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THE ACQUISITION OF WH-QUESTIONS IN ENGLISH AND KOREAN

A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE UNIVERSITY OF HAWAII IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

IN

LINGUISTICS

AUGUST 1995

By

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Seongchan Kim
For Eunjeong
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ABSTRACT

Chapter 2 addresses the issue of pied-piping in the acquisition of Wh questions in English and Korean. Nishigauchi (1990) argues that the Subjacency Principle applies at LF and that pied-piping should take place to avoid a Subjacency violation when a Wh-phrase is embedded in a complex NP. Based on the results from the experiment, it is concluded that Nishigauchi's claim is not correct and that the Subjacency Principle does not hold at LF.

Chapter 3 discusses the issue of the subject-object asymmetry in the acquisition of Wh questions. The subject preference in the acquisition of Wh questions is attributed to the depth of embedding account proposed by William O'Grady (1994).

Chapter 4 examines the acquisition of multiple Wh questions in English and Korean. The results from the experiment show that the first correct responses to multiple Wh question pattern (although at a very low rate) emerge earlier in English than in Korean by a factor of three years (age 2 vs. age 5). This difference between English and Korean is tentatively attributed to input difference between the two languages. Chapter 4 also examines whether there is any difference in terms of degree of difficulty among various types of multiple Wh questions in English and Korean. The results from the experiment show that the who-when type and the who-how type questions are the hardest among the six types of multiple Wh questions in English, but
not in Korean. This is ascribed to the ungrammaticality of the who-when type and the who-how type questions in English, but not in Korean.

Chapter 5 investigates the scope interaction between a Wh-phrase and a QP. Specifically, the issue is whether What is everyone eating? is ambiguous to English- and Korean-speaking children whereas Who is eating everything? is not, as in adult English and Korean. The results from the experiment show that Who is eating everything? is ambiguous to the Korean-speaking children unlike in adult Korean, but that this pattern was not ambiguous to the English-speaking children. The unambiguity of Who is eating everything? in English is attributed to Aoun and Li's (1991) Scope Principle.
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<tr>
<td>V</td>
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</tr>
<tr>
<td>A</td>
<td>Adjective or Adverbializer</td>
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<td>P</td>
<td>Preposition</td>
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<td>OSV</td>
<td>Object Subject Verb (Scrambled Word Order)</td>
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* Throughout this dissertation, Yale romanization system for Korean is used.
CHAPTER 1. INTRODUCTION

1.1. Wh Questions in English

In English, there are two major types of monoclausal questions: yes-no questions and *Wh* questions. Yes-No questions simply ask the hearer to indicate whether a particular proposition is true or not. On the other hand, *Wh* questions require the hearer to supply specific information in response to the *Wh*-phrase used in the question. These two types of questions and their possible answers are illustrated in (1).

(1) Two types of questions in English

a. Yes-No question
   Do you study linguistics?
   Possible Answer: Yes.

b. *Wh* question
   What do you study?
   Possible Answer: (I study) linguistics.

Syntactically, Yes-No questions and *Wh* questions have one thing in common; both involve subject-auxiliary inversion (with some exceptions such as *how come* questions or *Wh* questions involving a *Wh*-phrase in the subject position). Within the GB (Government and Binding) framework, subject-auxiliary inversion is treated as an instance of head-to-head movement. Specifically, it is movement of the head *I* to the head *C* (namely, I-to-C movement). This is demonstrated in (2).
(2) I-to-C movement

a. Yes-No question

\[
\begin{array}{c}
\text{CP} \\
\text{C'} \\
\text{I} \\
\text{CI} \\
\text{C'} \\
\text{will NP} \\
\text{you I} \\
\text{VP} \\
\text{t} \\
\text{I-to-C Move} \\
\text{V NP} \\
\text{study linguistics}
\end{array}
\]

b. Wh question

\[
\begin{array}{c}
\text{CP} \\
\text{NP} \\
\text{C'} \\
\text{IP} \\
\text{What C} \\
\text{will NP} \\
\text{you I} \\
\text{VP} \\
\text{t} \\
\text{I-to-C Move} \\
\text{V NP} \\
\text{study t}
\end{array}
\]

Wh questions differ from Yes-No questions in that the former involves Wh movement whereas the latter does not. Wh movement is an instance of Move alpha that moves the Wh-phrase to an A'-position (specifically to the SPEC of CP position) to satisfy [+WH] Comp filter (Aoun, Hornstein, and Sportiche 1981).

(3) [+WH] Comp filter

*COMP, unless it contains a [+WH] element.

[+WH]
Within the GB framework, it is assumed that every Wh-phrase must move, either overtly (at S-Structure) or covertly (at Logical Form), to the SPEC of CP position to satisfy the above mentioned [+WH] Comp filter and to be interpreted as a request for information. This Wh movement does not take place in Yes-No questions (see (2) above).

If an English monoclausal sentence includes only one Wh-phrase (simple Wh question), Wh movement takes place at SS. On the other hand, if it involves two Wh-phrases (multiple Wh question), one Wh movement occurs at SS and the other at LF. This is exemplified in (4).

(4) Wh movement in English
a. Wh question involving one Wh-phrase (simple Wh question)
1.2. Wh Questions in Korean

As in English, there are two major types of questions in Korean—Yes-No questions and Wh questions. However, unlike English, all Korean questions are indicated by question markers such as -kka or -ni. Since these markers differentiate questions from other types of sentences, there is no need to invert the subject with the auxiliary (i.e. in Korean there is no subject auxiliary inversion). The two types of questions in Korean are illustrated in (5).

(5) Two types of questions in Korean
a. Yes-No question
Ne-nun enehak-ul kongpwuha-ni?
you-Top linguistics-Acc study-Q
'Do you study linguistics?'

b. Wh question
Ne-nun mwe-l kongpwuha-ni?
you-Top what-Acc study-Q
'What do you study?'
It is a standard assumption in the GB framework that \(Wh\)-phrases move to the SPEC of CP position at LF to satisfy \([+WH]\) Comp filter mentioned above even in languages where the \(Wh\)-phrases do not move overtly. Following this assumption, we can say that Korean has covert \(Wh\) movement. This covert \(Wh\) movement is exemplified in (6).

(6) Covert (LF) \(Wh\) movement in Korean

\[
\begin{align*}
\text{SS} & \quad \text{Ne-nun mwe-1 kongpwuha-ni?} \\
& \quad \text{you-Top what-Acc study-Q} \\
& \quad \text{'What do you study?'}
\end{align*}
\]

\[
\begin{align*}
\text{LF} & \quad \text{[CP mwe-1 [IP ne-nun t kongpwuha-ni?]]} \\
& \quad \text{what-Acc you-Top study-Q} \\
& \quad \text{'What do you study?'}
\end{align*}
\]

1.3. Topics of Investigation

This dissertation is a comparative study of selected phenomena involving the acquisition of \(Wh\) questions in English and Korean in a grammar-oriented approach. I adopt a grammar-oriented approach for the reason outlined by O'Grady (1994:2).

There is good reason to think that 'grammar' rather than 'language' should be the focal point of research on linguistic development. As suggested several decades ago by Bloomfield (1926:155), a language is 'the totality of utterances that can be made in a speech community'. Since no one can ever learn the infinite set of utterances that are possible in a speech community, it follows that a language per se cannot be acquired. What can be acquired, however, is the finite grammar that allows members of a speech community to understand and use their language.
This dissertation applies a grammar-oriented approach to a variety of related topics in the acquisition of (simple and multiple) Wh questions, including pied-piping, the subject-object asymmetry, the acquisition of multiple Wh questions, and the scope interaction between a Wh-phrase and a quantifier phrase (henceforth QP). For each topic, the data from English child language and Korean child language will be compared and a unified explanation underlying developmental phenomena in both languages will be sought.

In the remaining sections of this chapter, each topic will be described briefly. The presentation of topics in this dissertation is in a sequence different from that in which the actual experiments were conducted.

1.3.1. Wh Questions and Pied-piping

Nishigauchi (1986) argues that the Subjacency Principle holds at SS and LF alike.

(7) The Subjacency Principle
No movement can cross two bounding nodes (IP (=S) and NP for both English and Korean) in a single step.

In order to make the Subjacency Principle work at both SS and LF, he adopts Ross' (1967) pied-piping convention in accounting for LF movements. Consider the following Korean sentence.
For the question *Nwu-ka ttaylin koyangi-ka wuni?* 'The cat that who hit is crying?' to be interpreted as a request for information, the Wh-phrase should be in the SPEC of CP position. However, there are two possible ways in which the Wh-phrase can be moved to the SPEC of CP position at LF. One is to raise the whole CP which includes the Wh-phrase, as in LF 1. The other is to move only the Wh-phrase, as in LF 2. But, in Nishigauchi's framework, LF 2 violates the Subjacency Principle, since *nwu-ka 'who-Nom' crosses two bounding nodes (IP and NP) on its way to the SPEC of CP position. Therefore, LF 1 is the only possible representation in Nishigauchi's framework. Nishigauchi finds one piece of evidence for his claim in the type of answer the question evokes (even though he used a Japanese example, we use an equivalent Korean example). According to him, answer 1 is the only possible answer to the question.
And this shows it is nwu-ka ttayli-n koyangi 'the cat that who hit' that is questioned, not nwu-ka 'who-Nom' alone.

The issue of whether pied-piping is manifested in this way in child language will be investigated in detail in chapter 2 using data from the acquisition of English and Korean.

1.3.2. The Subject-Object Asymmetry

The issue of the subject-object asymmetry in the acquisition of Wh questions is addressed in chapter 3. O'Grady (1994:138) argues that a structure's computational complexity increases with the number of XP categories (IP, VP etc.) between a Wh-phrase and the associated gap. If his claim is correct, the simple Wh question in which the Wh-phrase occupies the subject position (subject Wh question) should be easier than the Wh question in which the Wh-phrase is in the object position (object Wh question), because the subject Wh-phrase is less deeply embedded than the object Wh-phrase as shown in (9).

(9) Subject Wh question versus object Wh question
a. Subject Wh question
[CP Who [IP t is hitting the cow]]?
b. Object Wh question
[CP Who is [IP the cow [VP hitting t]]]?

The issue of whether subject Wh questions are easier than object Wh questions in child language will be studied in detail in chapter 3.
1.3.3. The Acquisition of Multiple Wh Questions

Chapter 4 discusses the acquisition of multiple Wh questions such as (10) in English and Korean.

(10) Multiple Wh questions in English and Korean
a. English multiple Wh question involving two arguments
Who is eating what?
b. English multiple Wh question involving one argument and one adjunct
*Who is going how?
c. Korean multiple Wh question involving two arguments
Nwu-ka mwe-l meke?
who-Nom what-Acc eat
'Who is eating what?'
d. Korean multiple Wh question involving one argument and one adjunct
Nwu-ka ettehkey ka?
who-Nom how go
'Who is going how?'

Two issues arise here. One is whether there is any difference between English and Korean in terms of the emergence of the multiple Wh question pattern. The other is whether there is any difference in terms of degree of difficulty for children among various types of multiple Wh questions (e.g. those involving two arguments versus those involving an argument and an adjunct). These two issues will be examined in chapter 4.

1.3.4. The Scope Interaction between a Wh-phrase and a QP

Finally, chapter 5 addresses the issue of children's interpretation of the scope interaction between a Wh-phrase and a QP in sentences such as the following.
Sample sentences for the scope interaction between a Wh-phrase and a QP

**English**

a. Who saw everything?
b. What did everyone see?

**Korean**
c. Nwu-ka motunke-1 poassni? who-Nom everything-Acc saw
   'Who saw everything?'
d. Motwu-ka mwe-l poassni? everyone-Nom what-Acc saw
   'What did everyone see?'

As already noted, a Wh-phrase is assumed to be raised to the SPEC of CP position at SS or at LF. A QP is assumed to be raised and adjoined to IP at LF via quantifier raising. Within the GB framework, the scope of a Wh-phrase or a QP is determined by its position at LF. If a Wh-phrase is higher than a QP in the LF representation, it has wider scope than the QP. If a QP is higher than a Wh-phrase, the opposite is true. In chapter 5, we will study whether children's interpretation of the scope interaction between a Wh-phrase and a QP is the same as adults' interpretation.

**1.4. Methodology**

This dissertation is built around experimental data. This is mainly because all the patterns used in the experiments (pied-piped questions, multiple Wh questions, and the scope interaction between a Wh-phrase and a QP) are very rare in children's spontaneous speech. Moreover, even though the subject Wh questions and the object Wh questions are relatively frequent in child language, it is very
difficult to find out which pattern is harder by simply observing naturalistic data.

Three experiments were designed for English--one each for pied piping, scope interaction, and multiple $Wh$ question. The three experiments were presented to 67 English-speaking children living in Honolulu, Hawaii, the U.S.A. (age range: 2 to 8) in that order in one session. The experimenter interviewed each child individually. It took about 10 to 15 minutes for each child to complete all three experiments, each of which involves a comprehension task with the aid of pictures. One of the experimenter's colleagues drew the pictures. The characters used in the pictures were already familiar to the children, because the children had chances of seeing them in story books. The pictures were drawn on 11 X 8.5' paper and presented to the children. However, they are considerably reduced in this dissertation for the sake of presentation.

Seventy-two Korean-speaking children living in Inchen, Korea (age range: 2 to 8) took part in the Korean acquisition study. Four experiments were designed for Korean--one each for pied piping, multiple $Wh$ questions, scope interaction, and the subject-object asymmetry. Pied piping, the multiple $Wh$ question, and the scope interaction experiments are grouped together in one session and presented in that order. The subject-object asymmetry experiment is grouped together with two other experiments in another session (one involving the acquisition of case and
word order and the other concerned with scope interaction between plurals and numerals in Korean; these two experiments are relevant to this dissertation). When enough (at least 20) subjects were found for one age group, each subject participated in only one of the two sessions. When there were not enough (less than 20 but more than 10) subjects for one age group, each subject participated in the two sessions with some break between them. Each session took about 10 to 15 minutes. All three experiments in the first session (pied piping, the multiple Wh question, the scope interaction experiments) consisted of a picture-based comprehension task to be discussed in detail later. In contrast, the subject-object asymmetry experiment consisted of a comprehension task, a production task, and an imitation task to be discussed in chapter 3. All the sessions were tape-recorded for later transcription or checking. Pointing was converted into speech. For example, if the child pointed to the cow, the experimenter said, 'Cow', afterwards so that the experimenter's voice was recorded.
CHAPTER 2. WH QUESTIONS AND PIED-PIPING

2.1. Introduction

A controversy in the literature on the GB syntax has to do with whether the Subjacency Principle (see chapter 1, p. 6 for the definition), which is assumed to apply at Surface Structure (SS), also applies at Logical Form (LF). This controversy is outlined by Watanabe (1992:255):

Since the work by Huang (1982), a common assumption has been that S-structure movement is constrained by Subjacency and the ECP (the definition of the ECP will be provided later in this chapter), whereas LF movement is only sensitive to the ECP. There is, however, a growing body of literature including Barss et al. (1991), Bergvall (1983), Choe (1987), Longobardi (1991), Nishigauchi (1986, 1990), Pesetsky (1987), and Reinhart (1991), which argues that Subjacency applies to LF movement as well.

Nishigauchi (1986, 1990) adduced several pieces of empirical evidence including the nature of "short answers", scope, and weak crossover, for the claim that the Subjacency Principle applies at LF. Among these pieces of evidence, the 'short answer' evidence is the most important, because the validity of the weak crossover as a piece of evidence heavily relies on the validity of the 'short answer' evidence (for discussion, see Nishigauchi 1990:63-74). The purpose of this chapter is to test the validity of the 'short answer' evidence against data from child English and Korean (plus some data from adult English and Korean).

As noted in chapter 1, within the GB framework, every Wh-phrase must move to the matrix SPEC of CP position either at SS or at LF to satisfy the [+WH] Comp filter (see chapter
1, p.2 for definition) and to be interpreted as a request for information. Following Baker (1970), Nishigauchi (1990:28) assumes that felicitous answers are clues to the logical structure (LF) of a Wh question. Consider the following example.

(1) **Question**
The cat that who hit is crying? [quizmaster question with falling intonation, which will be discussed in section 2.2]

**Possible Answers**
a. The cat that the dog hit.
b. The dog.

What Nishigauchi's assumption means is that the short answers such as (1a) and (1b) are clues to constructing LF representation for question (1). If somebody gives an answer like (1a), the LF representation for question (1) should be (2), according to Nishigauchi.

(2) LF for question (1)
[CP the cat that who hit [IP t is crying]]? (the cat that who hit occupies the matrix SPEC of CP position)

In contrast, if somebody gives an answer like (1b), the LF representation for (1) should be (3), according to Nishigauchi.

(3) Alternative LF for question (1)
[CP who [IP [NP the cat [CP that t hit]]] is crying]]? (only who occupies the matrix SPEC of CP position)
Nishigauchi's claim amounts to saying that the short answer should supply information on only elements in the matrix SPEC of CP position (either the Wh-phrase alone, as in (3) or the complex NP which contains the Wh-phrase, as in (2)).

If the Subjacency Principle applies at LF as Nishigauchi argues, (3) is not a legitimate LF representation. This is because it violates the Subjacency Principle, since who crosses two bounding nodes (highlighted IP and NP in (3)) in its movement to the matrix SPEC of CP position. Therefore, (2) should be the only possible LF representation for (1) and (1a) should be the only possible answer to question (1). If somebody gives an answer like (1b), it is, Nishigauchi argues, due to some sort of deletion operation, the conditions on which would be essentially pragmatic in nature.

