, there are two characters: Zebra
and Elephant. Zebra draws a picture of Elephant, and Elephant laughs heartily. The test sentence is the equivalent of ‘(Elephant laughs loudly) because Zebra drew self, where the only true reading is one which involves the antecedent of the reflexive being outside the test sentence.

<table>
<thead>
<tr>
<th>LD antecedent context</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
</tr>
<tr>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td>Zebra and Elephant are drawing a picture in an art class.</td>
</tr>
</tbody>
</table>

| **2**                 |
| ![Image](image2.png)  |
| **Test sentence**     |
| Kapcaki Khokkili-ka, kkalkkaltaymye |
| Suddenly, Elephant-NOM, joyfully |
| wus-ess-eyo. Hmm…       |
| laugh-PST-SES. Hmm…     |
| ‘Elephant, laughed joyfully.’ |
| Ellwukmal-i, caki/caki-casin-lul, wuskiey |
| Zebra-NOM self-ACC comically |
| kulyesski ttaymwun-i-lay-yo. |
| drew because-be-REP-SES |
| ‘(It was) because Zebra, drew self, comically.’ |

<table>
<thead>
<tr>
<th>Response type and antecedent interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>True = Extra-sentential LD interpretation (i.e., Zebra, drew Elephant, comically)</td>
</tr>
<tr>
<td>False = Local antecedent interpretation (i.e., Zebra, drew Zebra, comically)</td>
</tr>
</tbody>
</table>

*Figure 6.3. Sample pictures (with texts) of LD antecedent context with caki/caki-casin.*
In Figure 6.4, the story involves two characters, Penguin and Goat. Penguin draws a funny picture of himself and Goat laughs joyfully. The test sentence is the equivalent of ‘(Goat laughed) because Penguin drew self’, where the only true reading is one which involves the antecedent of the reflexive being the overt subject within the test sentence.

<table>
<thead>
<tr>
<th>Local antecedent context</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
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</table>

**Response type and antecedent interpretation**

True = Local antecedent interpretation (i.e., Penguin, drew Penguin, comically)

False = Extra-sentential LD interpretation (i.e., Penguin, drew Goat, comically)

*Figure 6.4. Sample pictures (with texts) of local antecedent context with caki/caki-casin*
6.2.3 Results. In the data analysis, the mean proportions of ‘true’ responses from the adult controls and from the children were calculated. The data of the adults is shown in Figure 6.5.

Figure 6.5. Antecedent interpretation of caki and caki-casin depending on context (adults); error bars represent standard errors.

Figure 6.5 shows that adults accepted caki in the LD antecedent contexts 80% (SD=16%) of the time, allowing the extra-sentential LD interpretation. However, they rarely accepted caki-casin in the LD antecedent contexts (acceptance rate = 10%; SD=15%), which indicates that the LD interpretation was not allowed for caki-casin. In addition the acceptance rate for caki in the local antecedent contexts was only 70% (SD=19%) of the time, suggesting that it genuinely does allow two readings (the local interpretation and the extra-sentential LD interpretation), and that at least some of the time, the extra-sentential LD interpretation is preferred. Caki-casin, on the other hand, seems to exclusively be a local anaphor (90%; SD=19%).

For the statistical analysis, a repeated measures ANOVA was conducted and revealed main effects of reflexive type ($F_1(1, 39) = 58.542, p < .001$; $F_2(1, 3) = 155.866, p < .01$) and
context type \(F_1(1, 39) = 164.728, p < .001; F_2(1, 3) = 157.763, p < .01\). It also showed a significant interaction effect between reflexive type and context type \(F_1(1, 39) = 322.001, p < .001; F_2(1, 3) = 1875.947, p < .001\). The main effects of reflexive type and context type are due to the low acceptance rate (10%) of the condition using \textit{caki-casin} and distant-antecedent context (i.e., collapsed across the contexts, acceptance rates are over 70% for \textit{caki} vs. around 50% for \textit{caki-casin}; collapsed across the reflexives, the acceptance rates are around 80% for local-antecedent context vs. under 50% for the LD antecedent context). The interaction effect comes from the fact that in the LD antecedent context the adult participants allow (even prefer) \textit{caki}, but disallow \textit{caki-casin}. Interactions were further analyzed with a paired sample \(t\)-test.

Planned comparisons reveal that the difference between LD and locally bound \textit{caki} (i.e., 80% vs. 70%) was significant \(t_1(39) = 3.591, p < .01; t_2(3) = 3.806, p = .032\), which means the adults had an LD binding preference for \textit{caki}. In addition, the difference between LD and local binding of \textit{caki-casin} (i.e., 10% vs. 90%) was significant \(t_1(39) = -18.735, p < .001; t_2(3) = -26.291, p < .001\), which means that the adults do not allow LD binding for \textit{caki-casin}.

Next, the results from the adult control group can be compared with the results from the children. Figure 6.6 shows the data of the children.
As the results in Figure 6.6 clearly show, while children accepted caki in the extra-sentential LD interpretation 68% of the time (SD=6%), they tended to reject caki-casin in the LD contexts: the acceptance rate in this condition was only 28% (SD=23%). This indicates that they knew that LD interpretation was not allowed for caki-casin. In addition, the children accepted the local binding of both caki and caki-casin, but at a higher rate for caki-casin (77%; SD=18%) than for caki (64%; SD=19%), showing that even in discourse binding, Korean-speaking children know the properties of the two Korean reflexives, caki and caki-casin: the former prefers the LD antecedent and the latter the local antecedent.

A repeated measures ANOVA was conducted, revealing a main effect of reflexive type ($F_1(1, 28) = 16.291, p < .001; F_2(1, 3) = 46.679, p = .006$), and of context type ($F_1(1, 28) = 50.112, p < .001; F_2(1, 3) = 13.724, p = .034$). It also showed a significant main effect by reflexive type and by context type ($F_1(1, 28) = 55.166, p < .001; F_2(1, 3) = 82.303, p = .003$). The main effects of reflexive type and context type are due to the low acceptance rate (28%) of
the condition using *caki-casin* and distant-antecedent context (i.e., collapsed across the contexts, acceptance rates are over 60% for *caki* vs. around 50% for *caki-casin*; collapsed across the reflexives, the acceptance rates are around 70% for local-antecedent context vs. under 50% for distant-antecedent context). The interaction effect comes from the fact that the children disallow *caki-casin* in the distant-antecedent context, but allow it in the local-antecedent context. Planned comparisons reveal that the difference between LD and locally bound *caki* (i.e., 68% vs. 64%) was not significant ($t_1(28) = .902, p = .375; t_2(3) = .530, p = .633$), which means that children do not have LD antecedent preference for *caki* in the discourse-binding context. It is noteworthy that the adults showed an LD antecedent preference for *caki* both in the sentence-binding and discourse-binding, while the children showed an LD antecedent preference for *caki* only in the case of sentence-internal binding. In addition, the difference between LD and local binding of *caki-casin* (i.e., 28% vs. 77%) was significant ($t_1(28) = -8.764, p < .001; t_2(3) = -6.720, p = .007$), which means that children do not allow *caki-casin* in the LD context.

### 6.3 General discussion of Experiments 1 and 2

The purpose of Experiments 1 and 2 was to test whether children interpret the two types of reflexives pronouns in different ways. Taken together, the results of these experiments revealed that Korean-speaking children have an adult-like grammar as far as the binding domains of the two Korean reflexives are concerned. Specifically, in Experiment 1, which tested sentence-level binding, the children accepted both an LD antecedent and a local antecedent for *caki*, exhibiting a preference for the LD antecedent; in contrast, in interpreting *caki-casin*, they only allowed a local antecedent. These results indicate that children have the ability to differentiate *caki* from *caki-casin*. The same trend was observed in Experiment 2, which tested discourse-binding: The children interpreted *caki* as having either an extra-sentential LD antecedent or a clause-mate local antecedent, while they interpreted *caki-casin* as having a local
antecedent. Therefore, the results of these experiments lead to the conclusion that native Korean-speaking children interpret the two types of reflexive pronouns differently, in accord with our first hypothesis.

An additional finding of the two experiments is the following: The adults showed LD antecedent preference for *caki* both in the sentence-binding and discourse-binding. However, the children showed LD antecedent preference for *caki* only in the sentence-binding. A further question arises: If the children had an LD antecedent preference for *caki* as attested in the sentence-binding, why is that preference not shown in the discourse-binding? One account may be this: It is possible that intra-sentential binding is preferable to extra-sentential binding in terms of processing, given that the distance between the reflexive and the LD antecedent is shorter in intra-sentential binding than in extra-sentential binding. Unlike adults, children do not have the processing capacity (Trueswell, Sekerina, Hill & Logrip, 1999) to allow easy searches throughout discourse (Reinhart 2006; Reuland 2011).

The preference for a sentence-internal antecedent (i.e., the local antecedent) obscures children’s LD antecedent preference for *caki* in Experiment 2. This issue—children’s processing limitation—will be discussed in Chapter 7.
CHAPTER VII
LEXICAL SEMANTIC INFORMATION OF VERBS

The aim of Experiment 3 and 4 was to explore whether semantic properties of the clause-mate verb are at work when children comprehend the two types of reflexive, caki and caki-casin. In particular, Section 6.1 is concerned with whether native Korean-speaking children’s antecedent choices differ according to reflexive types and semantic properties of the clause-mate verb in biclausal sentences. Section 7.2 taps into the role of semantic properties of the clause-mate verb in extra-sentential discourse binding. As discussed in Chapter 4, if children are adult-like in their interpretation of reflexives, the interpretation of caki will favor the LD antecedent (i.e., main clause subject in a bi-clause; extra-sentential discourse topic) when a DAV is used but the clause-mate local antecedent when a LAV is used. However, caki-casin should always take a local antecedent no matter what verb type is used. This section addresses whether semantic properties of the clause-mate verb affects the interpretation of reflexives of Korean children.

7.1 Experiment 3: Sentential binding

7.1.1 Participants. Thirty-one monolingual Korean native-speaker children (ages: mean = 5;2, range = 4;9–5;10) and 40 native-speaker adult controls participated in this experiment. Out of the 31 child participants, data from three participants (one four-year-old, and two five-year-old) were excluded from the analysis because they performed poorly on filler items. Thus, data from 28 participants were analyzed in Experiment 3. Note that the children tested in this experiment were newly recruited for this experiment only. They were all monolingual Korean speakers who were attending a kindergarten in Seoul, Korea at the time of testing.
7.1.2 Procedure and materials. The procedure used in Experiment 3 was identical to the procedure described in Experiments 1 and 2. Experiment 3 was a 2 x 2 x2 design, varying the type of reflexive pronoun (caki vs. caki-casin), the type of clause-mate verb (DAV vs. LAV), and the type of context (LD antecedent context vs. local antecedent context). Six verbs were used, including three DAV and three LAV. The three DAV were milecwuta ‘push’, tulecwuta ‘lift’, and ccochakata ‘chase’; the three LAV were swumta ‘hide’, pyencanghata ‘disguise’, and kkwumita ‘make up’. Each verb was used twice in two different items, where the reflexives were different (caki vs. caki-casin), resulting in 12 test sentences. In order to avoid an effect from the familiarity of the verbs, different animated characters were used.

Figures 7.1 and 7.2 present the LD and local contexts, respectively, for a DAV and for a LAV.
**LD antecedent context**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Dinosaur and Mouse" /></td>
<td><img src="image2.png" alt="Dinosaur doing something" /></td>
</tr>
<tr>
<td>Here are Dinosaur and Mouse.</td>
<td>Dinosaur is doing something. Blindfolded Rupy asks Mouse what is going on.</td>
</tr>
</tbody>
</table>

**Test sentence:**

Sayngewi-ka Konglyong-i *caki/caki-casin*-lul ccohawa-ss-tako malhay-ss-eyo

Mouse-NOM Dinosaur-NOM *self-ACC* chase-PST-COMP say-PST-SES

‘Mouse said that Dinosaur chased self.’

**Response type and antecedent interpretation**

True = LD antecedent interpretation (i.e., Mouse$_i$ said that Dinosaur$_j$ chased Mouse$_i$)

False = Local antecedent interpretation (i.e., Mouse$_i$ said that Dinosaur$_j$ chased Dinosaur$_i$)

*Figure 7.1.* Sample pictures (with texts) of LD antecedent context with *caki/caki-casin* and DAV.
**LD antecedent context**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image 1" /></td>
<td><img src="image2.png" alt="Image 2" /></td>
</tr>
</tbody>
</table>

Here are Rabbit and Elephant. Rabbit is doing something. Blindfolded Rupy asks Elephant what is going on.

**Test sentence:**

Khokkili-ka Thokki-ka *caki/caki-casin*-lul pyencanghay-ss-tako malhay-ss-eyo

Elephant-NOM Rabbit-NOM *self-ACC* disguise-PST-COMP say-PST-SES

‘Elephant said that Rabbit disguised self.’

**Response type and antecedent interpretation**

True = LD antecedent interpretation (i.e., Elephant$_i$ said that Rabbit$_j$ disguised Elephant$_i$)

False = Local antecedent interpretation (i.e., Elephant$_i$ said that Rabbit$_j$ disguised Rabbit$_i$)

*Figure 7.2.* Sample pictures (with texts) of LD antecedent context with *caki/caki-casin* and LAV.
Here are Fox and Duck. Fox is doing something. Blindfolded Rupy asks Duck what is going on.