In order to rule out (3) as an illegitimate LF and to rule in (2) as a legitimate LF, Nishigauchi adopted the Pied-Piping Convention for LF movement. The Pied-Piping Convention was first proposed by Ross (1967) for syntactic movement. A typical example is (4) (Ross 1967:116):

(4) [[[Which boy's] guardian's] employer] did we elect president?

In (4), it is which boy that is questioned, but the larger NP that dominates which boy is "pied-piped" to the sentence-initial position. Nishigauchi (1986, 1990) extended this syntactic convention to LF.
Following Nishigauchi (1986), Choe (1987) argues that, in Korean also, the Subjacency Principle holds at LF and that the pied-piping convention applies at that level of representation.

In this chapter, Nishigauchi's and Choe's pied-piping hypothesis for LF Wh movement will be checked against adult and child language data in English and Korean.

This chapter is organized as follows. Section 2.2 describes materials and the procedure used in the experiments. Section 2.3 describes two control studies with English and Korean adult speakers. Section 2.4 presents results from the actual experiment, while section 2.5 provides discussion. Finally, section 2.6 offers a conclusion.

2.2. Materials and Procedure

2.2.1. Korean

In order to test whether pied-piping takes place at LF in Korean, a sentence type which includes a Wh-word within a relative clause was formulated as follows and five tokens of this type were used in the experiment (for the sake of convenience, this sentence type is called the "pied-piped" sentence throughout this chapter):

(5) Korean "pied-piped" sentence (test sentence)

\[ NP[CP \text{Nwu-ka mi-n}] \text{kay-ka}] \text{nemecyess-ni?} \]

\`The dog that who pushed fell down-Q"

\`The dog that who pushed fell down?"
As in (3), if only \textit{nwu-ka} 'who-Nom' moves to the matrix SPEC of CP position at LF, the Subjacency Principle will be violated (if it holds at LF). \textit{Nwu-ka} 'who-Nom' crosses two bounding nodes (the NP, and the matrix IP) in a single step in its movement to the matrix SPEC of CP position. However, if the larger NP that dominates \textit{nwu-ka} 'who-Nom' (i.e. \textit{nwu-ka min kay-ka} 'the dog that who pushed') is pied-piped to the matrix SPEC of CP position, the Subjacency Principle is not violated. This is illustrated in (6).

(6) LF for (5)

a. Subjacency violated

\[
\begin{array}{c}
\text{bounding nodes} \\
[CP \text{\color{white}Nwu-ka}. [IP [NP [CP t mi-n] kay-ka] nemecyess]-ni]? \\
\end{array}
\]

b. Subjacency satisfied

\[
\begin{array}{c}
\text{bounding node} \\
[CP [NP [CP\text{\color{white}Nwu-ka mi-n]} kay-ka] [IP t nemecyess]-ni]?
\end{array}
\]

However, there is a problem with this type of Korean sentence for a direct comparison between English and Korean. As can be seen in the English gloss in (5), the Wh-word in the English sentence appears in the sentence-medial position (the reason why this specific type of English sentence was chosen for the English experiment will be explained later in this section), whereas the Wh-word in the corresponding Korean sentence appears in the sentence-initial position. Newport et al. (1977:138) argue that children pay special attention to the beginnings of utterances. Moreover, Au et
al. (1994:573) state that findings on human memory suggest that the initial position of a list is also privileged—although not as much as the final position (see Klatzky 1975 on primacy and recency effects in memory). If their claim is correct, we can expect a potential saliency effect for the sentence-initial position. To avoid this effect in Korean test sentences, a sentential adverbial phrase, *i kulim-eyse 'in this picture*', was therefore inserted at the beginning of the Korean test sentences.

As control sentences, another type of sentence which does not involve 'pied-piping' was used in the experiment. An example sentence is illustrated in (7) (for the sake of convenience, this type of sentence is called the non-pied-piped sentence throughout this chapter).

(7) Korean non-pied-piped sentence (control sentence)

\[
[CP \text{ pro } [CP \text{ Nwu-ka so-lul ttaylinta-ko] sayngkakha-ni}]?
\]

\text{Nwu-ka}[IP\text{ cpNwu-ka so-lul ttaylinta-ko] sayngkakha-ni]?

\text{Who-}\text{Nom} \text{ cow-Acc hit-}\text{Comp} \text{ think-}\text{Q}

'Who do (you) think is hitting the cow?'

In (7), the Wh-word appears in an embedded CP which is not embedded in an NP, unlike (5). Therefore, it crosses only one bounding node on its way to the matrix SPEC of CP position at LF, conforming to the Subjacency Principle.

(8) LF for (7)

\[
\text{[CP Nwu-ka[IP CP t so-lul ttaylinta-ko] sayngkakha-ni]}?
\]

\[\text{CP Nwu-ka[IP CP t so-lul ttaylinta-ko] sayngkakha-ni]}?\]
In order to make the control sentences maximally parallel to the test sentences, two things were controlled for in both types of sentence (i.e. (5) and (7)): the linear position of the Wh-word and the depth of embedding between the Wh-word and its associated gap. The Wh-word nwu-ka 'who' appears in the sentence-initial position in both types of sentence. This was possible, because Korean is a pro-drop language. The matrix subject ne 'you' was deleted, since it is recoverable from the context.

Since I used an intransitive verb in the matrix clause of test sentences, the depth of embedding (the number of XP categories, ignoring CP; see chapter 3 for detailed discussion) between the Wh-word and its associated gap was three (the embedded IP, NP, and the matrix IP) in test sentences (see (9)).
The depth of embedding in control sentences is the same as in test sentences (i.e. three; the embedded IP, VP, and the matrix IP).
Again, five tokens of the control sentence type were used in the actual experiment, and a sentential adverbial, *i kulim-eys* 'in this picture', was inserted in the sentence-initial position, to avoid the potential saliency effect for the sentence-initial position.

### 2.2.2. English

An English sentence corresponding to (5) (*The dog that who pushed fell down?*) is either ungrammatical or, at most, marginally grammatical in normal circumstances. If it is ungrammatical, there is no way of comparing Korean data with
English data directly. And this is a great challenge for a comparative study between English and Korean. To get around this problem, I used the so-called quizmaster Wh questions (see, e.g. Authier 1993) in the experiment (this was suggested to me by William O'Grady).

According to Authier (1993), the Wh-phrases in echo questions are nonquantificational and the trace of an echo Wh-operator behaves just like an epithet. Hence, echo Wh questions do not involve true Wh movement. In contrast, Wh-phrases in quizmaster questions are quantificational and therefore undergo true Wh movement. Unlike echo questions, quizmaster questions display a flat or falling intonation. They are, as Postal (1972:47) puts it, "natural only in the mouths of courtroom attorneys, police investigators, and quiz program announcers." Quizmaster questions, just like echo questions, may contain a Wh-in-situ. In this case, a quizmaster Wh question involves LF Wh movement. This is exemplified in (11).

(11) English quizmaster question
a. Surface Structure for the English quizmaster question
For fifteen thousand Bengal tigers, Tom Sawyer's sister-in-law was named what? (Cole 1974)

b. Logical Form
For fifteen thousand Bengal tigers, [CP what[Ip Tom Sawyer's sister-in-law was named t]]?

In order to sound natural, the experimenter pretends to be a quiz program announcer and uses a flat or falling intonation for the English test sentences. The actual English test
sentences and control sentences (which do not involve 'pied-piping') used in the experiment are illustrated in (12) (see the appendix for the complete list of test and control sentences).

(12) English test sentence
a. English "pied-piped" sentence (test sentence)
   \[\text{NP The cat [CP that [IP who hit]]] is crying? [with a falling intonation]}\]

b. English non-pied-piped sentence (control sentence)
   \[\text{The monkey thinks [CP who is hitting the cow?]} [with a falling intonation]\]

As discussed in 2.2.1, if only who moves to the matrix SPEC of CP position at LF in (12a), it violates the Subjacency Principle (if the Subjacency Principle holds at LF). But, if the complex NP which contains who moves to the matrix SPEC of CP position, the Subjacency Principle is not violated. This is illustrated in (13).

(13) LFs for (12a)
a. LF 1 (violating Subjacency)
   \[\text{bounding nodes}
   \begin{array}{c}
   \hline
   \text{CP who [IP [NP the cat that \text{t hit}] is crying]}?
   \\
   \text{UP}
   \end{array}\]

b. LF 2 (conforming to Subjacency)
   \[\text{bounding node}
   \begin{array}{c}
   \hline
   \text{CP [NP the cat that who hit] [IP t is crying]}?
   \\
   \text{UP}
   \end{array}\]

Five tokens for each of these two types (12a and 12b) were used in the experiment.
Compare the Korean non-pied-piped sentence with its English counterpart.

(7) Korean non-pied-piped sentence
[Cp[CpNwu-ka so-lul ttaylinta-ko] sayngkakha-ni]?
who-Nom cow-Acc hit-Comp think-Q
'Who do you think is hitting the cow?'

(12b) English non-pied-piped sentence
The monkey thinks who is hitting the cow? [with a falling intonation]

The agent doing the 'thinking' is you for Korean and the monkey for English. This is because the Korean sentence is natural with you (although deleted here) as the subject of the matrix clause without any context, whereas this is not the case in English quizmaster questions. "You think that who is hitting the cow?" is not natural as a quizmaster question. For this reason, I used slightly different test questions and pictures (see figure 2.1).

English

Korean

Figure 2.1: Pictures for English and Korean non-pied-piped questions
2.2.3. Subjects

The subjects for the experiment consisted of 67 English monolingual children aged 2 to 8 and 72 Korean monolingual children of the same age range. The English-speaking 2 to 4 year-olds attended the University of Hawaii Children's Center in Honolulu, Hawaii. The English-speaking 5 year-olds attended the University of Hawaii Lab School (corresponding to a kindergarten), which is a branch of the University's Curriculum Research Development Group of the College of Education. The English-speaking 6 to 8 year-olds also attended the University of Hawaii Lab School (corresponding to an elementary school). The Korean 2 year-olds attended Hankwuk Preschool in Inchen, Korea, while the Korean 3 year-olds and some of 4 year-olds were preschoolers at Ttolay Preschool and Ttolaytto Preschool in Inchen, Korea. The rest of the Korean 4 year-olds and the Korean 5 to 6 year-olds were kindergartners at Somyeng Kindergarten in Inchen, Korea. The Korean 7 to 8 year-olds were elementary school pupils who live in the experimenter's neighborhood in Inchen, Korea. The number of subjects by age group is given in table 2.1.

<table>
<thead>
<tr>
<th>Age</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
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<td>13</td>
<td>12</td>
<td>8</td>
<td>7</td>
<td>10</td>
<td>8</td>
<td>67</td>
</tr>
<tr>
<td>Korean</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>10</td>
<td>11</td>
<td>10</td>
<td>72</td>
</tr>
</tbody>
</table>
2.2.4. Pretest

To familiarize the child with the task in the actual experiment, a pretest which consists of five questions was provided. Two out of the five were used to test whether children can correctly respond to sentences including a relative clause. For example, showing a picture depicting a tiger hitting a lion and a lion hitting a tiger, the experimenter says, 'Show me the tiger that the lion hit.' Then the child is supposed to say or point to the tiger (see figure 2.2).

Figure 2.2. Picture for the pretest (relative clause)

The remaining three pretest questions were used to familiarize children with the task in the actual experiment and to see whether the quizmaster question works for English-speaking children. For instance, the experimenter says, 'The goat is touching who? [with a falling intonation]' The child is then supposed to say or point to the correct animal (the one who is touched by the goat).
Tables 2.2 and 2.3 show the results from the pretest regarding the acquisition of the relative clause pattern for English and Korean, respectively.

Table 2.2: Number of correct responses for the pretest sentence including a relative clause in English

<table>
<thead>
<tr>
<th>Age # of subjects</th>
<th>Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
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</tr>
<tr>
<td>3</td>
<td>13</td>
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<td>7</td>
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<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>67</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
</tr>
</tbody>
</table>

Table 2.3: Number of correct responses for the pretest sentence including a relative clause in Korean

<table>
<thead>
<tr>
<th>Age # of subjects</th>
<th>Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
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<td>4</td>
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<td>12</td>
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<td>6</td>
<td>10</td>
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<tr>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
</tr>
</tbody>
</table>
As will be discussed in section 2.4.2, English-speaking children gave no pied-piped answers to pied-piped questions, regardless of whether or not they passed the pretest on the relative clause pattern. Korean-speaking children gave a small number of pied-piped answers to pied-piped questions (only 12 times out of 193). This fact indicates that even the children who can recognize the relative clause pattern do not give pied-piped answers to pied-piped questions most of the time, except for a few Korean-speaking children.

Table 2.4 shows the number of the children who passed the pretest (on the relative clause pattern) and the number of pied-piped answers from them.

Table 2.4. Number of the Korean-speaking children who passed the pretest (relative clause)

<table>
<thead>
<tr>
<th>Age</th>
<th># of Correct</th>
<th># of Subjects</th>
<th># of Pied-piped (out of 193)</th>
</tr>
</thead>
<tbody>
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<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>2</td>
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<td>3</td>
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<td>1</td>
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<td></td>
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<td>4</td>
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<td>5</td>
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<td>8</td>
<td>2</td>
<td>6</td>
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<td>3</td>
<td>1</td>
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<td>1</td>
<td>0</td>
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<tr>
<td>Total</td>
<td>2</td>
<td>26</td>
<td>8</td>
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<td></td>
<td>1</td>
<td>30</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>16</td>
<td>1</td>
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</tbody>
</table>
Among the 26 Korean-speaking children who passed the pretest, only four children gave 8 pied-piped answers (1 pied-piped answer from one 4 year-old, 1 from one 6 year-old, 1 from one 7 year-old and 5 from another 7 year-old). The remaining 22 children who passed the pretest gave no pied-piped answer whatsoever.

For the imperative sentence *Show me the monkey* (which is one of the five pretest questions), all the children responded correctly. Most of the English- and Korean-speaking children (96.3% for English and 93.1% for Korean) had no difficulty answering the other two questions (e.g. *The goat is touching who*? [with a falling intonation]). For the question *The goat is touching who*?, the English-speaking 2 year-olds got it 77.8% correct and the English-speaking 3 year-olds 96.2% correct. The English-speaking 4 year-olds and older got it 100% correct. For the same question, the Korean-speaking 2 year-olds got it 61.1% correct and the Korean-speaking 3 year-olds 90% correct. The Korean-speaking 4 year-olds and older got it 100% correct.

2.2.5. The Task

The experiment for both English and Korean consisted of a comprehension task. The experimenter shows the child a series of two pictures and asks a question exemplified in (5), (7), and (12) regarding one of the two animals involved in the pictures. Looking at a series of two pictures, the child is supposed to either say the answer or point to the
correct animal. However, only verbal answers from the children are relevant to the pied-piping issue, since we can recognize whether children give pied-piped answers to "pied-piped" questions only when they verbalize their answers.

A sample interaction between the experimenter and the child is given in (14) and a sample picture for "pied-piped" questions in figure 2.3.

(14) Sample Interaction (for both English and Korean) [see the appendix for the Korean version of the instructions]
*Pretest:
**Experimenter:** I'm going to show you a picture and I'm going to ask you to point to an animal in the picture. Let's try one. Are you ready?
   a. Show me the monkey.
   b. Show me the tiger that the lion hit.
   c. Show me the mouse that the goat touched.
**Child:** (is supposed to point to the correct animal)
**Experimenter:** Very good. Now I'm going to show you some pictures and see if you can answer my questions about what is going on in the picture. Are you ready to try one?
   d. The goat is touching who? (a quizmaster question for English and a normal Wh question for Korean)
   e. The tiger is hitting who?
**Child:** (is supposed to either say the answer or point to the correct animal)

*Test:
**Experimenter:** Very good. Now let's try some more.
   f. The cat that who hit is crying? (the "pied-piped" question)
   g. The monkey thinks who is hitting the cow? (the non-pied-piped question)
**Child:** (is supposed to either say the answer or point to the correct animal)
Figure 2.3: A sample picture for English and Korean "pied-piped" questions (for question f)

Five "pied-piped" test sentences and five non-pied-piped ones were arranged in random order (see the appendix for the complete list of test and control sentences). Each question was initially presented once; if the child indicated confusion, failure to understand, or hesitation, the question is presented a second and final time. Regardless of the child's response, the experimenter said 'OK. Now let's try another one.' If the child responded by pointing instead of verbalizing the answer, the pointing answer was recorded. If the child both pointed and verbalized, both were recorded.

The experiment was conducted in a quiet room in the child's preschool or kindergarten, except for the Korean 7 and 8 year-olds, who participated in the experiment at the experimenter's home in Inchen, Korea. All the sessions were tape-recorded for later transcription and checking.
2.3. Control Study

The subjects for this control study consisted of 10 adult native speakers of English and 10 adult native speakers of Korean studying at the University of Hawaii. Two tokens for each of the two types (pied-piped and non-pied-piped questions) described above were used for both English and Korean in this control study. The procedure for Korean was just the same as described above (section 2.2). However, the procedure for the English control study was a little different from that for the English experiment. Instead of using the quizmaster question, the English control study involved a type of echo question. (The author did not think of the quizmaster question at the time of the control study. William O'Grady supplied it to the author at the time of the actual experiment. Cf. p. 22.) The instruction and the echo question used in the English pilot study are illustrated in (15). The pictures used in the control study were the same as those used in the actual experiments (see figures 2.1 and 2.3 above).

(15) Procedure for the English control study
Instruction: I will show you a series of two pictures and say a sentence about the pictures. And then I will ask a question. Please answer the question. Are you ready?