**Test sentence:**

Oli-ka Yewu-ka caki/caki-casin-lul ccochawa-ss-tako malhay-ss-eyo

Duck-NOM Fox-NOM self-ACC chase-PST-COMP say-PST-SES

‘Duck said that Fox chased self.’

**Response type and antecedent interpretation**

True = Local antecedent interpretation (i.e., Duck $i$ said that Fox$_j$ chased Fox$_i$)

False = LD antecedent interpretation (i.e., Duck$_i$ said that Fox$_j$ chased Duck$_i$)

*Figure 7.3.* Sample pictures (with texts) of local antecedent context with *caki/caki-casin* and DAV.
Local antecedent context

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="local_antecedent.png" alt="Image 1" /> Here are Goat and Squirrel.</td>
<td><img src="local_antecedent.png" alt="Image 2" /> Goat is doing something. Blindfolded Rupy asks Squirrel what is going on.</td>
</tr>
</tbody>
</table>

**Test sentence:**

Talamcwi -ka Yemso-ka *caki/caki-casin*-lul pyencanghay -ss-tako malhay-ss-eyo.

Squirrel-NOM Goat-NOM *self-ACC* disguise-PST-COMP say-PST-SES

‘Squirrel said that Goat disguised self.’

**Response type and antecedent interpretation**

True = Local antecedent interpretation (i.e., Squirrel, said that Goat, disguised Goat,i)

False = LD antecedent interpretation (i.e., Squirrel, said that Goat, disguised Squirrel,i)

*Figure 7.4. Sample pictures (with texts) of local antecedent context with caki/caki-casin and LAV.*

**7.1.3 Results.** Experiment 3 explores whether children use semantic properties of the clause-mate verb in their interpretation of the two types of reflexives in both the LD antecedent contexts and the local antecedent contexts. Therefore, the independent variables are verb type, reflexive type, and context type, while the dependent variable is the type of antecedent interpretation (as indicated by participants’ true/false responses). The logic of the design of the
experimental items is the same as in Experiments 1 and 2, except we systematically vary the type of verb (DAV vs. LAV). However, for statistical analyses, the ordinary logit model based on a logistic regression (instead of the ANOVAs that were used for Experiments 1 and 2) was implemented with the data of the adults and children. This is because not every participant had an equal number of tokens for each condition (recall that each participant was given a total of 12 tokens for 8 conditions), which meant it was impossible to create comparable means for each condition and participant. The three categorical predictors are coded in the logistic regression as follows: The LD context was coded 0 and the local context was coded 1. The DAV was coded 0 and the LAV was coded 1. Caki was coded 0 and caki-casin was coded 1. The categorical dependent variable, True/False, was coded as follows: a ‘False’ response was coded 0 and a ‘True’ response was coded 1.

Now, let us look at the data from the adults. Table 7.1 shows a summary of the ordinary logit model for all the data from adults.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>S.E.</th>
<th>Wald Z</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept (constant)</td>
<td>2.944</td>
<td>.592</td>
<td>24.709</td>
<td>.000</td>
<td>19.000</td>
</tr>
<tr>
<td>Verb type</td>
<td>-.547</td>
<td>.754</td>
<td>.525</td>
<td>.469</td>
<td>.579</td>
</tr>
<tr>
<td>Reflexive type</td>
<td>-.2016</td>
<td>.658</td>
<td>9.391</td>
<td>.002</td>
<td>.133</td>
</tr>
<tr>
<td>Context type</td>
<td>-5.142</td>
<td>.732</td>
<td>49.316</td>
<td>.000</td>
<td>.006</td>
</tr>
<tr>
<td>Interaction = reflexive x verb</td>
<td>-1.075</td>
<td>.852</td>
<td>1.590</td>
<td>.207</td>
<td>.341</td>
</tr>
<tr>
<td>Interaction = context x verb</td>
<td>.105</td>
<td>1.011</td>
<td>.011</td>
<td>.918</td>
<td>1.110</td>
</tr>
<tr>
<td>Interaction = context x reflexive</td>
<td>3.667</td>
<td>.831</td>
<td>19.492</td>
<td>.000</td>
<td>39.140</td>
</tr>
<tr>
<td>Interaction = context x reflexive x verb</td>
<td>4.461</td>
<td>1.212</td>
<td>13.545</td>
<td>.000</td>
<td>86.562</td>
</tr>
</tbody>
</table>

22 However, I acknowledge that the data from Experiments 3 and 4 violate the following assumption of ordinary logistic regression: Logistic regression requires each observation to be independent, and thus the independent variables should be independent from each other. My data show interaction effects between variables.
Table 7.1 shows that (i) reflexive type, (ii) context type, (iii) interaction between context type and reflexive type, and (iv) interaction between context type, reflexive type, and verb type are the significant predictors ($p < .01$) for this regression model. To understand how these four predictors affected reflexive interpretation, let us look at the data based on descriptive statistics. Figures 7.5 and 7.6 show the data of the adults in the four conditions with caki and the four conditions with caki-casin.

![Graph showing antecedent interpretation of caki depending on type of verb in the LD antecedent contexts and in the local antecedent contexts (adults); error bars represent standard errors.](image)

**Figure 7.5.** Antecedent interpretation of caki depending on type of verb in the LD antecedent contexts and in the local antecedent contexts (adults); error bars represent standard errors.
Figure 7.6. Antecedent interpretation of *caki-casin* depending on type of verb in the LD antecedent contexts and in the local antecedent contexts (adults); error bars represent standard errors.

The fact that (i) reflexive type and (ii) context type are significant predictors comes from the very low acceptance rates in the two conditions for *caki-casin* in the LD antecedent context (i.e., *caki-casin*+DAV+LD context 6% (SD = 23%); *caki-casin*+LAV+LD context, 10% (SD =25%); See Figure 7.6). Overall, the acceptance rate for the conditions with *caki* is generally higher than it is for the conditions with *caki-casin*; and the acceptance rate for the conditions with local antecedent context is higher than it is for the conditions with LD antecedent context.

The other two factors, (iii) interaction between context type and reflexive type, and (iv) interaction between context type, reflexive type, and verb type, are significant predictors because the adults’ interpretation of *caki-casin* is not affected by the semantic properties of the clause-mate verb while their interpretation of *caki* is, but differently so in LD versus and local contexts. Let us look at the data with *caki* first (see Figure 7.5). In the DAV+LD context, the acceptance rate is 91% (SD = 25%); however, in the LAV+LD context, it is merely 36% (SD =
This indicates that DAVs lead to the LD interpretation while LAVs lead to the local interpretation for *caki*. Likewise, in the DAV+local context, the acceptance rate is 33% (*SD* = 38%), while in the LAV+local context, it is 71% (*SD* = 37%). Again, this shows that semantic properties of the clause-mate verb play a role in the interpretation of *caki*. Now, let us look at the data with *caki-casin* (see Figure 7.6). Note that in both the DAV+LD context and LAV+LD context conditions, the acceptance rates are merely 6% (*SD* = 23%) and 10% (*SD* = 25%), respectively. In contrast, in the DAV+local context and LAV+local context, the acceptance rates are 88% (*SD* = 27%) and 95% (*SD* = 18%), respectively. These results suggest that the semantic properties of the clause-mate verb barely affected the interpretation of *caki-casin*, which allows local binding only. Another way to say this is that *caki-casin* is so strongly local in its orientation that semantic properties of the clause-mate verb play no role.

Now let us look at the data from children. Table 7.2 shows a summary of the ordinary logit model for all the data from the children.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>S.E.</th>
<th>Wald Z</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept (constant)</td>
<td>1.036</td>
<td>.351</td>
<td>8.716</td>
<td>.003</td>
<td>2.818</td>
</tr>
<tr>
<td>Verb</td>
<td>-.234</td>
<td>.484</td>
<td>.233</td>
<td>.629</td>
<td>.792</td>
</tr>
<tr>
<td>Reflexive</td>
<td>-.120</td>
<td>.490</td>
<td>.060</td>
<td>.807</td>
<td>.887</td>
</tr>
<tr>
<td>Context</td>
<td>-1.952</td>
<td>.490</td>
<td>15.893</td>
<td><strong>.000</strong></td>
<td>.142</td>
</tr>
<tr>
<td>Interaction = reflexive x verb</td>
<td>-.197</td>
<td>.672</td>
<td>.086</td>
<td>.770</td>
<td>.821</td>
</tr>
<tr>
<td>Interaction = context x verb</td>
<td>.234</td>
<td>.684</td>
<td>.117</td>
<td>.733</td>
<td>1.263</td>
</tr>
<tr>
<td>Interaction = context x reflexive</td>
<td>2.072</td>
<td>.693</td>
<td>8.952</td>
<td><strong>.003</strong></td>
<td>7.942</td>
</tr>
<tr>
<td>Interaction = context x reflexive x verb</td>
<td>.608</td>
<td>.981</td>
<td>.384</td>
<td>.536</td>
<td>1.837</td>
</tr>
</tbody>
</table>
Table 7.2 shows that (i) context type and (ii) interaction between context type and reflexive type are the significant predictors ($p < .01$) for this regression model. It is important to note that the interaction between context type, reflexive type, and verb type is not a significant predictor. To understand this further, let us look at the data based on descriptive statistics. Figures 7.7 and 7.8 show the data for the children in the four conditions with *caki* and the four conditions with *caki-casin*.

![Figure 7.7](image_url)

*Figure 7.7. Antecedent interpretation of *caki* depending on type of verb in the LD antecedent contexts and in the local antecedent contexts (children); error bars represent standard errors.*
Figure 7.8. Antecedent interpretation of caki-casin depending on type of verb in the LD antecedent contexts and in the local antecedent contexts (children); error bars represent standard errors.

The finding that (i) context type and (ii) interaction between context type and reflexive type are significant predictors comes from the lower acceptance rates in the two conditions for caki-casin + LD context (i.e., caki-casin+DAV+LD context 29% (SD = 37%); caki-casin+LAV+LD context, 29% (SD = 37%); see Figure 7.8). What is noteworthy is that semantic properties of the clause-mate verb did not play a significant role in the children’s interpretation of caki and caki-casin. Let us look at the data for caki first (see Figure 7.7). In both the DAV+LD context and the LAV+LD context, the acceptance rates are over 70% (80% (SD=34%) and 73% (SD=37%), respectively). Likewise, in both the DAV+local context and the LAV+local context conditions, the acceptance rates are over 60% (63% (SD=44%) and 70% (SD=41%), respectively). These results suggest that the semantic properties of the clause-mate verb hardly affected the children’s interpretation of caki. Now, let us look at the data with caki-casin (see Figure 7.8). Note that in both the DAV+LD context and the LAV+LD context conditions, the acceptance
rates are less than 30% (29% and 29%, respectively). In contrast, in the DAV+local context and LAV+local context conditions, the acceptance rates are 70% (SD=39%) and 73% (SD=39%), respectively. Again, these results suggest that the semantic properties of the clause-mate verb hardly affected the interpretation of \textit{caki-casin}, which allows local binding only.

In sum, the primary findings of Experiment 3 are (i) for adults, \textit{caki-casin} is strongly local; and (ii) \textit{caki} allows both local and LD, but is accepted at higher rates with LD antecedents; (iii) for adults, verb semantics plays a role in the interpretation of \textit{caki}, but not \textit{caki-casin}; (iv) for children, \textit{caki-casin} takes the local antecedent; and (v) \textit{caki} allows both local and LD, with a preference for the LD antecedent; (vi) for children, the choice of the clause-mate verb appears to play no role in the interpretation of both \textit{caki} and \textit{caki-casin}.

7.2 Experiment 4: Extra-sentential discourse binding

7.2.1 Participants. To investigate children’s interpretation of \textit{caki} and \textit{caki-casin} in extra-sentential discourse binding, Experiment 4 was conducted with 35 native Korean-speaking children (ages: mean = 5;3, range = 4;7–6;1) from a kindergarten in Seoul, Korea. These children had not participated in any of the previous experiments in the dissertation research. The data from two four-year-olds, one five-year-old, and one six-year-old were excluded as they failed to respond correctly to the filler items. The results from the remaining 31 children are used in the data analysis. Forty adult native speakers of Korean were also tested as a control group, and they all did well on the filler items.

7.2.2 Procedure and materials. The procedure and materials were identical to those used in Experiment 3, except for the type of the test sentence: in order to investigate the role of semantic properties of the clause-mate verb in discourse-binding, the test sentence contains one possible antecedent in the previous sentence, and another possible antecedent within the same
clause as the reflexive. The clause-mate verbs vary between DAV and LAV. Figures 7.9 and 7.10 present the LD and local contexts, respectively, for the LAV *kkwumita*‘make up’. (See Appendix B for DAV items.)