Test question for (12a) in the English control study
Statement: (showing figure 2.3) The cat that the dog hit is crying.
Question: The cat that WHO hit is crying? (with WHO stressed)

Test question for (12b) in the English control study
Statement: (showing figure 2.1) The monkey thinks the dog is hitting the cow.
**Question:** The monkey thinks WHO is hitting the cow? (with WHO stressed)

Though the procedure for the English control study is not without problem (as noted earlier, Authier 1993 argues that echo questions are not quantificational and that the trace of an echo Wh-operator behaves like an epithet), the English-speaking adult subjects interpreted the Wh-words in (15) as a request for information and gave appropriate answers to the questions.

Tables 2.5 and 2.6 show the number of pied-piped answers to the test questions (the cat that who hit is crying? [the pied-piping pattern] versus the monkey thinks who is hitting the cow? [the non-pied-piping pattern] for English and the equivalent nwu-ka ttaylin koyangi-ka wuni? versus nwu-ka koyangi-lul ttaylintako sayngkakhani? for Korean). Pied-piped answers here refer to, for instance, the cat that the dog hit for the pied-piping pattern and the dog is hitting the cow for the non-pied-piping pattern for English and kay-ka ttaylin koyangi for the pied-piping pattern and kay-ka koyangi-lul ttaylintako for the non-pied-piping pattern for Korean.

<table>
<thead>
<tr>
<th>Table 2.5: Number of pied-piped answers from adult English speakers [(12a): pied-piped questions, (12b): non-pied-piped questions]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>(12a)</td>
</tr>
<tr>
<td>(12b)</td>
</tr>
</tbody>
</table>
Table 2.6: Number of pied-piped answers from adult Korean speakers [(5): pied-piped questions, (7): non-pied-piped questions]

<table>
<thead>
<tr>
<th></th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>O</th>
<th>P</th>
<th>Q</th>
<th>R</th>
<th>S</th>
<th>T</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>0/2</td>
<td>0/2</td>
<td>0/2</td>
<td>2/2</td>
<td>0/2</td>
<td>0/2</td>
<td>0/2</td>
<td>2/2</td>
<td>2/2</td>
<td>2/2</td>
<td>6/20</td>
</tr>
<tr>
<td>(7)</td>
<td>0/2</td>
<td>0/2</td>
<td>0/2</td>
<td>2/2</td>
<td>1/2</td>
<td>0/2</td>
<td>0/2</td>
<td>0/2</td>
<td>2/2</td>
<td>0/2</td>
<td>3/20</td>
</tr>
</tbody>
</table>

Capital letters in these tables refer to individuals. J in table 2.5 considered (12a) so totally ungrammatical that he could not process it.

If Nishigauchi's (1986, 1990) and Choe's (1987) claim is correct and applies universally, it must be the cat that who hit for English and nwu-ka ttaylin koyangi for Korean, not just who and nwu-ka, that undergo LF Wh movement to avoid a violation of the Subjacency Principle. And the answers to the pied-piping pattern should be the cat that the dog hit and kay-ka ttaylin koyangi, rather than the dog and kay (or, at least, the subjects should prefer the former answer to the latter). As can be seen in tables 2.5 and 2.6, the pied-piped answer is not dominant and not preferred to the non-pied-piped one (6 instances vs. 12 for English and 6 instances vs. 14 for Korean). Based on adult English and Korean data, we can conclude that Nishigauchi's and Choe's prediction is not correct. Contrary to their claim, non-pied-piped answers are preferred to pied-piped ones in both English and Korean.
2.4. Results

2.4.1. Scoring

Two issues are at stake here. One is whether English- and Korean-speaking children give pied-piped answers to "pied-piped" questions (e.g. (12a) for English and (5) for Korean). The other is whether the test sentences (12a) and (5) are more difficult than the control sentences (12b) and (7), respectively. Only verbal answers from the children are relevant to the first issue, since we can recognize whether children give pied-piped answers to (12a) and (5) only when they verbalize their answers. If, for example, an English-speaking child answers the question *The cat that who hit is crying?* by saying, not just pointing to, *The cat that the dog hit*, then it is counted as a pied-piped answer. If he says *The dog*, it is counted as a non-pied-piped answer.

Both verbal and pointing answers are relevant to the second issue (i.e. the relative difficulty between test sentences and control sentences). The answers from the children were scored as correct, if the children say or point to the correct animal. For instance, when asked *The monkey thinks who is hitting the cow?* with a picture depicting a monkey thinking that the dog is hitting the cow (see figure 2.1), if the child says or points to the dog, it is scored as correct. All other answers such as pointing to the cow or the monkey were marked as incorrect. These errors are analyzed in detail in 2.4.3. (Error Analysis).
2.4.2. Results from the Actual Experiment

We can recognize whether children give pied-piped answers to pied-piped questions, only when they verbalize their answers. English-speaking children gave verbal answers to pied-piped questions 184 times out of 335 and Korean-speaking children 193 times out of 360. English-speaking children verbalize their answers to non-pied-piped questions 212 times out of 335 and Korean-speaking children 217 times out of 360. English-speaking children gave no pied-piped answers to pied-piped questions whatsoever, while Korean-speaking children gave 12 pied-piped answers to pied-piped questions. On the other hand, both English- and Korean-speaking children gave no pied-piped answers to the control questions (non-pied-piped questions). The Korean data thus show a mild asymmetry between the two types of question. The pied-piped questions in Korean elicited 12 pied-piped answers out of 193, while the control questions elicited none. However, the proportion of the pied-piped answers in Korean is very small (12 out of 193 or 6.2%). [See also pp. 28-9 for the analysis of the pied-piped answers.] Hence, these child language data still undermine Nishigauchi's (1986, 1990) and Choe's (1987) claim that pied-piped answers are preferred to non-pied-piped ones for pied-piped questions.

Tables 2.7 and 2.8 show the number, percentage and mean scores for pied-piped and non-pied-piped questions given by
the different age groups for English and Korean, respectively.

Table 2.7: Number of correct responses given by English-speaking children [(12a): pied-piped questions, (12b): non-pied-piped questions]

<table>
<thead>
<tr>
<th>Sentence type (12a)</th>
<th>(12b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age # of subjects</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
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<tr>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>67</td>
</tr>
<tr>
<td>Mean</td>
<td>3.358/5</td>
</tr>
</tbody>
</table>

The results from English data are very much similar to those from Korean data. This may be because we used English questions involving LF Wh movement in our experiment and the same principle or mechanism applies to both English and Korean LF Wh movement.
Table 2.8: Number of correct responses given by Korean-speaking children [(5): pied-piped questions, (7): non-pied-piped questions]

<table>
<thead>
<tr>
<th>Sentence type</th>
<th>(5)</th>
<th>(7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age # of subjects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>11/45(24.4%)</td>
<td>34/45(75.6%)</td>
</tr>
<tr>
<td>3</td>
<td>16/50(32%)</td>
<td>42/50(84%)</td>
</tr>
<tr>
<td>4</td>
<td>36/50(72%)</td>
<td>47/50(94%)</td>
</tr>
<tr>
<td>5</td>
<td>38/60(63.3%)</td>
<td>53/60(88.3%)</td>
</tr>
<tr>
<td>6</td>
<td>39/50(78%)</td>
<td>50/50(100%)</td>
</tr>
<tr>
<td>7</td>
<td>48/55(87.3%)</td>
<td>55/55(100%)</td>
</tr>
<tr>
<td>8</td>
<td>50/50(100%)</td>
<td>50/50(100%)</td>
</tr>
<tr>
<td>Total</td>
<td>238/360(66.1%)</td>
<td>331/360(91.9%)</td>
</tr>
<tr>
<td>Mean</td>
<td>3.306/5</td>
<td>4.597/5</td>
</tr>
</tbody>
</table>

As can be seen in tables 2.7 and 2.8, pied-piped questions were much harder than non-pied-piped questions for both English- and Korean-speaking children in all age groups to answer (67.2% versus 92.5% for English and 66.1% versus 91.9% for Korean). And this difference is statistically significant (p-value=.0001, F-value=39.565 for English and p-value=.0001, F-value=57.363 for Korean). This difference is schematically represented in figures 2.4 and 2.5 (C stands for Control (=non-pied-piped question) and P for Pied-piped question).
2.4.3. Error Analysis

Since the picture for the test questions (12a) and (5) (see figure 2.6 below) involves only two animals, there is only one type of error for the test question (e.g. The cat that who hit is crying?). When asked The cat that who hit is crying? with a picture depicting a dog hitting a cat and the cat crying (figure 2.6), if the child says or points to the cat instead of the dog, it is counted as an error. This
type of error occurred 110 times out of 335 in English and 122 times out of 360 in Korean.

Figure 2.6: Picture for English and Korean "pied-piped" questions

Since the picture for the English control question involves three animals, there are two types of errors for the English control question (e.g. The monkey thinks who is hitting the cow?). When asked The monkey thinks who is hitting the cow? with a picture depicting a monkey thinking that a dog is hitting a cow (see figure 2.7 below), if the child says or points to the monkey or the cow instead of the dog, it is marked as an error. For the control question, children point to the monkey 12 times out of 335. Children point to the patient animal (in the above question, the cow) 13 times out of 335.

Even though the picture for English control question involves three animals while the picture for Korean control question involves two animals, this did not result in higher
scores for the English control questions harder (92.5% correct in English and 91.9% correct in Korean).

Since the Korean control sentence (Who do you think is hitting the cow? with a picture depicting a dog hitting a cow) involves only two animals, there is only one type of error (pointing to the cow instead of the dog) for the Korean control sentence. This type of error occurred 29 times out of 360.

Figure 2.7: Pictures for English and Korean non-pied-piped questions

2.5. Discussion

In order to argue that Korean LF Wh movement involves pied-piping when the Wh-word is embedded in a complex NP (an NP modified by an S), Choe (1987) adduced a very complex Korean example which includes double embedding.

(16) ?[s\[s{NP}\[s\[s{NP}\[s\[s Nwu-ka cwuk-ess-ta]-nun]kisa]-lul
  who-Nom die-Past article-Acc
  panpakha]-n]salam]-ul manna-ess-upni]kka]?
criticize person-Acc meet-Past Q
'* Who did you meet the person who criticized the article (that says) that t died?' [*: ungrammatical]
I agree with him that total repetition of the highest NP (Andropov-ka cwukesstanun kisa-lul panpakhan salam-iptnita 'the person who criticized the article (that says) that Andropov died') is the preferred answer for this specific question. Based on this example (the short answer evidence) and the weak crossover phenomenon in Korean and Japanese (see Choe 1987:347-53 for discussion), Choe concludes it is not nwu-ka 'who-Nom' alone but nwu-ka cwukesstanun kisa-lul panpakhan salam 'the person who criticized the article (that says) that t died' that undergoes LF Wh movement in (16) and that the Subjacency Principle also holds at LF in Korean and Japanese.

If Nishigauchi's and Choe's claim is correct, pied-piping should take place in all Wh questions which include a Wh-word in a complex NP and total repetition of the highest NP should be the preferred answer. However, this seems plausible only for (16), which includes double embedding. If we take a simpler sentence as in our experiment (nwu-ka ttaylin koyangi-ka wuni? 'The cat that who hit is crying?'), their claim does not hold. The preferred answer for this type of question was a non-pied-piped one in all cases (English-speaking children and adults as well as Korean-speaking children and adults). The non-pied-piped answer (for example, kay-ka or the dog) is an answer for the Wh-word itself (nwu-ka or who), not for the complex NP which includes the Wh-word (nwu-ka ttaylin koyangi-ka or the cat that who hit). And this implies it is only nwu-ka or who,
not nwu-ka ttaylin koyangi-ka or the cat that who hit that is raised to the matrix SPEC of CP position at LF. Even though giving a non-pied-piped answer is a violation of the Subjacency Principle (according to Nishigauchi and Choe), pied-piped questions and non-pied-piped answers for those questions are grammatical to both English- and Korean speakers (adults as well as children).

Therefore, based on the results from the control study and the experiment I performed, I would conclude that pied-piping does not take place at LF when a Wh-word is embedded in a complex NP and that the short answer evidence does not support the claim that the Subjacency Principle applies at LF in English and Korean. Based on evidence from adult language, many other scholars argue that the Subjacency Principle does not hold at LF (for example, Huang 1982 for English and Chinese, Lasnik and Saito 1984, Mahajan 1994 for Hindi among others). My data seem to support their view.

My data could also be construed as evidence for non-movement account of Wh-in-situ patterns. Aoun and Li (1993) suggest that a Wh-in-situ does not need to raise to the SPEC of CP at LF and that the Wh-in-situ is coindexed and interpreted with respect to a question operator (Qu-operator) that is raised to the appropriate SPEC of CP position by SS. This is illustrated in (17).
As mentioned in section 2.1, Nishigauchi claims that the short answer should supply information on only elements in the matrix SPEC of CP position. In Aoun and Li's analysis, the element in the SPEC of CP position is Qu-operator. And this Qu-operator is coindexed with who, not with the cat that who hit. Therefore, if Nishigauchi's claim and Aoun & Li's claim are correct, the short answer should supply information on who, not on the cat that who hit. Namely, the short answer should be 'the dog', not 'the cat that the dog hit'.

Another issue in this chapter is why pied-piped questions (nwu-ka ttae-kin koyangi-ka wuni? or the cat that who hit is crying?; test sentence) were harder to answer than non-pied-piped questions (nwu-ka so-lul ttae-kintako sayngkakhani? or the monkey thinks who is hitting the cow?; control sentence).

The first possible answer to this question might be that pied-piped questions include a relative clause while non-pied-piped questions do not. According to Kim (1987), English-speaking children begin to produce relative clauses at 2;8 on the average and Korean-speaking children at around 2;0. This implies both English-speaking and Korean-speaking children acquire relative clause construction by age 3 at the latest. However, as the results from the pretest show
(see 2.4.2), both English- and Korean-speaking children had a hard time interpreting sentences including a relative clause in an experimental setting (55.2% correct for English and 56.9% correct for Korean). This may be the reason why pied-piped questions are harder than non-pied-piped questions for both English- and Korean-speaking children.

Another alternative explanation is attributed to the Empty Category Principle (ECP).

(18) The Empty Category Principle
All traces must be properly governed---either antecedent-governed by an antecedent (c-commanded by and coindexed with the antecedent without any barrier between the antecedent and its trace) or lexically governed (selected) by a lexical head.

The Wh-word is extracted out of an adjunct CP (a relative clause) in (12a), whereas it is extracted out of an argument CP (a complement clause) in (12b). According to Chomsky (1986), an adjunct CP is not L-marked (selected by a lexical category) and, therefore, is a barrier. This barrier blocks the proper government (antecedent-government) of the trace of the Wh-word resulting in a violation of the ECP. On the other hand, an argument CP is L-marked (selected by the verb) and, hence, not a barrier. So the trace of the Wh-word is properly governed (antecedent-governed by the Wh-word) and the ECP is satisfied. For this reason, (12b) might be easier than (12a).

In order to choose between the two competing accounts (the relative clause account versus the ECP account), we
need a new sentence type which includes no relative clause but violates the ECP. This type of test sentence and the control sentence for it are given in (19).

(19) Test sentence and control sentence for a future experiment

a. Test sentence for English
The dog talks to the cat before who talks to him? [a quizmaster question with a falling intonation]

\[
\text{LF} \\
\text{barrier} \\
[\text{Ip the dog talks to the cat} [\text{Ip } t_i \text{ talks to him}] ]
\]

\[
\text{not properly governed}
\]

b. Control sentence for English
The dog tells the cat that who hits the cow? [a quizmaster question with a falling intonation]

\[
\text{LF} \\
[\text{Ip the dog tells the cat} [\text{Ip } t_i \text{ talks to the cat} ] ]
\]

\[
\text{properly governed}
\]

In the LF for (19a), the highlighted \( t_i \) is not properly governed, because the embedded CP is an adjunct clause (which is not selected by the verb), and therefore a barrier. The antecedent who\( i \) cannot antecedent-govern \( t_i \) due to this barrier. On the other hand, the highlighted \( t_i \) is properly governed (antecedent-governed by who\( i \)) in the LF for (19b), because the embedded CP is a complement clause (which is selected by the verb), and therefore is not a barrier. In sum, (19a) violates the ECP whereas (19b) does not.

If (19a) is more difficult than (19b) for children, then it suggests that the ECP account is better than the relative clause account. The difficulty of (19a) cannot be
attributed to the presence of a relative clause, because (19a) does not include any relative clause. Therefore, the key reason why (19a) is more difficult than (19b) should be the fact that the former violates the ECP while the latter does not.

But, if there is no difference between (19a) and (19b) in terms of the degree of difficulty, it suggests that the relative clause account is better than the ECP account: (12a) in our experiment is more difficult than (12b), because it includes a relative clause. However, I will not pursue this issue further and I will leave it for future research.

2.6. Conclusion

In this chapter, Nishigauchi's (1986, 1990) and Choe's (1987) claim that the Subjacency Principle applies at LF and that pied-piping should take place to avoid a violation of the Subjacency Principle when a Wh-word is embedded in a complex NP was checked against English and Korean child language data (plus some adult language data from the control study). It was shown that their claim is not correct. Therefore, the short answer evidence is not valid for the claim that the Subjacency Principle holds and that pied-piping takes place when a Wh-word is embedded in a complex NP.

Secondly, whether the question with the Wh-word embedded in a relative clause (12a) is more difficult for
children to answer than the question with the Wh-word embedded in a complement CP (12b) was discussed using English and Korean child language data. The finding was that the former type of question is significantly more difficult than the latter. This is attributed to the ECP. Another alternative explanation (the relative clause account) was also suggested. Finally, the way of choosing between these two competing accounts was presented.

Notes
1. An epithet is a definite NP that functions quasi-pronominally. Overt epithets occur in:

i) I went to visit John Smith last week, but the man was too busy to talk to me.
ii) All of Bill's friends love the guy.