<table>
<thead>
<tr>
<th>LD antecedent context</th>
<th>Test sentence</th>
<th>Response type and antecedent interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td>Wenswungi-ka$_i$ mwuchek nolla-ss-eyo. Monkey-NOM$<em>i$ very surprise-PST-SES. Hmm… Hmm.. ‘Monkey$<em>i$ was very surprised.’ Talk$</em>{ij}$ kapcaki caki/caki-casin-lul$</em>{ij}$ Chicken-NOM suddenly <em>self</em>-ACC <em>kkwumye-ss-ki</em> ttaymwun-i-lay-yo make up-PST-COMP because-be-REP-DECL ‘(It was) because Chicken$<em>i$ made self$</em>{ij}$ up suddenly.’</td>
<td></td>
</tr>
</tbody>
</table>

| ![Image](image2.png)  |                                           |

**Response type and antecedent interpretation**

True = Extra-sentential LD interpretation (i.e., Chicken$_i$ made Monkey$_j$ up suddenly)

False = Local antecedent interpretation (i.e., Chicken$_i$ made Chicken$_j$ up suddenly)

*Figure 7.9. Sample pictures (with texts) of LD antecedent context with *cakil/caki-casin* and LAV.*
<table>
<thead>
<tr>
<th>Local antecedent context</th>
<th>Test sentence</th>
<th>Response type and antecedent interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image 1" /></td>
<td><img src="image2.png" alt="Image 2" /></td>
<td>True = Local antecedent interpretation (i.e., Chicken\textsubscript{i} made Chicken\textsubscript{i} up suddenly)</td>
</tr>
</tbody>
</table>

Chicken and Fox were supposed to go to a birthday party of their friend so they wanted to look pretty.

Test sentence

Yewu-\textsubscript{ka} mwuchek nolla-ss-eyo.

Fox-\textsubscript{NOM} very surprise-PST-SES.

Hmm…

Hmm…

‘Fox\textsubscript{i} was very surprised.’

Talk -\textsubscript{ij} kapcaki caki/caki-casin-lul\textsubscript{ij}.

Chiken-NOM suddenly self-\textsubscript{ACC}.

kkwumye-ss-ki ttaymwun-i-lay-yo.

make up-PST-COMP because-be-REP-DECL.

‘(It was) because Chicken\textsubscript{j} made self\textsubscript{ij} up suddenly.’

Response type and antecedent interpretation

True = Local antecedent interpretation (i.e., Chicken\textsubscript{i} made Chicken\textsubscript{i} up suddenly)

False = Extra-sentential LD interpretation (i.e., Chicken\textsubscript{i} made Fox\textsubscript{j} up suddenly)

*Figure 7.10. Sample pictures (with texts) of local antecedent context with cakil/caki-casin and LAV.*
7.2.3 Results. The methods of data analysis were the same as those that were used in Experiment 3. That is, the independent variables are verb type, reflexive type, and context type, while the dependent variable is the type of response (true vs. false). For statistical analyses, the ordinary logit model based on a logistic regression was implemented with the data of the adults and children.

Now, let us look at the data from the adults. Table 7.3 shows a summary of the ordinary logit model for all the data from adults.

Table 7.3

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>S.E.</th>
<th>Wald Z</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept (constant)</td>
<td>2.398</td>
<td>.467</td>
<td>26.354</td>
<td>.000</td>
<td>11.000</td>
</tr>
<tr>
<td>Verb type</td>
<td>-.526</td>
<td>.602</td>
<td>.764</td>
<td>.382</td>
<td>.591</td>
</tr>
<tr>
<td>Reflexive type</td>
<td>-1.134</td>
<td>.563</td>
<td>4.060</td>
<td>.044</td>
<td>.322</td>
</tr>
<tr>
<td>Context type</td>
<td>-4.796</td>
<td>.661</td>
<td>52.707</td>
<td>.000</td>
<td>.008</td>
</tr>
<tr>
<td>Interaction = reflexive x verb</td>
<td>-1.331</td>
<td>.731</td>
<td>3.310</td>
<td>.069</td>
<td>.264</td>
</tr>
<tr>
<td>Interaction = context x verb</td>
<td>.900</td>
<td>.862</td>
<td>1.090</td>
<td>.296</td>
<td>2.459</td>
</tr>
<tr>
<td>Interaction = context x reflexive</td>
<td>2.888</td>
<td>.780</td>
<td>13.724</td>
<td>.000</td>
<td>17.953</td>
</tr>
<tr>
<td>Interaction = context x reflexive x verb</td>
<td>2.908</td>
<td>1.042</td>
<td>7.791</td>
<td>.005</td>
<td>18.316</td>
</tr>
</tbody>
</table>

Table 7.3 shows that (i) reflexive type, (ii) context type, (iii) interaction between context type and reflexive type, and (iv) interaction between context type, reflexive type, and verb type are the significant predictors ($p < .01$) for this regression model. To understand how these four predictors affected reflexive interpretation, let us look at the data based on descriptive statistics. Figures 7.11 and 7.12 shows the data of the adults in the four conditions with caki and the four conditions with caki-casin.
Figure 7.11. Antecedent interpretation of caki depending on type of verb in the LD antecedent contexts and the local antecedent contexts (adults); error bars represent standard errors.

<table>
<thead>
<tr>
<th></th>
<th>LD antecedent context</th>
<th>Local antecedent context</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAV</td>
<td>80%</td>
<td>35%</td>
</tr>
<tr>
<td>LAV</td>
<td>33%</td>
<td>79%</td>
</tr>
</tbody>
</table>

Figure 7.12. Antecedent interpretation of caki-casin depending on type of verb in the LD antecedent contexts and the local antecedent contexts (adults); error bars represent standard errors.

<table>
<thead>
<tr>
<th></th>
<th>LD antecedent context</th>
<th>Local antecedent context</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAV</td>
<td>10%</td>
<td>88%</td>
</tr>
<tr>
<td>LAV</td>
<td>8%</td>
<td>93%</td>
</tr>
</tbody>
</table>
The fact that (i) reflexive type and (ii) context type are significant predictors comes from the very low acceptance rates in the two conditions for *caki-casin* in the LD antecedent context (i.e., *caki-casin*+DAV+LD context, 10% (*SD*=23%); *caki-casin*+LAV+LD context, 8% (*SD*=21%); see Figure 7.12), which results in the following: Overall, the acceptance rate for the conditions with *caki* is generally higher than it is for the conditions with *caki-casin*; and the acceptance rate for the conditions with the local antecedent context is higher than it is for the conditions with the LD antecedent context.

The other two factors, (iii) interaction between context type and reflexive type, and (iv) interaction between context type, reflexive type, and verb type, are significant predictors due to the following: The adults’ interpretation of *caki-casin* is not affected by the semantic properties of the clause-mate verb while their interpretation of *caki* is, but differently so in LD versus and local contexts. Let us look at the data with *caki* first (see Figure 7.11). In the DAV+LD context, the acceptance rate is 80% (*SD*=33%); however, in the LAV+LD context, it is merely 33% (*SD* = 37%). This indicates that DAVs lead to the LD interpretation while LAVs lead to the local interpretation for *caki*. Likewise, in the DAV+local context, the acceptance rate is 35% (*SD*=41%), while in the LAV+local context, it is 79% (*SD*=37%). Again, this shows that the semantic properties of the clause-mate verb play a role in the interpretation of *caki*. Now, let us look at the data with *caki-casin* (see Figure 7.12). Note that in both the DAV+LD context and LAV+LD context conditions, the acceptance rates are merely 10% and 8%, respectively. In contrast, in the DAV+local context and LAV+local context, the acceptance rates are 88% (*SD*=29%) and 93% (*SD*=21%), respectively. These results suggest that the semantic properties of the clause-mate verb hardly affected the interpretation of *caki-casin*, which allows local binding only.

Now let us look at the data from children. Table 7.4 shows a summary of the ordinary logit model for all the data from the children.
### Table 7.4
*Summary of the ordinary logit model (children)*

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>S.E.</th>
<th>Wald Z</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept (constant)</td>
<td>1.414</td>
<td>.372</td>
<td>14.468</td>
<td>.000</td>
<td>4.111</td>
</tr>
<tr>
<td>Verb</td>
<td>-.372</td>
<td>.501</td>
<td>.552</td>
<td>.457</td>
<td>.689</td>
</tr>
<tr>
<td>Reflexive</td>
<td>-.228</td>
<td>.507</td>
<td>.203</td>
<td>.653</td>
<td>.796</td>
</tr>
<tr>
<td>Context</td>
<td>-2.171</td>
<td>.486</td>
<td>19.974</td>
<td>.000</td>
<td>.114</td>
</tr>
<tr>
<td>Interaction = reflexive x verb</td>
<td>-.336</td>
<td>.678</td>
<td>.246</td>
<td>.620</td>
<td>.714</td>
</tr>
<tr>
<td>Interaction = context x verb</td>
<td>.272</td>
<td>.671</td>
<td>.165</td>
<td>.685</td>
<td>1.313</td>
</tr>
<tr>
<td>Interaction = context x reflexive</td>
<td>1.614</td>
<td>.671</td>
<td>5.784</td>
<td>.016</td>
<td>5.025</td>
</tr>
<tr>
<td>Interaction = context x reflexive x verb</td>
<td>.534</td>
<td>.924</td>
<td>.333</td>
<td>.564</td>
<td>1.705</td>
</tr>
</tbody>
</table>

Table 7.4 shows that (i) context type and (ii) interaction between context type and reflexive type are the significant predictors ($p < .01$) for this regression model. It is noteworthy that unlike adults, there is no interaction effect between context type, reflexive type and verb type. To gain a clearer picture of the data, let us look at the data based on descriptive statistics. Figures 7.13 and 7.14 show the data of the children in the four conditions with *caki* and the four conditions with *caki-casin*. 
Figure 7.13. Antecedent interpretation of *caki* depending on type of verb in the LD antecedent contexts and the local antecedent contexts (children); error bars represent standard errors.

<table>
<thead>
<tr>
<th></th>
<th>LD antecedent context</th>
<th>Local antecedent context</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAV (66%)</td>
<td>66%</td>
<td>63%</td>
</tr>
<tr>
<td>LAV (68%)</td>
<td></td>
<td>76%</td>
</tr>
</tbody>
</table>

Figure 7.14. Antecedent interpretation of *caki* depending on type of verb in the LD antecedent contexts and the local antecedent contexts (children); error bars represent standard errors.

<table>
<thead>
<tr>
<th></th>
<th>LD antecedent context</th>
<th>Local antecedent context</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAV (29%)</td>
<td></td>
<td>74%</td>
</tr>
<tr>
<td>LAV (32%)</td>
<td></td>
<td>81%</td>
</tr>
</tbody>
</table>
The fact that (i) context type and (ii) interaction between context type and reflexive type are significant predictors comes from the low acceptance rate in the two conditions on caki-casin+LD context (i.e., caki-casin+DAV+LD context (mean = 29%; SD=38%); caki-casin+LAV+LD context (mean = 32%; SD=41%); see Figure 7.14). What is noteworthy is that the semantic properties of the clause-mate verb did not play a significant role in the children’s interpretation of caki and caki-casin. Let us look at the data with caki first (see Figure 7.13). In both the DAV+LD context and the LAV+LD context, the acceptance rates are near 70% (66% (SD=39%) and 68% (SD=37%), respectively). Likewise, in both the DAV+local context and the LAV+local context conditions, the acceptance rates are over 60% (63% (SD=42%) and 76% (SD=38%), respectively). These results suggest that the semantic properties of the clause-mate verb hardly affected the interpretation of caki. Now, let us look at the data with caki-casin (see Figure 7.14). Note that in both the DAV+LD context and LAV+LD context conditions, the acceptance rates are around 30% (29% and 32%, respectively). In contrast, in the DAV+local context and LAV+local context conditions, the acceptance rates are 74% (SD=40%) and 81% (SD=33%), respectively. Again, these results suggest that the semantic properties of the clause-mate verb hardly affected the interpretation of caki-casin, which allows local binding only.

As a whole, the interaction effect between context type and reflexive type suggests that like the adults, the children the two reflexives according to their defining properties in the sense that they allowed both an LD antecedent and a local antecedent in the caki+DAV and the caki+LAV conditions, but allowed only the local antecedent in the caki-casin+DAV and caki-casin+LAV conditions. However, the lack of interaction between context type, reflexive type, and verb type suggests that, unlike the adults, the children did not attend to the semantic properties of the clause-mate verb in interpreting the reflexives.

In sum, the primary findings of Experiment 4, discourse-binding, are (i) for adults, caki-casin is strongly local; and (ii) caki allows both local and LD, suggesting that the interpretation
of *caki* allows an antecedent across a sentence boundary; (iii) for adults, the interpretation of *caki* is modulated by the type of the clause-mate verb, whereas *caki-casin* does not show any such sensitivity; (iv) for children, *caki-casin* takes the local antecedent; and (v) *caki* allows both local and LD; (vi) for children, the choice of the clause-mate verb appears to play no significant role in the interpretation of both *caki* and *caki-casin*.