The traces of non-QPs have the character of null epithet. Epithets obey Principle C.

iii) *John Smith denied that the man was too busy to see me. [Principle C violation]

Thus, we expect Strong Crossover (= Principle C violation) effects with their null counterparts.

iv) *John, I think he told Mary to visit e.

(For more detailed discussion, see Lasnik and Stowell 1991:687-720.)

2. Of course, we need an independent pretest to establish that children can handle adverbial adjunct clauses.
CHAPTER 3. THE SUBJECT-OBJECT ASYMMETRY IN THE ACQUISITION OF WH QUESTIONS

3.1. Introduction

In monoclausal Wh questions, the Wh-word can function as the subject or the direct object of the sentence. The Wh question where the Wh-word functions as the subject is referred to as the subject Wh question. And the Wh question where the Wh-word functions as the direct object is called the object Wh question.

(1) Subject and object Wh questions

Subject Wh question
Who is hitting the cow?

Object Wh question
Who is the cow hitting?

A recurring issue in the field of the acquisition of Wh questions has to do with whether subject Wh questions (for example, Who is hitting the cow?) are easier for children to acquire than object Wh questions (for example, Who is the cow hitting?).

Several researchers have proposed different ideas on the issue of this possible subject-object asymmetry. This section presents previous research (three studies on English) on this question. These studies will be compared with my own study for Korean. Section 3.2 discusses relevance of elicited imitation task, elicited production task, and comprehension task to language acquisition study. Section 3.3 describes materials and procedure used in the
comprehension task and presents the results from that task. Section 3.4. describes materials and procedure used in the production task and provides the results from that task, while section 3.5 describes materials and procedure used in the imitation task and presents the results from that task. Section 3.6 provides discussion. Finally, section 3.7 offers a conclusion.

3.1.1. Tyack and Ingram (1977)

Tyack and Ingram (1977:218) observed in their comprehension study of English Wh questions that who-subjects were easier than who-objects (80% correct versus 56% correct) and that what-objects were easier than what-subjects (57% correct versus 35% correct).

(2) Test sentences in Tyack and Ingram's study (p. 217)

**who-subject**
Who is touching the boy?

**who-object**
Who is the boy touching?

**what-subject**
What is touching the boy?

**what-object**
What is the boy touching?

They account for this asymmetry in terms of the animacy effect. They claim that the who-subject preference supports the hypothesis proposed by Ervin-Tripp (1970) that who is associated through its animacy feature with the subject position, whereas inanimate what is more closely identified
with the object. Consistent with this idea, Pinker (1984:39) argues that propositions with action predicates involving the semantic relations **agent-of-action** and **patient-of-action** are expressed using the grammatical relations **SUBJ** and **OBJ** in maternal speech.

Presumably, notions such as physical object, agent-of-action, and patient-of-action are available to the child perceptually and are elements of the semantic representation as part of the input to the language acquisition mechanisms. According to Pinker (ibid.), the child assumes that the correspondences such as **subject-agent** and **object-patient** hold in the linguistic input. Since **who** has animacy features, it can be readily associated with the agent role and the subject relation, just as **what** is easily identified with the patient role and the object relation, because it has no animacy features.

Tyack and Ingram's claim for English can be applied to Korean, even though Korean has a different mechanism for **Wh** questions. Let us review the difference between English **Wh** questions and Korean **Wh** questions before looking into the applicability of Tyack and Ingram's account to Korean. First of all, Korean **Wh** questions involve a different word order from English **Wh** questions (SOV versus SVO).¹ Another major difference between the two languages is that Korean does not involve overt (Surface Structure) **Wh** movement whereas English does. These two differences are illustrated in (3).
(3) Difference between English and Korean Wh questions

a. English Wh question (Surface Structure)
[CP who [IP t is hitting the cow?] ] : subject Wh question
[CP who is [IP the cow hitting t?] ] : object Wh question

b. Korean Wh question (Surface Structure)
[CP[Ip nwukwu-ka so-lul taylye?] ] : subject Wh question
who-Nom cow-Acc hit
'Who is hitting the cow?'
[CP[Ipso-ka nwukwu-lul taylye?]]: object Wh question
cow-Nom who-Acc hit
'Who is the cow hitting?'

In spite of these differences between English and Korean Wh questions, nwukwu 'who' in Korean has animacy features, whereas mwues 'what' does not. Since the animacy features are semantic in nature, the syntactic differences between the two languages shown above should not make any difference for Tyack and Ingram's claim. Therefore, all other things being equal, nwu-ka 'who-Nom'-subjects should be easier than nwukwu-lul 'who-Acc'-objects and mwues-ul 'what-Acc'-objects easier than mwues-i 'what-Nom'-subjects in Korean.

Tyack and Ingram's claim will be checked against data from the acquisition of English and Korean multiple Wh questions (chapter 4). Based on these data, we will conclude that Tyack and Ingram's claim is not correct (this issue will be discussed in detail in section 3.6). For this reason, I included only the Wh questions with nwukwu 'who' in my experiment.

3.1.2. Hanna and Wilhelm (1992)

Hanna and Wilhelm (1992) carried out an experiment on the acquisition of English subject and object Wh questions.
Their experiment consisted of a production task and a comprehension task involving eleven children aged 3;4 to 4;7 years. Their comprehension task, which was modeled on Tyack and Ingram's, yielded no apparent preference. On the other hand, the sharpest contrast showed up in the production task, which yielded the results depicted in table 3.1. (O'Grady 1994:137). The procedure for the production task is summarized nicely in O'Grady (1994:136) as follows. Two experimenters presented the child with a picture depicting an action involving two participants, one of whom was covered over. The child was then given a prompt such as the following (for the who-object sentence type):

Experimenter I (pointing to the picture): The bear is biting someone, and I know who.
Experimenter II: Can you make up a question to find out who?

The experiment began with the two experimenters modeling a series of examples; only one child (the youngest) refused to participate or did not understand what was expected. Table 3.1 shows the results from Hanna and Wilhelm's experiment.

<table>
<thead>
<tr>
<th>type</th>
<th>3;4-3;6 (5 children)</th>
<th>4;1-4;7 (5 children)</th>
</tr>
</thead>
<tbody>
<tr>
<td>subj WH</td>
<td>12 (40%)</td>
<td>21 (70%)</td>
</tr>
<tr>
<td>obj WH</td>
<td>13 (43.3%)</td>
<td>15 (50%)</td>
</tr>
</tbody>
</table>
As can be seen in table 3.1, the younger children did poorly (gave a small number of correct answers) on both subject and object questions, getting fewer than half right. The older children also did poorly on the object questions (50% correct), but performed relatively well on the subject questions (75% correct). This suggests that subject questions are easier than object questions.

O'Grady (1994:137-38) offers a purely syntactic account for the subject preference in the acquisition of English Wh questions. O'Grady originally adopted a non-movement analysis of English Wh questions, but his account can be easily translated into the GB framework. In the GB framework, it is assumed that every Wh-word in the subject position must move from the SPEC of IP position to the SPEC of CP position at SS in English and at LF in Korean. On the other hand, the Wh-word in the object position moves from the complement of V position to the SPEC of CP position to be interpreted as a request for information. This is illustrated in (4) below.

O'Grady argues that the subject preference in the acquisition of Wh questions reflects the depth of embedding of the gap associated with the sentence-initial Wh word. The relationship in object Wh questions extends over both an S (or IP) boundary and a VP boundary, whereas it extends over only an S boundary in subject Wh questions. This is also illustrated in (4).
(4) Wh movement in English and Korean

a. English subject Wh question (Surface Structure)
   \[ \text{[CP who } \text{IP } t \text{ is hitting the cow?]} \]

b. English object Wh question (Surface Structure)
   \[ \text{[CP who is } \text{IP the cow } \text{VP hitting } t \text{?}]} \]

c. Korean subject Wh question (Logical Form)
   \[ \text{[cpnwu-ka } \text{IP } t \text{ so-lul t taylye:]} \]

   'Who is hitting the cow?'

d. Korean object Wh question (Logical Form)
   \[ \text{[cpnwukwu-lul } \text{IP so-ka } \text{VP } t \text{ taylye:]} \]

   'Who is the cow hitting?'

O'Grady (ibid.:138) formulated this as follows:

(5) O'Grady's depth of embedding account

A structure's computational complexity increases with the number of XP categories (S, VP, etc.) between a gap and the element with which it is associated (i.e. between a Wh-word and the associated gap).

As can be seen in (4), who-subject in English and nwu-ka 'who-Nom' in Korean move to the SPEC of CP position in the GB framework crossing only one XP (IP) whereas who-object and nwukwu-lul 'who-Acc' move to the same position crossing two XP categories (IP and VP). Therefore, the subject Wh questions are less computationally complex and easier than the object Wh questions.

Collins (1994:55) provides a similar line of reasoning. He proposes that internal to the operation of Form Chain, the length of the derivation is to be measured in terms of the number of the nodes traversed during the derivation. Based on this, he further argues that there must be at least
two measures of Economy (see Epstein 1992): the number of nodes traversed and the number of operations of Form Chain. Then, to put the depth of embedding account in Collins' term, the more nodes traversed during the SS or LF Wh movement, the less economical the derivation is and, probably, the more difficult the Wh question is.

O'Grady's idea will be studied in detail in this chapter.

3.1.3. Stromswold (1988)

Quite opposite to Tyack & Ingram's and Hanna & Wilhelm's claim, Stromswold (1988) argues that object Wh questions are easier than subject Wh questions. After examining the spontaneous speech transcripts of the twelve English-speaking children (age range 0;11 to 6;6), she concludes that the children asked their first object question 1.5 months before they asked their first subject question and that the children produced three times as many object questions as subject questions. Based on these production data, she suggests that children find subject questions harder than object questions. She explains this asymmetry in terms of the Empty Category Principle (ECP).

(6) The ECP
All traces must be properly governed.

There are two ways a trace can be properly governed. On the one hand, a Wh-trace can be directly theta-governed by a
verb, as is the case with object Wh-traces. Alternatively, a Wh-trace can be indirectly or antecedent-governed by a Wh-word via a chain, as is the case with subject Wh-traces.

(7) Two types of proper government
a. antecedent-government in the subject Wh question
   [CP Who [IP \( t \) is hitting the cow?]]

b. theta-government in the object Wh question
   [CP Who [IP is the cow hitting \( t \)?]]

According to Stromswold, theta-government by a verb is more direct and less complicated than antecedent-government by a Wh-word. It seems plausible, therefore, that questions with theta-governed gaps (i.e. object Wh questions) should be acquired before questions with antecedent-governed gaps (i.e. subject Wh questions). Even though Stromswold did not provide a specific reason why theta-government by a verb is more direct and less complicated than antecedent-government by a Wh-word, we can speculate that this is so because theta-government involves a head-complement relation which is the most local of all structural relationships. On the other hand, antecedent-government involves a less local relation between a Wh-word and its trace. This is illustrated in (8).
It is widely accepted within the GB framework that the ECP applies either at SS or at LF (Huang 1982). Then, we can expect that Stromswold's ECP account for English also applies to Korean.

However, according to Huang (ibid.), there is one big difference between Chinese-type languages (possibly including Korean) and English-type languages. Huang argues that Infl is a lexical category in Chinese whereas it is a functional category in English. If Infl is a lexical
category in Korean as in Chinese, Stromswold's claim cannot be directly applied to Korean. The trace of the subject Wh-word can also be lexically governed by Infl. If this is correct, Stromswold's claim predicts that there should be no difference between subject Wh questions and object Wh questions in terms of degree of difficulty, because the traces of both types of Wh-words (subject Wh-words and object Wh-words) are lexically governed (or theta-governed) by a lexical category (by a verb in the case of the object trace and by an Infl in the case of the subject trace).

However, if Infl is a functional category in Korean as Han (1987), Choe (1988), and Lee (1993) argue, Stromswold's claim for English can be directly applied to Korean. As in English, object Wh questions which include theta-governed gaps should be easier than subject Wh questions which include antecedent-governed gaps.

In sum, Stromswold's claim predicts either that object Wh questions are easier than subject Wh questions in Korean as in English (if Infl is a functional category in Korean), or that object Wh questions are as easy as subject Wh questions in Korean unlike English (if Infl is a lexical category in Korean). Stromswold's claim will be checked against data from the acquisition of Korean Wh questions in this chapter.
3.2. Relevance of Elicited Imitation Task, Elicited Production Task, and Comprehension Task to Language Acquisition Study

One of the three methods of experimentation used in this chapter is elicited imitation. The task is described in Lust et al. (1987:284, cited by Sarma 1991) as follows:

The elicited imitation task provides a test of language production. It involves a direct request for the child to repeat a sentence presented as a model for the child. Elicited imitation data consist of the child's attempted reproduction of the stimulus in response to this request. These data are measured in terms of comparison of the child's utterance to the model utterance with regard to specific features of the stimulus sentence which may be systematically varied. The sentences may or may not accord with certain principles of UG or parameter settings, for example. On the assumption that the child's production in the elicited situation reflects their ability for construction of the model sentence, elicited imitation specifically reflects a map between the adult grammar (involved in the experimenter's construction of the model sentence) and the child grammar (involved in the child's construction of the model).

Lust et al. (ibid.:287, cited by Sarma 1991:59) made the following further statement regarding the fundamental assumption on which elicited imitation is based:

Elicited imitation is reconstructive,... in imitation, the child must analytically access and store specific features of the stimulus sentence and consult these in the reconstruction of the stimulus. These linguistic features are not limited solely to surface characteristics of the stimulus sentence. ... the child's elicited imitation reflected the child's "own productive system" (Slobin and Welsh 1973:490) where this system must include the child's theory of the structure of the stimulus sentence. Since the child's theory of language structure must reflect its grammatical competence, such elicited imitation data could be said to reflect the grammatical competence of the child.

Slobin and Welsh (1973) also argue that elicited sentence imitation is a useful research tool in developmental psycholinguistics. Following Lust et al. and
Slobin & Welsh, we conclude that elicited imitation is a useful research tool for language acquisition study.

A second experimental task used in this chapter is elicited production. Sarma (1991:62) argues that incorrect utterances in spontaneous production do not necessarily represent lack of knowledge of the target structure, whereas correct production of a structure in an experimental setting is taken to imply knowledge of it. Her claim is supported by Crain (1988, cited by Sarma 1991:63). Crain states:

Successful production by children is a strong indicator of underlying linguistic competence. Because there are so many ways to combine words incorrectly, consistently correct combinations in the appropriate contexts are not likely to come about by accident.

Following Sarma and Crain, we conclude that elicited production is another useful research tool for language acquisition study.

The third experimental task used in this chapter involves a comprehension task. Many language acquisition researchers (Crain et al. 1987, Ingram 1989, Hirsh-Pasek 1991, among others) argue that the comprehension task is a useful research tool for language acquisition study. Following them, it is assumed in this dissertation that the comprehension task is still another useful research tool for language acquisition study.

Fraser et al. (1963:478) studied whether the order of carrying out the three tasks has any effect on the results. Their finding was that order had no consistent effect on
either imitation tasks or comprehension tasks. Although there was a slight tendency for subjects who performed production as their second task to do better than those who performed it first, and for those who did production last to score higher than those who did it second, it could not be demonstrated that this tendency was statistically significant. Following Fraser et al., we conclude that the order of presenting the three tasks has no effect on the results. In the actual experiment for this dissertation, the comprehension task, the production task, and the imitation task were conducted in that order.

3.3. Comprehension Task

3.3.1. Materials

The materials used in the comprehension task consisted of eleven pictures. One picture out of the eleven was used to train the children on how to do the task; the other ten were used to test comprehension of Wh questions.

The experiment included two types of Wh question, which are exemplified in (9) (see the appendix for the complete list).

(9) Two types of Wh question
a. Korean subject Wh question
Nwu-ka so-lul ttaylye?
who-Nom cow-Ace hit
'Who is hitting the cow?'

b. Korean object Wh question
So-ka nwukwu-lul ttaylye?
cow-Nom who-Ace hit
'Who is the cow hitting?'
Both the who-subject type and the who-object type were represented by five tokens each (a total of ten tokens for each child).

The verbs used in the test sentences are mil-ta 'to push', mwul-ta 'to bite', and ttayli-ta 'to hit'. I deliberately chose these verbs because the actions they denote are reversible. For example, in the sentence, 'The pig is pushing the cow,' even though it is the pig who is pushing the cow, it is also possible to imagine a cow pushing a pig. That is, the verb 'push' allows either participant to function as agent and is therefore "neutral". But, in the sentence, 'The boy wears a hat,' it is unimaginable for a hat to wear a boy. In this sense, the verb 'wear' is not reversible. The verb mil-ta 'to push' and ttayli-ta 'to hit' were used twice in the who-subject type and the who-object type respectively (a total of 8 times out of 10) and the verb mwul-ta 'to bite' was used once in the who-subject type and the who-object type respectively (a total of 2 times out of 10).

The animals are carefully chosen for the test sentences. In Korean, some animals' names end in a consonant, while others end in a vowel. If they end in a vowel, they bear the nominative marker -ke. If they end in a consonant, they bear the nominative marker -i. According to Chung (1994), -ka is acquired earlier than -i and hence can be said to be easier for young Korean children. Therefore, the test sentences including the nominative
marker -i can be more difficult than those including -ka especially for young children. To avoid this potential difficulty for young children, only those animals whose names end in a vowel were chosen for the experiment (for instance, saca 'lion', kay 'dog', twayci 'pig', etc...).