### 7.3 General discussion of Experiments 3 and 4

Two experimental studies that examined lexical effects on the interpretation of the Korean reflexives *caki* and *caki-casin* in child language were reported in Sections 7.1 and 7.2. The results of both Experiments 3 and 4 tell us that, although the children showed adult-like knowledge of the domains where the two reflexives find their antecedents, as demonstrated in Sections 6.1 and 6.2, they did not attend to semantic properties of the clause-mate verb (DAV vs, LAV) the way that the adult native speakers did when interpreting *caki*. In both sentence-level and discourse-level binding, children were not influenced by the meaning of the clause-mate verb when they searched for the antecedent of *caki*. Accordingly, they chose either the LD antecedent or the local antecedent based only on the locality-related properties of the two reflexives. The results of the two experiments revealed that native Korean-speaking children are not adult-like in terms of using semantic properties of the clause-mate verb for the interpretation of *caki*, the reflexive that is affected by the semantic properties of the clause-mate verb.
CHAPTER VIII
GENERAL DISCUSSION AND CONCLUSION

This chapter provides a general discussion on the roles of (i) knowledge of antecedent domains and (ii) knowledge of the semantic properties (DAV vs. LAV) of clause-mate verbs. Section 8.1 begins by summarizing the findings of each study described in Chapters 6 and 7. Section 8.2 discusses the implications of these findings for the understanding of the acquisition of Korean reflexives. In particular, first, it addresses the research questions in this dissertation and elucidates new findings in the acquisition literature. Second, it discusses why the children in this study were not effective at integrating semantic properties of the clause-mate verb in their interpretation of reflexives, focusing on children’s difficulty with reanalysis. Third, it compares children’s and adults’ interpretation of the Korean reflexives. Section 8.3 concludes this dissertation.

8.1 Summary of the Findings

This section provides a summary of the key findings of a series of experimental studies on children’s comprehension of the Korean reflexives *caki* and *caki-casin*. Experiment 1 found that the type (i.e., *caki* vs. *caki-casin*) affected interpretation by the native Korean-speaking children (and the adult control group) in sentence-level binding: *caki* prefers a long-distant antecedent and *caki-casin* takes a local antecedent. Experiment 2 revealed that for native Korean-speaking children (and adults), the interpretation of *caki* crossed sentence boundaries, whereas the binding domain of *caki-casin* was limited to the local antecedent. Experiment 3 showed that unlike the adult control group, the native Korean-speaking children did not show a sensitivity to the semantic properties of the clause-mate verb in interpretive reflexive *caki* in biclausal sentences. For *caki-casin*, children (and adults) only allowed a local antecedent in any case. Lastly, Experiment 4 found that the type of clause-mate verb (i.e., DAV vs. LAV) did not
shape the native Korean-speaking children’s interpretation of *caki* in discourse-level binding, but it did affect the adult control group’s interpretation. For *caki-casin*, neither the children’s nor the adults’ interpretations were affected by the verb type.

In these four experiments, the Korean-speaking children performed like adults with respect to the interpretation of the two reflexives in sentence-level and in discourse-level binding when the verbs used in the experiments were neutral. However, when the type of verb favored a local or distant interpretation, the children did not perform like the adults: the children did not use the information in verbs in interpreting *caki*.

These results raise the question of why the young children were not able to use the semantic properties of the clause-mate verb. Do children have different knowledge than adults? If not, then what made them perform differently than the adults? These questions will be discussed in the following sections.

**8.2 Implications of the Findings**

**8.2.1 Knowledge of antecedent domains.** The first research question asked whether the type of reflexive (i.e., *caki* vs. *caki-casin*) affects native Korean-speaking children’s reflexive interpretation in biclausal sentences and in discourse. I hypothesized that young children are able to parameterize the antecedent domain for *caki* and *caki-casin* even though the reflexives are hardly ever used in Korean speech.

The results of the four TVJT experiments clearly confirmed this hypothesis, showing the effect of reflexive type in the children’s choice of an antecedent in both biclausal sentences (Experiment 1 and Experiment 3) and in a discourse (Experiment 2 and Experiment 4). Their interpretation of *caki* allowed either the LD antecedent (main clause subject in a biclausal sentence; extra-sentential discourse topic) or the local antecedent, whereas their interpretation of *caki-casin* allowed only the local antecedent both in sentence-level binding and in discourse-
level binding. That is, the children involved in all the experiments knew that the two reflexives were distinct from one another in terms of locality.

8.2.2 Integrating lexical semantic properties of the clause-mate verb into antecedent interpretation. The second research question asked whether the type of clause-mate verb (i.e., DAV vs. LAV) induces a particular bias toward the choice of one or the other antecedent in native Korean-speaking children. Following the previous results reporting that young children used semantic properties of the clause-mate verb in the interpretation of the Icelandic LD reflexive, *sig* (e.g., Hyams & Sigurjónsdóttir, 1990), I hypothesized that the effect of the clause-mate verb would be evident in children’s choice of antecedent for *caki* (but not *caki-casin*). That is, *caki* would favor the LD antecedent (i.e., main clause subject in a biclausal sentence; extra-sentential discourse topic) with a DAV and the local antecedent with a LAV.

However, the results did not support this hypothesis. The children did not integrate the semantic properties of the clause-mate verb into their interpretation of the reflexives, while the adults did. Why is it the case that semantic properties of the clause-mate verb plays an important role for Icelandic children (Hyams & Sigurjónsdóttir, 1990), but not for the Korean children involved in this study? In order to elucidate why the Korean-speaking children performed differently from the Icelandic-speaking children with respect to the interpretation of reflexives, I...
compare the two studies in terms of (i) the amount of information in the verbs and (ii) the word order of the test sentences.

First, Icelandic verbs have more information that affects the interpretation of the reflexive than Korean verbs do. Korean verbs are divided into three groups (neutral, DAV, and LAV), while Icelandic verbs are divided into six categories based on type of mood and semantic properties of the clause-mate verb (i.e., subjunctive-gefa verbs, infinitive-gefa verbs, indicative-gefa verbs, subjunctive-normal verbs, infinitive-normal verbs, and indicative-normal verbs). For the indicative mood verbs, only the local interpretation is possible for the interpretation of sig, while for the gefa verbs, only the LD interpretation is allowed. That is, the information of Icelandic verbs plays a more important role than the information of Korean verbs in terms of the interpretation of reflexives. This suggests that Icelandic-speaking children might be more sensitive to the information of verbs than Korean-speaking children for the interpretation of reflexives.

Second, the difference in canonical word order between Icelandic and Korean may be one reason that Icelandic-speaking children were better at integrating the information of the verbs. The Icelandic language is SVO while Korean is SOV. Hence, Icelandic reflexives tend to appear after the verb, while Korean reflexives tend to appear before the verb. Given that the processing mechanism children as well as adults adopt during online interpretation is incremental, and that children’s online processing is different from that of adults in that children are not efficient at reanalysis, the lexical information of verbs may not overcome the temporary antecedent interpretation. When sentences are processed, the interpretations are obtained incrementally. That is, incoming constituents are construed on a word-by-word basis, without waiting for a crucial cue that disambiguates the possible interpretations (Frazier, 1987). If both Icelandic speakers and Korean speakers process sentences incrementally, Icelandic speakers’ initial parsing commitment of sig can be influenced by the semantic properties of the clause-
mate verb that they encounter before they reach sig. However, Korean speakers’ initial parsing commitment of caki cannot be influenced by these semantic properties of the clause-mate verb, because the verb appears after caki. When the lexical information of a verb encountered later in a Korean sentence does not correspond to the initial parsing commitment of caki, the parser must reanalyze the initial parsing commitment. For example, let us look at the incremental processing of a DAV verb + LAV context shown in Figure 8.1.

<table>
<thead>
<tr>
<th>Local antecedent context</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td>Here are Fox and Duck.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test sentence:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oli-ka yewu-ka caki-lul ccochawa-ss-tako malhay-ss-eyo</td>
</tr>
<tr>
<td>Duck-NOM Fox-NOM self-ACC chase-PST-COMP say-PST-SES</td>
</tr>
<tr>
<td>‘Duck said that Fox chased self.’</td>
</tr>
</tbody>
</table>

*Figure 8.1. Test sentence (DAV verb + LAV context).*

Incremental processing by adults is described in Figure 8.2. In order to describe a reanalysis process, we suppose that adults initially map caki to the local antecedent, yewu ‘fox’.
**Stage 1. Incremental processing of the test sentence by adults**

<table>
<thead>
<tr>
<th>Word 1</th>
<th>Word 2</th>
<th>Word 3 (Initial decision)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oli-ka</td>
<td>yewu-ka</td>
<td>caki-lul</td>
</tr>
<tr>
<td>Duck-NOM</td>
<td>Fox-NOM</td>
<td>self-ACC</td>
</tr>
<tr>
<td>Parser: Duck = argument</td>
<td>Fox = argument</td>
<td>Caki-lul = Fox</td>
</tr>
</tbody>
</table>

**Word 4 (Reanalysis)**

<table>
<thead>
<tr>
<th>Word 4</th>
<th>Word 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>ccocawa-ss-tako</td>
<td>malhay-ss-eyo</td>
</tr>
<tr>
<td>chase-PST-COMP</td>
<td>say-PST-SES</td>
</tr>
</tbody>
</table>

Parser: (DAV; Fox = agent; Duck = theme; caki-lul = Duck)

**Stage 2. Response**

The dominant TVJT response by adults for the test item shown in the figure was False (Why? Because the test sentence indicates that Duck is the theme of chasing, while the context describes Fox as the theme of chasing.)

**Figure 8.2. Incremental processing of caki-DAV in local antecedent context by adults.**

Incremental processing by children is described in Figure 8.3. Again, in order to describe a reanalysis process, we suppose that the children initially map caki to the local antecedent, yewu′fox′.

**Stage 1. Incremental processing of the test sentence by children**

<table>
<thead>
<tr>
<th>Word 1</th>
<th>Word 2</th>
<th>Word 3 (Initial decision)</th>
</tr>
</thead>
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<tr>
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**Word 4 (Reanalysis)**

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<td>say-PST-SES</td>
</tr>
</tbody>
</table>

Parser: (DAV; Fox = agent; Duck = theme; caki-lul = Duck)

**Stage 2. Response**

A possible TVJT response by the children is “True.” (Why? Because the children parse Fox as the theme of chasing, and the context describes Fox as the theme of chasing.)

**Figure 8.3. Incremental processing of caki-DAV in local antecedent context by children.**
Figure 8.3 shows an example of incremental processing of caki-DAV in the local antecedent context. When participants listen to the test sentence and encounter the accusative-marked caki-lul, they will assign caki-lul a temporary role as theme of the transitive verb that follows, because the accusative marker normally signals that the NP is the theme of the transitive verb. Both children and adults would temporarily assign either Fox or Duck as the antecedent of caki. Encountering the DAV ccochawa ‘chase’, adults now interpret Duck as the theme of the DAV, because the DAV is biased against co-reference between its agent and theme arguments. Thus, if the agent is Fox, the theme must be Duck. If the adults’ initial interpretation was Fox, they will reanalyze their initial commitment, as seen in Figure 8.2.

However, if children’s initial interpretation was Fox, it is questionable whether they can reanalyze their initial commitment. Previous psycholinguistic studies have addressed children’s difficulty in revising their initial parsing of a sentence. For example, Trueswell et al. (1999) and Hurewitz, Brown-Schmidt, Thorpe, Gleitman and Trueswell (2000) showed that children have difficulty in reanalysis. Their online studies using a head-mounted eye-tracker revealed that 5-year-olds showed little or no ability to revise their initial parsing commitments. The children listened to test sentences involving temporary syntactic ambiguities such as “Put the frog on the napkin in the box” and were asked to manipulate toys in front of them to show their interpretation. Both children and adults showed signs of rapid incremental interpretation, initially treating the phrase on the napkin as a PP expressing a goal; however, only the adults could later reanalyze it as a PP modifying the frog.

8.2.3 The difference between adults and children in the interpretation of reflexives.

The third research question asked whether native Korean-speaking children have the same interpretations as adults for caki and caki-casin. The study found that the children and the adults share the same interpretations for caki and caki-casin when the given verbs are neutral.
However, the children differ from the adults in how they interpret *caki* and *caki-casin* when the given verbs are either DAV or LAV.

These results suggest that children know about the different antecedent domains for *caki* and *caki-casin*. In other words, they know that there is a syntactic constraint on *caki-casin* but not on *caki*: *Caki-casin* only refers to the local subject, while *caki* refers to the local subject, the LD subject, or even an entity outside the sentence in which *caki* is placed.

However, children are not adult-like in integrating semantic properties of the clause-mate verb into the interpretation of *caki*. In other words, adults know that the semantic properties of DAVs and LAVs can play a role as a semantic constraint, and they use the semantic constraint in their interpretation of *caki*. However, the semantic properties of DAVs and LAVs do not play any role as a semantic constraint for children. As discussed earlier, there are two possible accounts for this: one account is that native Korean children do not exert much of their effort to use the lexical information in verbs for the disambiguation of reflexives, because Korean verbs have less information than Icelandic verbs in the disambiguation of reflexives. Another account is that children are unable to reanalyze their interpretation of the reflexives when they later encounter the verbs. Note that both accounts are relevant to children’s parsing abilities rather than knowledge issue.

8.3 Concluding Remarks

Native Korean-speaking children at ages 4–6 know *caki* and *caki-casin* despite infrequent input exposure. However, unlike native Icelandic-speaking children, native Korean-speaking children have little ability to integrate verb information into their interpretation of reflexives. The children’s inability to use verb information can be best accounted for by processing issues. Given that children’s processing resources are limited, young native speakers of Korean (an SOV language) might not be able to revise their initial parsing commitment for
the Korean reflexive or be less effective at using lexical information of verbs for disambiguation of reflexives.
References