To avoid the potential saliency effect for the sentence-initial position in the comprehension task, a sentential adverb was placed at the beginning of the sentence (thanks to a pilot study with 15 Korean-speaking children, the author can conceive of this as possible; see Kim (to appear) for discussion). Specifically, a place adverb followed by a postposition was placed in the sentence-initial position. A place adverb (yeki-eyse 'here'), rather than a time adverb (e.g. cikum 'right now'), was chosen for the comprehension task, because the former matches the pointing action by the experimenter, which accompanies the test sentence. This is illustrated in (10).

(10) Adverb insertion in the test sentence for the comprehension task
a. Korean subject Wh question (accompanied by pointing to the picture)
Yeki-eyse nwu-ka so-lul ttaylye?
here-in who-Nom cow-Acc hit
'Here (or in this picture) who is hitting the cow?'

b. Korean object Wh question (accompanied by pointing to the picture)
Yeki-eyse so-ka nwukwu-lul ttaylye?
here-in cow-Nom who-Acc hit
'Here (or in this picture) who is the cow hitting?'
3.3.2. Subjects

The subjects consisted of 69 Korean monolingual children for the comprehension task. Their age ranged from 2 to 8. The 2 year-olds were preschoolers at Hankwuk Preschool in Inchon, Korea. The 3 year-olds and some of the 4 year-olds attended Ttolay Preschool and Ttolaytto Preschool in Inchon, Korea. The rest of the 4 year-olds and the 5 to 6 year-olds were kindergartners at Somyeong Kindergarten in Inchon, Korea. The 7 to 8 year-olds were elementary school pupils who live in the experimenter's neighborhood in Korea. The number of subjects by age group is given in table 3.2.

<table>
<thead>
<tr>
<th>Age</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td># of subjects</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>69</td>
</tr>
</tbody>
</table>

3.3.3. The Task

The experiment that I conducted consists of three tasks --comprehension, production, and imitation. The comprehension task was modelled after Hanna and Wilhelm's (1992) comprehension task.

In the comprehension task, the experimenter shows the child a picture depicting a cow pushing a cat and a pig pushing a cow (see figure 3.1 below) and asks, 'Who is pushing the cow?' to test the child's ability to comprehend the who-subject question. To test the child's ability to
comprehend the who-object question, the experimenter shows the child a picture depicting a tiger hitting a pig and a pig hitting a monkey and asks, 'Who is the pig hitting?' (see figure 3.1).

Figure 3.1. Comprehension task for who-subject and who-object

The child is then supposed to indicate the answer (for instance, the monkey for the who-object question above) by either pointing or naming the correct animal. To make the child familiar with the task, a practice session was provided.

Each child was given ten pictures (five for the who-subject type and five for the who-object type) arranged in random order plus one picture for training which included an intransitive verb (camcata 'to sleep'). A sample interaction was given in (11).
(11) Sample interaction for the comprehension task (see the 67 appendix for the Korean version of the instruction)

* Practice:

**Experimenter:** I'm going to show you a picture and I'm going to ask you about the picture. Let's try one. Are you ready?

a. Who is sleeping?

**Child:** (is supposed either to point to the correct animal or to verbalize the answer)

*Test:

**Experimenter:** Very good. Now I'm going to show you some more pictures and ask you some more questions. Are you ready?

b. Who is pushing the cow?

c. Who is the monkey hitting?

**Child:** (is supposed either to point to the correct animal or to verbalize the answer)

Five who-subject questions and five who-object questions were arranged in random order. Each question was initially presented once; if the child indicated confusion, a failure to understand, or hesitation, the question was presented a second and final time. Regardless of the child's response, the experimenter said 'OK. Now let's try another one.' If the child verbalized the answer, the verbal answer was tape-recorded for later checking. If the child responded by pointing instead of verbalizing the answer, the pointing answer was recorded. If the child both pointed and verbalized, both were recorded.

The experiment was conducted in a quiet room in the child's preschool or kindergarten, except for the 7- and 8-year-olds, who participated in the experiment at the experimenter's home in Inchen, Korea. All the sessions were tape-recorded for later transcription.
3.3.4. Results

3.3.4.1. Scoring

In the comprehension task, the answer corresponded to one of the three animals in the picture (see figure 3.2).

Figure 3.2: Comprehension task for who-subject and who-object

When the child names or points to the correct animal, it is counted as a correct answer. If the child names or points to one of the other two animals, it is scored as an incorrect answer and as an error. For example, in the question, 'Who is pushing the cow?' (with the picture depicting a pig pushing a cow and a cow pushing a cat; see figure 3.2 above), pointing to (or saying) the pig is counted as a correct answer. If the child points to (or says) the cat or the cow, it is scored as an incorrect answer. However, pointing to the cat and pointing to the cow are two different types of error. It is reasonable to think that pointing to the cow indicates the child does not
know how to respond to Wh questions. On the other hand, pointing to the cat implies that the child is reversing the object with the subject of the question and that the child is restructuring the object as the subject of the question. Namely, the question, 'Who is pushing the cow?' is reinterpreted by the child as 'Who is the cow pushing?' If this really happens, it would imply that the who-object question is preferred to the who-subject question (or vice versa in the opposite case). The actual errors made by the subjects in the comprehension task will be analyzed in detail in section 3.3.4.3.

3.3.4.2. Results

Table 3.3 shows the percentages and mean scores for the who-subject and the who-object questions given by the different age groups of Korean-speaking children in the comprehension task. Each type of question consists of five tokens in each task.
As can be seen in table 3.3, who-subject questions were slightly easier than who-object questions (84.1% versus 82%) in the comprehension task. But this difference is not statistically significant (p-value=.5869, F-value=.298). This result is the reverse of the one reported in my pilot study (71.1% for who-subject questions versus 82.2% for who-object questions; see Kim to appear). Based on these data, we can conclude that who-subject questions are as easy as (or as difficult as) who-object questions in the comprehension task.

But the results from the comprehension task do not provide a complete picture of the acquisition of Wh questions. Fraser et al. (1973:480) found that children's comprehension ability always precedes their production ability, at least in an experimental setting. We can take
this to mean that young children could comprehend who-subject questions and who-object questions equally well, even though they could not produce them equally well. This may be why the subject-object asymmetry does not show up in the comprehension task. O'Grady (personal communication) also suggests that children have to compute and utilize the full syntactic structure only when children are actually producing sentences and that therefore it might be with the production task that we can test children's syntactic knowledge most accurately. Bley-Vroman (1991:194, footnote) also points out that subjects can understand sentences without using grammar.

In one influential early treatment, Clark and Clark (1977:73) group word semantics and schematic knowledge under the umbrella of the "reality principle" and propose the following comprehension strategy: "Using content words alone, build propositions that make sense and parse the sentence into constituents accordingly". The ways in which non-grammatical knowledge (basic world knowledge: "schemata") play a role in comprehension has been the object of extensive study in applied linguistics, especially reading comprehension research. Psycholinguistic researchers have long had grammatical comprehension experiments thwarted by subjects' ability to understand sentences even without using grammar.

The lack of difference between who-subject questions and who-object questions in the comprehension task is schematically represented in figure 3.3.
3.3.4.3. Error Analysis

As described in section 3.3.4.1., there are two types of error in the comprehension task. For example, for the question *Mwu-ka kay-lul ttaylye?* 'Who is hitting the dog?' with the picture depicting a cat hitting a dog and a dog hitting a monkey, the correct answer is either pointing to the cat or saying *koyangi* 'cat'. If the child points to the dog instead, it causes one type of error. Let us call this a 'type C-I error'. This type of error, which implies that the child did not understand how to respond to Wh questions in general, occurred 44 times out of 690 (the total number of subjects = 69) (6.38%). For who-subject questions only, it occurred 24 times out of 345 (6.96%) and for who-object questions only, 20 times out of 345 (5.8%).

The second type of error (let us call this a 'type C-II' error) includes the cases where who-subjects are interpreted as who-objects or vice versa. If, for example,
who-subjects are interpreted as who-objects, this implies that children prefer the former type of Wh pattern. We could interpret this as meaning that who-subjects are easier than who-objects for children. These type C-II errors occurred 73 times out of 690, or 10.6% (for both who-subjects and who-objects questions). For who-subject questions only, they occurred 31 times out of 345 (8.99%) and for who-object questions only 42 times out of 345 (12.2%). The incidence of these two types of error is shown in table 3.4.

Table 3.4: Incidence of type C-I and C-II errors in the comprehension task

<table>
<thead>
<tr>
<th>Sentence type</th>
<th>who-subject</th>
<th>who-object</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>type C-I</td>
<td>24/345(6.96%)</td>
<td>20/345(5.8%)</td>
<td>44/690(6.38%)</td>
</tr>
<tr>
<td>type C-II</td>
<td>31/345(8.99%)</td>
<td>42/345(12.2%)</td>
<td>43/690(10.6%)</td>
</tr>
</tbody>
</table>

As can be seen in table 3.4, the difference between who-subject questions and who-object questions with respect to incidence of type C-I errors is very small (only 1.16% difference). For type C-II errors, the difference is a little bigger (3.21%) and shows a modest who-subject preference. But, since the difference is not big, this cannot provide strong support for the claim that the who-subject pattern is easier than the who-object structure.
3.4. Production Task

3.4.1. Materials

The materials used in the production task consisted of fourteen pictures. Four pictures out of the fourteen were used to train the children; the other ten were used to elicit production of Wh questions. The production task included more training pictures than the comprehension task, because a comprehension task is generally considered easier than a production task (see Fraser et al. 1973:471).

The two types of target Wh question for the production task are exemplified in (9) in section 3.3.1 (see the appendix for the complete list).

(9) Two types of Wh questions
a. Korean subject Wh question
   Nwu-ka so-lul ttaylye?
   who-Nom cow-Acc hit
   'Who is hitting the cow?'

b. Korean object Wh question
   So-ka nwukwu-lul ttaylye?
   cow-Nom who-Acc hit
   'Who is the cow hitting?'

Both the who-subject type and the who-object type were represented by five tokens each (a total of ten tokens for each child).

3.4.2. Subjects

The subjects consisted of 45 Korean monolingual children for the production task. Their age ranged from 3 to 8. The number of subjects for the production task is
smaller than that for the comprehension task, because some of the children refused or were not able to do the production task after completing the comprehension task. The 3 year-olds and some of the 4 year-olds attended Ttolay Preschool and Ttolaytto Preschool in Inchen, Korea. The rest of the 4 year-olds and the 5 to 6 year-olds were kindergartners at Somyeng Kindergarten in Inchen, Korea. The 7 to 8 year-olds were elementary school pupils who live in the experimenter's neighborhood in Korea. The number of subjects by age group is given in table 3.5.

Table 3.5: Number of subjects by age group in the production task

<table>
<thead>
<tr>
<th>Age</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td># of subject</td>
<td>2</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>9</td>
<td>10</td>
<td>45</td>
</tr>
</tbody>
</table>

3.4.3. The Task

In the production task, which is modelled after Hanna and Wilhelm's (1992) production task, for the who-subject question, the experimenter shows the child a picture depicting, for example, something hidden from view pushing a cow (see figure 3.4 below) and asks the child to formulate his own appropriate Wh question for the picture (in this case, it is supposed to be 'Who is pushing the cow?'). For the who-object question, the experimenter shows the child a picture depicting a dog hitting something that is covered from view and asks him to formulate his own appropriate Wh
question for the picture (in this case, it is supposed to be 'Who is the dog hitting?'; see figure 3.4).

A prop (Komtolí 'Baby Pooh') was used to help elicit Wh questions from the children. So the children are supposed to ask a question to Komtolí 'Baby Pooh', not to the experimenter. And to make the child familiar with the task, a practice session was provided.

Each child was given ten pictures (five for the who-subject type and five for the who-object type) arranged in random order plus four pictures for practice. A sample interaction is provided in (12).

(12) Sample interaction for the production task (see the appendix for the Korean version of the instruction)

* Practice

**Experimenter:** Let's play another game. Here is a picture. This guy (pointing to the covered animal) is reading a book. Since he is hidden from view, we don't know. But Baby Pooh knows. If you ask him, he will tell you the answer. Do you know how to ask him?

**Child:** (is supposed to ask, 'Who is reading a book?')
When the child formulates a correct question, then the experimenter proceeds as follows;

**Experimenter:** Very good. Now let's try some more. Here is another picture. The dog is pulling this guy (pointing to the covered animal). Since he is hidden from view, we don't know. But Baby Pooh knows. If you ask him, he will tell you the answer. Do you know how to ask him?

**Child:** (is supposed to ask, 'Who is the dog pulling?')

When the child cannot formulate an appropriate question, then

**Experimenter:** You can ask this way. "Who is reading a book?" Can you repeat it?

**Child:** (is supposed to repeat, 'Who is reading a book?')

**Experimenter:** Very good. Now let's try some more. Here is a picture. The dog is pulling this guy...

A total of 4 practice examples are given.

* Actual tests. The method is exactly the same as in the practice session.

Note that in the introduction, the experimenter says, "The dog is pulling this guy (yay in Korean). Since he is hidden from view, we don't know (moluci in Korean). But Baby Pooh knows (antay in Korean)." There is good reason to introduce the situation this way. If the experimenter says Kay-ka nwukwuinka-lul kkulkoisse 'The dog is pulling somebody,' instead of saying Kay-ka yay-lul kkolkoisse 'The dog is pulling this guy,' the word, nwukwuinka, can be a cue for the Wh-word nwukwu or nwu-ka 'who'. This is because Korean Wh-words are almost identical to quantifier phrases in form (nwukwu or nwu-ka versus nwukwu-inka or nwukwu-nka). Note also that the object of the sentence (who he is) is deleted in the clauses, 'we don't know' and 'Baby Pooh knows'. If the experimenter says, "Yay-ka nwukwunci moluci. 'We don't know who he is' Kuntey Komtoli-nun nwukwunci antay. 'But Baby Pooh knows who he is,'" he is giving the child a cue by
Baby Pooh knows who he is," he is giving the child a cue by providing the Wh-word, nwukwu 'who'. To avoid giving a cue to the child, a neutral word, yay 'this guy', was chosen and the object of the above two clauses was deleted. In spite of this, the instruction was easily interpretable to the subjects, because Korean is a discourse-oriented language and therefore every element deleted in the introduction can be recovered from the context.

Five who-subject target questions and five who-object target questions were arranged in random order. The child was asked to formulate his own Wh question once; if the child indicated confusion, a failure to understand, or hesitation, he was asked to formulate his own Wh question a second and final time. Regardless of the child's formulation of Wh questions, the experimenter said, 'OK. Now let's try another one.'

The experiment was conducted in a quiet room in the child's preschool or kindergarten, except for the 7- and 8-year-olds, who participated in the experiment at the experimenter's home in Inchon, Korea. All the sessions were tape-recorded for later transcription.

3.4.4 Results
3.4.4.1 Scoring

In the production, the answers that included both the correct type of Wh-word and the correct case marker for it were counted as correct. For example, for the picture
depicting something covered from view pushing a cow (see figure 3.5), the response, *Nwu-ka so-lul mile?* 'Who is pushing the cow?', is regarded as the correct answer.

![Diagram](image)

Figure 3.5: Production task for who-subject and who-object

Since this study focuses on the correct use of who-subjects and who-objects, a question was regarded as correct as long as it included the appropriate Wh-word. This means that a question where one of the two elements other than the Wh-word itself (for instance, in the case of the who-subject question, the object or the verb) is deleted was counted as correct, as long as the question involved the correct use of the Wh-word. Some examples of such questions are given in (13).

(13) Some examples of deletion errors
a. Verb deletion: marked as correct
*Nwu-ka pyengali-lul...*  
who-Nom chicken-Acc...  
'Who ... the chicken?'
b. Non-Wh object deletion: marked as correct
*Nwu-ka  ____ epkoisse?*  
who-Nom  ____ piggyback?  
'Who is piggybacking  ____?'
c. Non-Wh subject deletion: marked as correct

___ nwukwu-lul   ttaylye?
___ who-Acc   hit?
'Who is ____ hitting?'

In the same vein, the cases where a non-Wh-word was replaced by a different lexical item (hit in place of look, for example) were scored as correct.

Chung (1994) observed that the nominative marker -ka is overgeneralized at the early stages of language acquisition in Korean. The overgeneralization of the nominative marker is also attested in my experiment. Some children formulated a question where both the subject and the object bear the nominative marker (for example, Nwu-ka wenswungi-ka mile? 'Who is pushing the monkey?'). In this case, the question was scored as correct, because the overgeneralization of the nominative marker is common with young Korean-speaking children and young children rely more heavily on word order than case markers in processing the sentence (Cho 1982 and Chung 1994). Patterns in which the accusative marker was overgeneralized never occurred (for example, *Wenswungi-lul nwukwu-lul mile? 'Who is the monkey pushing?' * meaning not occurring).

Chung (ibid.) also observed that case markers do not have any grammatical function in the early stages of language acquisition and that grammatical functions are represented by word order. Kim et al. (to appear) carried out an experiment with 68 Korean monolingual children on the acquisition of case and word order in Korean. They report
that Korean 4 year-olds can interpret OSV pattern (scrambled sentences) with context above chance level. Korean 5 year-olds can interpret the same pattern above 80% accuracy. This indicates that Korean 4 or 5 year-olds and older can interpret scrambled sentences in which the subject and the object switch their positions. This in turn suggests that Korean 3 year-olds and younger rely on word order to interpret sentences whereas Korean 4 or 5 year-olds and older are able to rely on case markers to interpret sentences. Following Chung and Kim et al., case-marker drop was ignored in the calculation of the results from 3 year-olds and younger, as long as the question exhibits the correct word order. The overgeneralization of the nominative marker and case-marker drop are illustrated in (14).

(14) Overgeneralization of the nominative marker and deletion of case markers
a. Overgeneralization of the nominative marker
Nwu-ka wenswungi-ka mile?
who-Nom monkey-Nom push
'Who is pushing the monkey?'

b. Deletion of case markers: 0 indicating deletion of case marker
Nwukwu-0 pyengali-lul chyetapwa?
who-0 chicken-Acc look at
'Who is looking at the chicken?'

Korean is a so-called free word-order language. And, as mentioned above, Korean 4 or 5 year-olds and older are able to rely on the case markers to interpret sentences. Hence, OSV questions were also counted as correct, as long
as they were given by 4 year-olds and older, and the subject and the object bear the correct case markers. This is illustrated in (15).

(15) Scrambled questions
a. Scrambling only: marked as correct when given by 4 year-olds and older
Twayci-lul nwu-ka ttaylye?
pig-**Acc** who-**Nom** hit
'Who is hitting the pig?'

b. Scrambling plus a topic marker on the object: marked as correct when given by 4 year-olds and older
Twayci-nun nwu-ka ttaylye?
pig-**Top** who-**Nom** hit
'As for the pig, who is hitting the pig?'

In some cases, the lexical item nwukwu 'who' was confused with the lexical item mwusun 'which' and replaced by mwusun 'which'. Since this study does not focus on the acquisition of lexical items, this simple replacement of a lexical item by another was counted as correct.

Finally, some subjects formulated a question such as Koyangi-lul mwulkoissnun kes-un mwues-ini? 'What is it that is biting the cat?' for the target question Nwu-ka koyangi-lul mwule? 'Who is biting the cat?' Since the structure of this question is very different from the target question and the Wh-word always appears as complement of the verb (-ita 'to be') position, it was eliminated from the calculation of my results (only one 6 year-old and one 8 year-old gave this type of answer). This is illustrated in (16).
(16) Question including a relative clause

a. who-object question


'What is it that the cat is biting?'

cat-Nom is biting-Comp thing-Top what-be-Q

b. who-subject question


'What is it that is biting the cat?'

cat-Acc is biting-Comp thing-Top what-be-Q

3.4.4.2. Results

Table 3.6 shows the percentages and mean scores for the who-subject and the who-object questions given by the different age groups of Korean-speaking children in the production task. Each type of question consists of five tokens.

<table>
<thead>
<tr>
<th>Sentence type</th>
<th>who-subject</th>
<th>who-object</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age # of subjects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>10/10(100%)</td>
<td>0/10(0%)</td>
</tr>
<tr>
<td>4</td>
<td>30/35 (85.7%)</td>
<td>11/35 (31.4%)</td>
</tr>
<tr>
<td>5</td>
<td>39/40 (97.5%)</td>
<td>22/40 (55%)</td>
</tr>
<tr>
<td>6</td>
<td>44/45 (97.8%)</td>
<td>41/45 (91.1%)</td>
</tr>
<tr>
<td>7</td>
<td>45/45 (100%)</td>
<td>45/45 (100%)</td>
</tr>
<tr>
<td>8</td>
<td>50/50 (100%)</td>
<td>48/50 (96%)</td>
</tr>
<tr>
<td>Total</td>
<td>218/225 (96.9%)</td>
<td>167/225 (74.2%)</td>
</tr>
<tr>
<td>Mean</td>
<td>4.844/5</td>
<td>3.711/5</td>
</tr>
</tbody>
</table>

As we can see in table 3.6, who-subject questions are noticeably easier than who-object questions in the production task (96.9% versus 74.2%). And the difference
was statistically significant (p-value=.0001, F-value=29.632). This result is compatible with the result from my pilot study (76.9% for who-subject questions versus 52.2% for who-object questions; see Kim (to appear)). Specifically, the contrast between the two types is sharper for younger children (from age 3 to age 5). Therefore, we can safely conclude that who-subject questions were easier than who-object questions (especially for younger children) in the production task.

The difference between who-subject questions and who-object-questions in the production task is schematically represented in figure 3.6.

![Figure 3.6: The difference between who-subject and who-object questions in the production task in terms of the mean number of correct responses](image)

3.4.4.3. Error Analysis

In the production task, there are three types of errors. The first type, which occurs most frequently, involves the substitution of who-subjects for who-objects or
vice versa (let us call this a P-I error). A sample of this type of error is given in (17).

(17) A sample for type P-I error

Target question
So-ka nwukwu-lul ttaylye?
cow-Nom who-Acc hit
'Who is the cow hitting?'

Child's formulation of the question
Nwu-ka so-lul ttaylye?
who-Nom cow-Acc hit
'Who is hitting the cow?'

For the reason explained above, this type of error implies that who-subject questions are easier than who-object questions. Reversal errors occurred 57 times out of 450 (12.7%) in the production task. Substitution of a who-object for a who-subject only occurred 6 times out of 225 (2.7%). In contrast, substitution of a who-subject for a who-object occurred 51 times out of 225 (22.7%). The incidence of this type of error in the production task is summarized in table 3.7.

Table 3.7: Incidence of type P-I errors in the production

<table>
<thead>
<tr>
<th>Sentence type</th>
<th>who-subject</th>
<th>who-object</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>type P-I</td>
<td>6/225(2.7%)</td>
<td>51/225(22.7%)</td>
<td>57/450(12.7%)</td>
</tr>
</tbody>
</table>

As can be seen in the above table, the type I error is dominant in the production task. Of particular importance is the fact that this reversal occurs much more frequently with who-objects than with who-subjects, which lends very
strong support to the claim that who-subject questions are easier than who-object questions.

A second type of error, which occurred only several times, includes cases where who-subjects or who-objects are deleted altogether. This is illustrated in (18).

(18) A sample for type P-II error

**Target question**
Nwu-ka so-lul ttaylye?
who-Nom cow-Acc hit
'Who is hitting the cow?'.

**Child's formulation of the question**
--- so-lul(-ka) ttaylye?
cow-Acc(-Nom) hit
'--- is hitting the cow? or --- is the cow hitting?'

This type of error occurred 6 times out of 450 (1.3%). The incidence of this type of error in the production task is shown in table 3.8.

<table>
<thead>
<tr>
<th>Sentence type</th>
<th>who-subject</th>
<th>who-object</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>type P-II</td>
<td>1/225 (0.4%)</td>
<td>5/225 (2.2%)</td>
<td>6/450 (1.3%)</td>
</tr>
</tbody>
</table>

The third type of error involves cases where both the who-subject and the who-object are used in the same sentence. However, this type of error was very rare (only 1 time out of 450 for the production task). An example of this type of error is given in (19).
3.5. Imitation Task

3.5.1. Materials

The imitation task included two types of Wh question, which are exemplified in (9) in section 3.3.1 (see the appendix for the complete list).

(9) Two types of Wh question
a. Korean subject Wh question
Nwu-ka so-lul ttaylye?
who-Nom cow-Acc hit
'Who is hitting the cow?'

b. Korean object Wh question
So-ka nwukwu-lul ttaylye?
cow-Nom who-Acc hit
'Who is the cow hitting?'

Both the who-subject type and the who-object type were represented by five tokens each (a total of ten tokens for each child).

The animals are carefully chosen for the test sentences. In Korean, some animals' names end in a consonant, while others end in a vowel. If they end in a vowel, they bear the nominative marker -ka. If they end in a consonant, they bear the nominative marker -i. According to Chung (1994), -ka is acquired earlier than -i and hence
can be said to be easier for young Korean children. Therefore, the test sentences including the nominative marker -i can be more difficult than those including -ka especially for young children. To avoid this potential difficulty for young children, only those animals whose names end in a vowel were chosen for the experiment (for instance, saca 'lion', kay 'dog', twayci 'pig', etc...).

To avoid the potential saliency effect for the sentence-initial position in the imitation task, a time adverb, cikum 'right now', was inserted at the beginning of the model sentence. A time adverb was chosen because pictures were not presented and using a place adverb such as yeki-eyse 'here' does not make sense when pictures are not presented. This is illustrated in (20).

(20) Adverb insertion in the test sentence for the imitation task
a. Korean subject Wh question
Cikum nwu-ka so-lul ttaylye?
now who-Nom cow-Acc hit
'Right now, who is hitting the cow?'

b. Korean object Wh question
Cikum so-ka nwukwu-lul ttaylye?
now cow-Nom who-Acc hit
'Right now, who is the cow hitting?'

However, not all the subjects in the imitation task were given model sentences that included a sentence-initial adverb. William O'Grady (personal communication) pointed out a methodological problem here. In my methodology, the variable 'insertion of an adverb' is confounded by another
variable, namely 'age'. Ideally, the subjects for each age group should be divided into two (for example, five 3 year-olds for the experimental group and another five 3 year-olds for the control group, five 4 year-olds for the experimental group and another five 4 year-olds for the control group, etc...), and one of the two subgroups of each age group should be given model sentences with a sentence-initial adverb while the other should be given model sentences without a sentence-initial adverb. In my experiment, five 3 year-olds, nine 7 year-olds and eight 8 year-olds were given model sentences with a sentence-initial adverb. These 22 subjects belong to the experimental group. All 4 year-olds (N=8), 5 year-olds (N=10), and 6 year-olds (N=10) were given model sentences without a sentence-initial adverb. These 28 subjects belong to the control group.

The reason why I divided all subjects (N=50) into two groups is to find out through a comparison between the two groups whether insertion of an adverb at the beginning of the sentence makes any difference for the performance of the imitation task. Even though insertion of an adverb in the sentence-initial position may prevent the potential saliency effect, it may cause some extra load for short-term memory resulting in poorer results. Due to this possibility, the experimental model sentences (with a sentence-initial adverb) were mostly given to 7 and 8 year-olds (the oldest among our subjects), who are considered to have the longest short-term memory among our subjects.
3.5.2. Subjects

The subjects consisted of 50 Korean monolingual children for the imitation task. Their age ranged from 3 to 8. The number of subjects for the imitation task is smaller than that for the comprehension task, because some of the children refused or were not able to do the imitation task after completing the comprehension task. The 3 year-olds and some of the 4 year-olds attended Ttolay Preschool and Ttolaytto Preschool in Inchen, Korea. The rest of the 4 year-olds and the 5 to 6 year-olds were kindergartners at Somyeng Kindergarten in Inchen, Korea. The 7 to 8 year-olds were elementary school pupils who live in the experimenter's neighborhood in Korea. The number of subjects by age group is given in table 3.9.

Table 3.9: Number of subjects by age group in the imitation task

<table>
<thead>
<tr>
<th>Age</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td># of subjects</td>
<td>5</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>50</td>
</tr>
</tbody>
</table>

3.5.3. The Task

In the imitation task, the children were supposed to imitate ten sentences (five who-subject questions and five who-object questions) without the aid of pictures. One sentence was provided for training purpose. Each sentence consisted of nine to ten syllables and three to four morphemes (excluding the case markers). If there is no time-delay between the end point of the experimenter saying
the model sentence and the starting point of the children imitating it, there is a possibility that the children can repeat the stimulus without truly acquiring a given structure (rote imitation). To avoid this possibility, the experimenter said 'Tasi malhaycwuseyyo 'Please say it again for me' as soon as each model sentence was presented. This short sentence created a two- or three-second delay before the children's response.

A prop (Komtoli 'Baby Pooh') was used to make the situation realistic. A sample interaction is given in (21).

(21) Sample interaction for the imitation task (see the appendix for the Korean version of the instructions)
* Practice

**Experimenter:** Let's play one more game. This time, I will say a sentence. But Baby Pooh couldn't hear it. If he says, "Tasi malhaycwuseyyo 'Please say it again for me'", could you tell him what I said?

a. *Phyopem-i nwukwu-lang ssawe? 'Who is the leopard fighting with?* Tasi malhaycwuseyyo. 'Please say it again for me'

(When the experimenter says this sentence, he pretends to be Baby Pooh by assuming a different voice.)

**Child:** (is supposed to repeat the model sentence)

*Test

**Experimenter:** Very good. Let's try some more.

b. *Nwu-ka yemso-lul epkoisse? 'Who is piggybacking the goat ?* Tasi malhaycwuseyyo. 'Please say it again for me'

**Child:** (is supposed to repeat the model sentence)

c. *Saca-ka nwukwu-lul hyungnaynay? 'Who is the lion imitating?* Tasi malhaycwuseyyo. 'Please say it again for me'

... 

The experiment was conducted in a quiet room in the child's preschool or kindergarten, except for the 7- and 8-year-olds, who participated in the experiment at the experimenter's home in Inchen, Korea. All the sessions were tape-recorded for later transcription.
3.5.4. Results

3.5.4.1. Scoring

In the imitation task, the answers that included both the correct type of Wh-word and the correct case marker for it were counted as correct. For example, children's correct imitation of *Nwu-ka so-lul mile?* 'Who is pushing the cow?’, is regarded as the correct answer.

Since this study focuses on the correct use of who-subjects and who-objects, a question was regarded as correct as long as it includes the appropriate Wh-word. This means that a question where one of the two elements other than the Wh-word itself (for instance, in the case of the who-subject question, the object or the verb) is deleted was counted as correct, as long as the question involves the correct use of the Wh-word. Some examples of such questions are given in (22).

(22) Some examples of deletion errors

a. Verb deletion: marked as correct

*Nwu-ka pyengali-lul...*

who-Nom chicken-Acc...

'Who ... the chicken?'

b. Non-Wh object deletion: marked as correct

*Nwu-ka ___ epkoisse?*

who-Nom ___ piggyback?

'Who is piggybacking ___?'

c. Non-Wh subject deletion: marked as correct

___ *nwukwu-lul ttaylye?*

___ who-Acc hit?

'Who is ___ hitting?'
In the same vein, the cases where a non-Wh-word was replaced by a different lexical item (hit in place of look, for example) were scored as correct.

As mentioned in section 3.4.4.1 (p.78 ff), Chung (1994) observed that the nominative marker -ka is overgeneralized at the early stages of language acquisition in Korean. The overgeneralization of the nominative marker is also attested in my experiment. Some children formulated a question where both the subject and the object bear the nominative marker (for example, Nwu-ka wenswungi-ka mile? 'Who is pushing the monkey?'). In this case, the question was scored as correct, because the overgeneralization of the nominative marker is common with young Korean-speaking children and young children rely more heavily on word order than case markers in processing the sentence (Cho 1982 and Chung 1994). Patterns in which the accusative marker was overgeneralized never occurred (for example, *Wenswungi-lul nwukwu-lul mile? 'Who is the monkey pushing?' * meaning not occurring).

Chung (ibid.) also observed that case markers do not have any grammatical function in the early stages of language acquisition and that grammatical functions are represented by word order. Kim et al. (to appear) carried out an experiment with 68 Korean monolingual children on the acquisition of case and word order in Korean. They report that Korean 4 year-olds can interpret OSV pattern (scrambled sentences) with context above chance level. Korean 5 year-
olds can interpret the same pattern above 80% accuracy. This indicates that Korean 4 or 5 year-olds and older can interpret scrambled sentences. This suggests that Korean 3 year-olds and younger rely on word order to interpret sentences whereas Korean 4 or 5 year-olds and older are able to rely on case markers to interpret sentences. Following Chung and Kim et al., case-marker drop was ignored in the calculation of the results from 3 year-olds and younger, as long as the question exhibits the correct word order. The overgeneralization of the nominative marker and case-marker drop are illustrated in (23).

(23) Overgeneralization of the nominative marker and deletion of case markers
a. Overgeneralization of the nominative marker
Nwu-ka wenswungi-ka mile?
who-Nom monkey-Nom push
'Who is pushing the monkey?'

b. Deletion of case markers: 0 indicating deletion of case marker
Nwukwu-0 pyengali-lul chyetapwa?
who-O chicken-Acc look at
'Who is looking at the chicken?'

Korean is a so-called free word-order language. And, as mentioned above, Korean 4 or 5 year-olds and older are able to rely on the case markers to interpret sentences. Hence, OSV questions were also counted as correct, as long as they were given by 4 year-olds and older, and the subject and the object bear the correct case markers. This is illustrated in (24).
(24) Scrambled questions

a. Scrambling only: marked as correct when given by 4 year-olds and older
Twayci-lul nwu-ka ttaylye?
pig-Acc who-Nom hit
'Who is hitting the pig?'

b. Scrambling plus a topic marker on the object: marked as correct when given by 4 year-olds and older
Twayci-nun nwu-ka ttaylye?
pig-Top who-Nom hit
'As for the pig, who is hitting the pig?'

In some cases, the lexical item nwukwu 'who' was confused with the lexical item mwusun 'which' and replaced by mwusun 'which'. Since this study does not focus on the acquisition of lexical items, this simple replacement of a lexical item by another was counted as correct.

Finally, some subjects formulated a question such as Koyangi-lul mwulkoissnun kes-un mwues-ini? 'What is it that is biting the cat?' for the target question Nwu-ka koyangi-lul mwule? 'Who is biting the cat?' Since the structure of this question is very different from the target question and the Wh-word always appears as complement of the verb (-ita 'to be') position, it was eliminated from the calculation of my results (only one 6 year-old and one 8 year-old gave this type of answer). This is illustrated in (25).

(25) Question including a relative clause

a. who-object question
cat-Nom is biting-Comp thing-Top what-be-Q
'What is it that the cat is biting?'

b. who-subject question
cat-Acc is biting-Comp thing-Top what-be-Q
'What is it that is biting the cat?'
In the imitation task for the experimental group (those who were given model questions with a sentence-initial adverb), the positioning of the adverb (cikum 'right now') or its deletion was not taken into consideration. That is, a Wh question was counted as correct as long as it contains the appropriate Wh-word and is compatible with the standards set up above, regardless of where the adverb appears.

3.5.4.2. Results

Table 3.10 shows the results from the control group in the imitation task (the subjects who were given model questions without a sentence-initial adverb), while table 3.11 shows the results from the experimental group in the imitation task (the subjects who were given model questions with a sentence-initial adverb). Each type of question consists of five tokens.

Table 3.10: Results from imitation task I (Control group; no sentence-initial adverb given)

<table>
<thead>
<tr>
<th>Sentence type</th>
<th>who-subject</th>
<th>who-object</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td># of subjects</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>38/40(95%)</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>50/50(100%)</td>
</tr>
<tr>
<td>6</td>
<td>10</td>
<td>50/50(100%)</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>138/140(98.6%)</td>
</tr>
<tr>
<td>Mean</td>
<td>4.929/5</td>
<td>4.536/5</td>
</tr>
</tbody>
</table>
Table 3.11: Results from imitation task II (Experimental group; a sentence-initial adverb given)

<table>
<thead>
<tr>
<th>Sentence type</th>
<th>who-subject</th>
<th>who-object</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td># of subjects</td>
<td>16/25(64%)</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>42/45(93.3%)</td>
</tr>
<tr>
<td>7</td>
<td>9</td>
<td>39/40(97.5%)</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>97/110(88.2%)</td>
</tr>
<tr>
<td>Mean</td>
<td>4.409/5</td>
<td>3.273/5</td>
</tr>
</tbody>
</table>

In the imitation task, who-subject questions were easier than who-object questions with both the control group (no adverb given) and the experimental group (a sentence-initial adverb given). And this difference is also statistically significant (p-value=.0140, F-value=6.988 for the control group, and p-value=.0225, F-value=6.170 for the experimental group). Again, this result is consistent with the result from my pilot study (89.7% for who-subject questions versus 57.7% for who-object questions; see Kim to appear). These data confirm that who-subject questions were easier than who-object questions in the imitation task, regardless of whether a sentence-initial adverb was inserted in the model question or not.

The difference between who-subject questions and who-object questions in the imitation task is schematically represented in figures 3.7 and 3.8.
3.5.4.3. Error Analysis

In the imitation task, there are three types of errors. The first type, which occurs most frequently, involves the substitution of who-subjects for who-objects or vice versa (let us call this a I-1 error). A sample of this type of error is given in (26).
(26) A sample for type I-1 error

Model question
So-ka nwukwu-lul ttaylye?
cow-Nom who-Acc hit
'Who is the cow hitting?'

Child's imitation of the question
Nwu-ka so-lul ttaylye?
who-Nom cow-Acc hit
'Who is hitting the cow?'

For the reason explained above, this type of errors implies that who-subject questions are easier than who-object questions. Reversal errors occurred 53 times out of 500 (10.6%) in the imitation task. Substitution of a who-object for a who-subject only occurred 8 times out of 250 (3.2%). In contrast, substitution of a who-subject for a who-object occurred 45 times out of 250 (18%). The incidence of this type of error in the imitation task is summarized in table 3.12.

Table 3.12: Incidence of type I-1 errors in the imitation task

<table>
<thead>
<tr>
<th>Sentence type</th>
<th>who-subject</th>
<th>who-object</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>type I-1</td>
<td>8/250 (3.2%)</td>
<td>45/250 (18%)</td>
<td>53/500 (10.6%)</td>
</tr>
</tbody>
</table>

As can be seen in the above table, the type I-1 error is dominant in the imitation task. Of particular importance is the fact that this reversal occurs much more frequently with who-objects than with who-subjects, which lends very strong support to the claim that who-subject questions are easier than who-object questions.
A second type of error, which occurred only several times, includes cases where who-subjects or who-objects are deleted altogether. This is illustrated in (27).

(27) A sample for type I-2 error

Model question
Nwu-ka so-lul ttaylye?
who-Nom cow-Acc hit
'Who is hitting the cow?'

Child's imitation of the question
--- so-lul(-ka) ttaylye?
cow-Acc(-Nom) hit
'--- is hitting the cow? or --- is the cow hitting?'

This type of error occurred 11 times out of 500 (2.2%). The incidence of this type of error in the imitation task is shown in table 3.13.

Table 3.13: Incidence of type I-2 errors in the imitation task

<table>
<thead>
<tr>
<th>Sentence type</th>
<th>who-subject</th>
<th>who-object</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>type I-2</td>
<td>7/250 (2.8%)</td>
<td>4/250 (1.6%)</td>
<td>11/500 (2.2%)</td>
</tr>
</tbody>
</table>

The third type of error involves cases where both the who-subject and the who-object are used in the same sentence. However, this type of error was very rare (only 2 times out of 500 for the imitation task). An example of this type of error is given in (28).

(28) A sample for type I-3 error

Model question
Wenswungi-ka nwukwu-lul mile?
monkey-Nom who-Acc push
'Who is the monkey pushing?'
3.6. Discussion

Our results show that who-subject questions and who-object questions were equally easy or difficult in the comprehension task. However, who-subject questions were significantly easier than who-object questions in the production task and the imitation task. The data from error analysis in the production task and the imitation task also support this conclusion.

Based on the results presented in above subsections and the error analysis given above, we can conclude that who-subject questions are easier than who-object questions for children.

Our findings are consistent with those of Tyack and Ingram, who found that who-subjects are easier than who-objects (80% versus 56%). Tyack and Ingram (1977:218) attributed this asymmetry to the animacy effect. They claimed following Ervin-Tripp (1970) that who is associated through its animacy feature with the subject position and that inanimate what is more closely identified with the object (let us tentatively call this the 'Animacy Principle'). This means that who in the object position is more difficult than who in the subject position, because the former does not comply with the Animacy Principle whereas the latter does.
If Tyack and Ingram (1977) are correct, their Animacy Principle should hold for multiple Wh questions too. Let us consider the following.

(29) Multiple Wh questions
i. who-who type
Who is meeting who?
ii. who-what type
Who is eating what?
iii. what-what type
What is hitting what?
iv. what-who type
What is hitting who?

Among these four types, the who-what type should be the easiest for children, because it is completely consistent with the Animacy Principle. The who-who and the what-what types should be less easy than the who-what type and easier than the what-who type, because the second who in the who-who and the first what in the what-what violate the Animacy Principle. And the what-who type should be the most difficult, because both what and who violate the Animacy Principle.

In order to determine the rank in difficulty among these seven types of multiple Wh questions, I conducted an experiment with 67 English-speaking and 72 Korean-speaking children (see chapter 4 for detailed description of the procedure and discussion). The results from the experiment show that the who-who type was the easiest in both English and Korean, contrary to Tyack and Ingram's prediction (62.7% for English and 50% for Korean). The who-what and the what-what types did not differ from each other and were less easy
than the who-who type in both language (58.2% for the who-what and 58.2% for the what-what in English, and 44.4% for the who-what and 45.8% for the what-what in Korean), contrary to Tyack and Ingram's claim. Finally, the what-who type was the most difficult in both English and Korean, as Tyack and Ingram predict (34.3% for English and 34.7% for Korean). Based on these data we can conclude that Tyack and Ingram's claim is only partially correct (only for the what-who type). Therefore, we cannot take their account for the subject-object asymmetry in the acquisition of simple Wh questions as valid.

Moreover, Hanna and Wilhelm (1992) report based on their production data that not only who-subjects but also what-subjects are easier than who-objects and what-objects, respectively. This is another piece of evidence against Tyack and Ingram's account.

Now let us turn to syntactic accounts of the asymmetry between who-subjects and who-objects. As reviewed in section 3.1.3., Stromswold (1988) argues that object Wh questions are easier than subject Wh questions. She attributes this asymmetry to the different types of government. According to the ECP, all traces must be properly governed. There are two ways a trace can be properly governed; a Wh-trace can be theta-governed by the verb or antecedent-governed by a Wh-word via a chain. She further argues that a Wh question involving theta-government (i.e. the object Wh question) is easier than a Wh question
involving antecedent-government (i.e. the subject Wh question).

As discussed above, English and Korean differ in terms of (possibly) the categorical status of Infl and the level where Wh movement takes place; SS for English and LF for Korean.

If we assume that Infl is lexical in Korean, Stromswold's claim predicts that subject Wh questions should be as easy as object Wh questions in Korean (if we substitute lexical government for theta-government in Stromswold's account). Since the subject trace is lexically governed by Infl and the object trace is also lexically governed by the verb, there should be no difference between the subject Wh question and the object Wh question (both involve lexical government).

However, if we assume that Infl is functional as in English, Stromswold's claim can be directly applied to Korean, because the ECP is assumed to hold at SS and LF alike (Huang 1982). If her claim is correct universally, Korean object Wh questions should be easier than subject Wh questions. But, as can be seen in our results, the opposite is true. The subject Wh question is easier than the object Wh questions in Korean. Therefore, we can conclude either that her claim is wrong, or that her claim does not hold across languages. At any rate (regardless of the categorical status of Infl in Korean), the results from my
experiment dispute Stromswold's claim. Subject Wh questions are easier than object Wh questions.

In explaining the subject preference shown in the production task of Hanna and Wilhelm's experiment for English Wh questions, O'Grady (1994) offers a purely syntactic account. As mentioned in 3.1.2., O'Grady argues that a structure's computational complexity increases with the number of XP categories (S, VP, etc.) between the Wh word and the associated gap. Hence, a subject Wh question, in which the Wh word crosses one XP (i.e. IP), is expected to be easier than an object Wh question, in which the Wh word crosses two XPs (i.e. VP and IP). O'Grady did not clarify whether his account for English SS Wh movement also applies to Korean LF Wh movement. But, if we assume that it does apply in Korean, it offers a clear explanation for the subject-object asymmetry in the acquisition of Korean Wh questions. As a matter of fact, his claim is strongly supported by the results from my experiment. Subject Wh questions were actually easier than object Wh questions in Korean.

In Kim (to appear), I suggest an alternative non-linguistic explanation for the subject-object asymmetry in the acquisition of Korean Wh questions. Subject Wh questions are easier than object Wh questions, because they appear in the sentence-initial position which is a salient position for children (Newport et al. 1977 and Au et al. 1994). To choose between this saliency account and
O'Grady's depth of embedding account, a sentence-initial adverb was inserted at the beginning of the test sentence in the comprehension and the imitation task (yeki-eyse 'here' for the comprehension task and cikum 'right now' for the imitation task). This is irrelevant in the production task, because in this task the subjects are given only contextual information and are supposed to formulate their own Wh questions. As we can see in the results from the experimental group in the imitation task, who-subject questions were easier than who-object questions, regardless of insertion of the sentence-initial adverb. This result leads us to conclude that the depth of embedding account is better than the saliency account in explaining the subject-object asymmetry in the acquisition of Wh questions.

3.7. Conclusion

In this chapter, the issue of a possible subject-object asymmetry in the acquisition of Wh questions was raised. In English studies, there were two conflicting results and three different accounts for these results. Tyack & Ingram (1977) and Hanna and Wilhelm (1992) report that who-subjects were easier than who-objects based on their experimental data. On the other hand, based on her longitudinal data, Stromswold (1988) reports that object Wh questions were easier than subject Wh questions.

Tyack and Ingram (ibid.) attributed the subject preference in their results to the animacy effect: who is
associated through its animacy feature with the subject position.

In contrast, O'Grady (1994) provided a purely syntactic account for the subject preference in Kunzman and Hanna's results. According to O'Grady, a structure's computational complexity increases with the number of XP categories (S, VP, etc.) between the Wh word and the associated gap. The relationship in object Wh questions extends over both an S (or IP) boundary and a VP boundary, whereas it extends over only an S boundary in subject Wh questions. This difference makes who-subject questions computationally easier than who-object questions. And this is why who-subject questions are easier than who-object questions for children to acquire.

Stromswold (1988) attributes the object preference in her longitudinal data to the difference between subject Wh questions and object Wh questions in terms of the type of proper government. She argues that theta-government by a verb is more direct and less complicated than antecedent-government by a Wh-word and that questions with theta-governed gaps (i.e. object questions) should be acquired before questions with antecedent-governed gaps (i.e. subject questions).

Finally, in Kim (to appear), in order to explain the subject preference in Korean Wh questions, I suggest that who-subject questions are easier than who-object questions, because the Wh-word in the who-subject question appears in
the sentence-initial position and this position is salient in Korean.

The results from my experiment on the subject-object asymmetry in the acquisition of Wh questions support O'Grady's claim, whereas they dispute Tyack and Ingram's claim, Stromswold's claim, and the saliency account suggested in Kim (to appear).

Notes
1. Of course, not all English Wh questions are SVO. Usually, subject Wh questions in English are SVO.

i) Who saw the elephant?

2. Theta-government (assigned a theta-role and c-commanded by a verb or a preposition) is a sub-type of lexical government (selection by a lexical category). Our discussion is valid, only if we replace theta-government by lexical government in Stromswold's account. By doing so, we are expanding Stromswold's account (from theta-government to lexical government).
CHAPTER 4. THE ACQUISITION OF MULTIPLE WH QUESTIONS

4.1. Introduction

Chapters 2 and 3 considered Wh questions including only a single Wh-word. In this chapter, however, Wh questions involving two Wh-words will be studied (for example, *Who is eating what?* for English and *Nhwan-ka mwul meke?* for Korean). This type of Wh question is called a multiple Wh question.

A simple Wh question (which includes a single Wh-word) is different from a multiple Wh question syntactically. As mentioned in the previous chapters, all Wh-words should move to the SPEC of CP position to be interpreted as a request for information. As both Wh-words in the above example (*Who is eating what?*) are interpreted as a request for information (for instance, the answer for the above question may be "Tom is eating a banana, Mary is eating an apple, Bob is eating a pear..."), the two must be in the SPEC of CP position either at SS or at LF. In English, the simple Wh question involves only one Wh-word and therefore a single Wh movement, which takes place at SS. However, the multiple Wh question involves two Wh words and hence two Wh movements, one of which takes place at SS and the other at LF. In Korean, since there is no SS Wh movement, the two Wh movements take place at LF. This is illustrated in (1).
(1) LF for the multiple Wh question in English and Korean

a. English LF for *Who is eating what?*

```
CP
  NPj who C
  NPj what
     SS Move
     LF Move
  VP
   V is
   V NPj eating
```

b. Korean LF for *Nwu-ka mwe-lul meke?*

```
CP
  NPj nwu-ka C
  mwe-lul
     LF Move
     LF Move
     LF Move
  VP
   V NPj meke
```

[The second Wh-word is adjoined to the first Wh-word, which already occupies the SPEC of CP position (May 1985, Chomsky 1995). This complex SPEC of CP is called a generalized quantifier.]

As discussed in chapter 3, all traces must be properly governed (the ECP). In (1a), the trace of *what* is theta-governed by the verb *eat* (the verb c-commands the trace and assigns a theme role to *what*), whereas the trace of *who* is...
antecedent-governed by *who* (*who* c-commands its trace and the trace is coindexed with *who*). But, if one of the two *Wh*-words is an adjunct and the other a subject, both must be antecedent-governed. This is because the verb cannot assign a theta-role to an adjunct and therefore cannot theta-govern it. And the verb cannot theta-govern the subject, either, because the verb cannot c-command the subject even though it assigns a theta-role to the subject. This is illustrated in (2).

(2)

```
  IP
  / \  
 NP   VP
  /   |
 John I V'
  |
    V
    |
    walked
```

cannot c-command
but assigns a theta-role

Hence, the traces of both *Wh*-phrases should be antecedent-governed. But, it is impossible for the traces of both *Wh*-phrases to be antecedent-governed in a multiple *Wh* question (the reason for this will be explained shortly). Thus, an English multiple *Wh* question in which one of the two *Wh*-words is an adjunct and the other a subject is ungrammatical. Let us consider the following ungrammatical example.
I propose to account for the ungrammaticality of this sentence by using an "updated" version of the proposal put forward by Huang (1982:554 ff). In particular, I assume that LF movement of a syntactically unmoved Wh-phrase (when in (3), for example) in English is carried out by placing the Wh-phrase within the SPEC of CP--adjoining it to the Wh-phrase that has already moved there to create a "generalized quantifier" (May 1985, Chomsky 1995). Following Aoun, Hornstein, and Sportiche (1981), there is a rule that identifies, by way of index percolation, the SPEC of CP with the higher Wh-phrase: thus the generalized quantifier when-who bear the index of who, the first element that moved to the SPEC of CP position.

In (3), who moves at SS whereas when moves at LF. Thanks to "index percolation", the higher NP who (NP$_i$) can antecedent-govern the trace in the SPEC of IP position, but it cannot antecedent-govern NP$_j$ in the modifier of the verb.
position (it bears a different index from NP\(j\)). The trace of \textit{when} cannot be lexically governed by the verb, either, because the verb does not assign a theta-role to \textit{when}, which is an adjunct. In sum, the trace of \textit{when} is neither antecedent-governed nor lexically governed, resulting in a violation of the ECP. This is why the sentence \textit{Who is running when?} is ungrammatical in English.

4.1.1. Issues in the Acquisition of Multiple \textit{Wh} questions

The first issue regarding the acquisition of multiple \textit{Wh} questions has to do with the age at which multiple \textit{Wh} questions are acquired in English and Korean. A related question is whether there is any difference between English and Korean in terms of the stage at which the multiple \textit{Wh} question pattern emerges.

The second issue in this chapter has to do with whether there is any difference in the degree of difficulty of various multiple \textit{Wh} questions in English and Korean. Multiple \textit{Wh} questions that include just two argument \textit{Wh}-words are referred to as 'argument multiple \textit{Wh} questions' in this dissertation, and multiple \textit{Wh} questions that involve one argument \textit{Wh}-word in the subject position and one adjunct \textit{Wh}-word are called 'adjunct multiple \textit{Wh} questions' for the sake of convenience. These two types of multiple \textit{Wh} questions are illustrated in (4).
Two types of multiple Wh questions

a. Argument multiple Wh question
   Who is eating what?

b. Adjunct multiple Wh question
   * Who is going how?

The term 'argument' is used here to refer to subjects, objects, or locatives (which are optional arguments), while the term 'adjunct' labels elements which cannot have a theta-role. In contrast to adjuncts, the subject, the object, and the locative receive a theta-role. For example, in (4a) who gets an agent role from the verb eat and what also obtains a theme role from the verb. In (4b), who bears an agent role, but how has no theta role. (Of course, this simplified definition of arguments and adjuncts is not without problems. However, the more elaborate definition is irrelevant to the research discussed here.)

The organization of this chapter is as follows. Section 4.2 describes a pretest, while section 4.3 describes a control study with adult native speakers of English and adult native speakers of Korean. Section 4.4 describes the materials and the procedure used in my experiment. Section 4.5 presents my results, and section 4.6 provides discussion. Finally, section 4.7 offers a conclusion.

Since the various types of multiple Wh question involve only one token for each type, the experiment here must be seen as a pilot study.
4.2. Pretest

To familiarize the child with the task in the actual experiment and to test children's ability to answer the simple Wh questions properly, a pretest involving four simple Wh questions was provided. The four simple Wh questions used in the pretest are given in (5), and sample pictures used in the pretest in figures 4.1 and 4.2.

(5) Simple Wh questions used in the pretest

a. English simple Wh questions
i. Who is eating an apple? (who question)
ii. Where is the woman sleeping? (where question)
iii. How is the man going to school? (how question)
iv. When is the man running? (when question)

b. Korean single Wh questions
i. who question
Nwu-ka sakwa-lul meke?
who-Nom apple-Acc eat
'Who is eating an apple?'

ii. where question
Yeca-ka eti-se ca?
woman-Nom where-at sleep
'Where is the woman sleeping?'

iii. how question
Namca-ka ettehkey hakkyo-e ay ka?
man-Nom how school-to go
'How is the man going to school?'

iv. when question
Namca-ka encey ttwie?
man-Nom when run
'When is the man running?'

Figure 4.1: Picture for the pretest (the who question)
In the pretest, the experimenter showed a picture (viz. figure 4.1), and asked, 'Who is eating an apple?' The children were supposed to answer by saying 'the rabbit'.

Tables 4.1 and 4.2 show the number, the percentages, and mean scores for each of the pretest questions (one who question, one where, one when, one how) in English and Korean, respectively.
Table 4.1: Number of correct responses for the simple Wh question given by English-speaking children in the pretest

<table>
<thead>
<tr>
<th>Q-type</th>
<th>who</th>
<th>where</th>
<th>how</th>
<th>when</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2(9)</td>
<td>4/9(44.4%)</td>
<td>3/9(33.3%)</td>
<td>1/9(11.1%)</td>
<td>0/9(0%)</td>
</tr>
<tr>
<td>3(13)</td>
<td>13/13(100%)</td>
<td>6/13(46.2%)</td>
<td>7/13(53.8%)</td>
<td>1/13(7.7%)</td>
</tr>
<tr>
<td>4(12)</td>
<td>12/12(100%)</td>
<td>9/12(75%)</td>
<td>11/12(91.7%)</td>
<td>6/12(50%)</td>
</tr>
<tr>
<td>5(8)</td>
<td>8/8(100%)</td>
<td>8/8(100%)</td>
<td>8/8(100%)</td>
<td>8/8(100%)</td>
</tr>
<tr>
<td>6(7)</td>
<td>7/7(100%)</td>
<td>7/7(100%)</td>
<td>7/7(100%)</td>
<td>6/7(85.7%)</td>
</tr>
<tr>
<td>7(10)</td>
<td>10/10(100%)</td>
<td>10/10(100%)</td>
<td>10/10(100%)</td>
<td>10/10(100%)</td>
</tr>
<tr>
<td>8(8)</td>
<td>8/8(100%)</td>
<td>8/8(100%)</td>
<td>8/8(100%)</td>
<td>8/8(100%)</td>
</tr>
<tr>
<td>T(67)</td>
<td>62/67(92.5%)</td>
<td>51/67(76.1%)</td>
<td>52/67(77.6%)</td>
<td>39/67(58.2%)</td>
</tr>
<tr>
<td>Mean</td>
<td>0.925/2</td>
<td>0.761/1</td>
<td>0.776/1</td>
<td>0.582/1</td>
</tr>
</tbody>
</table>

Table 4.2: Number of correct responses for the single Wh question given by Korean-speaking children in the pretest

<table>
<thead>
<tr>
<th>Q-type</th>
<th>Nwu-ka(who)</th>
<th>eti-se(where)</th>
<th>ettehkey(how)</th>
<th>encey(when)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2(9)</td>
<td>7/9(77.8%)</td>
<td>1/9(11.1%)</td>
<td>1/9(11.1%)</td>
<td>2/9(22.2%)</td>
</tr>
<tr>
<td>3(10)</td>
<td>10/10(100%)</td>
<td>9/10(90%)</td>
<td>6/10(60%)</td>
<td>2/10(20%)</td>
</tr>
<tr>
<td>4(10)</td>
<td>10/10(100%)</td>
<td>9/10(90%)</td>
<td>7/10(70%)</td>
<td>6/10(60%)</td>
</tr>
<tr>
<td>5(12)</td>
<td>12/12(100%)</td>
<td>12/12(100%)</td>
<td>12/12(100%)</td>
<td>11/12(91.7%)</td>
</tr>
<tr>
<td>6(10)</td>
<td>10/10(100%)</td>
<td>10/10(100%)</td>
<td>10/10(100%)</td>
<td>10/10(100%)</td>
</tr>
<tr>
<td>7(11)</td>
<td>11/11(100%)</td>
<td>11/11(100%)</td>
<td>11/11(100%)</td>
<td>11/11(100%)</td>
</tr>
<tr>
<td>8(10)</td>
<td>10/10(100%)</td>
<td>10/10(100%)</td>
<td>10/10(100%)</td>
<td>10/10(100%)</td>
</tr>
<tr>
<td>T(72)</td>
<td>70/72(97.2%)</td>
<td>62/72(86.1%)</td>
<td>57/72(79.2%)</td>
<td>52/72(72.2%)</td>
</tr>
<tr>
<td>Mean</td>
<td>0.972/1</td>
<td>0.861/1</td>
<td>0.792/1</td>
<td>0.722/1</td>
</tr>
</tbody>
</table>

[The number in the parentheses next to the age refers to the number of subjects, and the bold face indicates the stage at which a given Wh-word is assumed to be acquired in both Table 4.1 and 4.2]
As can be seen in the above tables, the who-type question was the easiest and the when-type the hardest among the simple Wh questions in both English and Korean. It is assumed in this dissertation that the children know how to answer a certain type of question properly if 70% or more of the children answered correctly. If we adopt this standard, we can say, based on the above data, that the English-speaking children at or before age 3 know how to answer a who question and the Korean-speaking children do at or before age 2. The English-speaking children at age 4 know how to answer a where question and the Korean-speaking children do at age 3. Both the English- and Korean-speaking children at age 4 know how to answer a how question. Finally, both the English- and Korean-speaking children at age 5 know how to answer a when question.

These experimental data (from a comprehension task) are more or less consistent with the longitudinal and the experimental data from English, Korean, German, Serbo-Croatian and Japanese (see Clancy 1989:329). The overall sequence of acquisition in those longitudinal and experimental data is what/where (2;2) < who (2;4) < how (2;9) < why (2;11) < when (3;0) (the age in the parentheses refers to the stage at which English-speaking children first produced the respective Wh questions (Bloom et al. 1982), but this age norm varies depending on the kind of methodology and the language).
The obvious difference between Clancy's longitudinal data from Korean (the order given above also holds for Korean) and my experimental data from English and Korean is the order between where and who. In her longitudinal study of Korean Wh questions, where emerges earlier than who. However, in my experimental study, who was easier than where. But in Clancy’s data, eti 'where' appeared primarily in eti isse 'Where is X?' and eti ka 'Where is X going?', which are arguably rote expressions in child language. In my experiment, however, the test question was Where is the woman sleeping?, which requires the child's productive use of a where question. Therefore, we speculate that the productive use of where is acquired later than the productive use of who (at least, in Korean), even though the formulaic use of where appears before the use of who. Furthermore, unlike Clancy, Blank and Allen (1976) include who in the early, sensorimotor group of Wh questions.

4.3. Control Study

The subjects for this control study consisted of 10 adult native speakers of English and 10 adult native speakers of Korean studying at the University of Hawaii at Manoa. Two types of multiple Wh question were used for both English and Korean in the control study—the argument multiple Wh question and the adjunct Wh question illustrated in (6).
(6) Two types of multiple Wh question
a. Argument multiple Wh question
Who is eating what?

b. Adjunct multiple Wh question
* Who is going how?

Each type is represented by one token.

The experiment in the control study consisted of a comprehension task. To test the subject's ability to comprehend the argument multiple Wh question, the experimenter presented the subject with a picture depicting a cat eating a sandwich, a rabbit eating an apple, an elephant eating a banana, and a dog eating an ice cream cone (figure 4.3).

Figure 4.3: Picture used in the control study (the who-what type)

And then the experimenter says, 'Here is a picture. And I will ask a question about it. Are you ready? Who is eating what?' The subject is supposed to answer by saying, 'The cat is eating a sandwich, the rabbit is eating an apple, the elephant is eating a banana, and the dog is eating an ice
cream cone.' To test the subject's ability to comprehend the adjunct multiple Wh question, the experimenter says, 'Here is another picture. I am going to ask you a question. Are you ready? *Who is going how?,' showing a picture which depicts an elephant driving, a cat riding a bike, a rabbit riding a skateboard, and a dog walking (see figure 4.4).

![Figure 4.4: Picture used in the control study (the who-how type).](image)

If the subject can interpret the test question despite its ungrammaticality (*Who is going how?), he would answer by saying, 'The elephant is driving, the cat is riding a bike, the rabbit is riding a skateboard, and the dog is walking.'

No subject in the English and Korean control study had any difficulty answering either type of multiple Wh question. The experimenter then asked the subjects to give a grammaticality judgement on the seven types of multiple Wh question used in the actual experiment. This was done in order to find out whether the test questions are grammatical to adult native speakers of the two languages.
All of the argument multiple Wh questions were grammatical to English- and Korean-speaking subjects. However, the who-how type was ungrammatical to 2 out of 10 English-speaking subjects and marginal to 4 out of 10 English-speaking subjects. The who-when type was ungrammatical to 2 out of 10 English-speaking subjects and marginal 2 out of 10 English-speaking subjects. On the other hand, the adjunct multiple Wh questions (the who-how and the who-when type) were grammatical to 9 out 10 Korean-speaking subjects. The who-how type was marginal to only 1 out of 10 Korean-speaking subjects. Tables 4.3 and 4.4 show the subjects' judgements for the seven types of multiple Wh question in English and Korean respectively. The numbers here refer to the individuals. / indicates a grammatical sentence. * means an ungrammatical sentence, while ? refers to a marginal sentence.

Table 4.3: Sentence judgement on the seven types of multiple Wh question in English

<table>
<thead>
<tr>
<th>Type</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>who-who</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>who-what</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>what-what</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>what-who</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>who-where</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>who-how</td>
<td>*</td>
<td>*</td>
<td>?</td>
<td>?</td>
<td>/</td>
<td>/</td>
<td>?</td>
<td>/</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>who-when</td>
<td>.</td>
<td>*</td>
<td>/</td>
<td>?</td>
<td>/</td>
<td>*</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
</tbody>
</table>
Table 4.4: Sentence judgement on the seven types of multiple Wh question in Korean

<table>
<thead>
<tr>
<th>Type</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>who-who</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>who-what</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>what-what</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>what-who</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>who-where</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>who-how</td>
<td>/</td>
<td>/</td>
<td>?</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>who-when</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
</tbody>
</table>

As can be seen in the tables, almost all Korean-speaking subjects found the who-how type (i.e. *Nwu-ka ettehkey kani?* 'Who is going how?') grammatical in Korean, whereas only 4 out of 10 English-speaking subjects found the who-how type (*Who is going how?*) grammatical and 6 out 10 English-speaking subjects found the who-when type (*Who is running when?*) grammatical in English. This is because *Nwu-ka ettehkey kani?* 'Who is going how?' conforms to the ECP whereas *Who is going how?* and *Who is running when?* violate the ECP (Section 4.6.2 will discuss this difference in detail). The reason why I included the ungrammatical English adjunct multiple Wh questions (*Who is going how? and *Who is running when?*) in the experiment is to investigate whether the grammatical English argument multiple Wh questions are easier than the ungrammatical English adjunct multiple Wh questions for English-speaking children. *Who is sleeping where?* is grammatical to adult
native speakers of English. It is because where is an
optional argument of the verb, hence satisfying the ECP (the
verb theta-governs the trace of where; see section 4.6.2 for
discussion).

4.4. Materials and Procedure

4.4.1. Materials

The materials used in the experiment consisted of
eleven pictures. Four pictures out of the eleven were used
to test whether children could answer a simple Wh question
appropriately (i.e. the pretest). The other seven were used
to test comprehension of the two types of multiple Wh
question (the argument multiple Wh question and the adjunct
multiple Wh question). The argument multiple Wh question is
represented by five tokens and the adjunct multiple Wh
question by two tokens. The seven multiple Wh questions
used in the experiment and sample pictures are given in (7)
and figure 4.5, respectively.

(7) Two types of multiple Wh question used in the experiment
for English and Korean
a. English argument multiple Wh questions
   i. who-who type
      Who is meeting who?
   ii. who-what type
      Who is eating what?
   iii. what-what type
      What is hitting what?
   iv. what-who type
      What is hitting who?
   v. who-where type
      Who is sleeping where?
b. English adjunct multiple Wh questions

vi. who-how type
* Who is going how?

vii. who-when type
* Who is running when?
(The reason why I included ungrammatical English multiple Wh questions in the experiment was just discussed in section 4.3.)

c. Korean argument multiple Wh questions

i. who-who type
Nwu-ka nwukwu-lul manna?
who-Nom who-Acc meet
'Who is meeting who?'

ii. who-what type
Nwu-ka mwe-l meke?
who-Nom what-Acc eat
'Who is eating what?'

iii. what-what type
Mwe-ka mwe-l chye?
what-Nom what-Acc hit
'What is hitting what?'

iv. what-who type
Mwe-ka nwukwu-lul chye?
what-Nom who-Acc hit
'What is hitting who?'

v. who-where type
Nwu-ka eti-eyse ca?
who-Nom where-at sleep
'Who is sleeping where?'

d. Korean adjunct multiple Wh questions

vi. who-how type
Nwu-ka etehkey ka?
who-Nom how go
'Who is going how?'

vii. who-when type
Nwu-ka encey ttwie?
who-Nom when run
'Who is running when?'

who-who type  who-what type  what-what type  what-who type
who-where type  who-how type  who-when type

Figure 4.5: Sample pictures for various types of multiple Wh questions in English and Korean

The who-why adjunct multiple Wh question was excluded, because it was very hard (though not impossible) to draw a picture for this type of adjunct question and to elicit appropriate answers to the who-why question from young children.

The verbs used in the argument multiple Wh questions are all transitive (except for the who-where type),--meet (mannata for Korean), eat (mekta for Korean), and hit (chita for Korean)--and were carefully chosen to avoid a potential animacy effect involving the mapping of arguments onto grammatical relations. Meet is a verb which requires an animate subject and an animate object and therefore was used in the who-who type. Eat is a verb requiring an animate subject and an inanimate object and hence used in the who-what type. Hit is a verb which has no restrictions on the animacy of either the subject or the object. Therefore, it
was used both in the what-what type and in the what-who type.

The verbs used in the adjunct multiple Wh questions and the who-where type are all intransitive,--run (ttwita for Korean), sleep (cata for Korean), and go (kata for Korean). The reason for this was to make the adjunct multiple Wh questions parallel to the argument multiple Wh questions, which essentially consisted of a verb and two Wh-words (a Wh V Wh pattern in English and a Wh Wh V pattern in Korean). If I had used transitive verbs for the adjunct multiple Wh questions, it would not only have undermined the parallelism between the argument type and the adjunct type, but it also would have made the adjunct type questions more complex by giving it a subject, an object, and a modifier (time or manner). This extra complexity could well give children additional difficulty in answering the adjunct multiple Wh question. This in turn would make the direct comparison between the two types of multiple Wh questions difficult.

4.4.2. Subjects

The subjects consisted of 67 English monolingual children aged 2 to 8 and 72 Korean monolingual children of the same age range. The English-speaking 2 to 4 year-olds attended the University of Hawaii Children's Center in Honolulu, Hawaii. The English-speaking 5 year-olds attended the University of Hawaii Lab School (equivalent to a kindergarten), which is a branch of the University's
Curriculum Research Development Group of the College of Education, while the English-speaking 6 to 8 year-olds attended the University of Hawaii Lab School (equivalent to an elementary school). The Korean 2 year-olds attended Hankwuk Preschool in Inchen, Korea, while the Korean 3 year-olds and some of 4 year-olds were preschoolers at Ttolay Preschool and Ttolyto Preschool in Inchen, Korea. The rest of the Korean 4 year-olds and the Korean 5 to 6 year-olds were kindergartners at Somyeng Kindergarten in Inchen, Korea. The 7 to 8 year old Korean subjects were elementary school pupils living in the experimenter's neighborhood in Inchen, Korea. The number of subjects by age group is given in table 4.5.

<table>
<thead>
<tr>
<th>Age</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>9</td>
<td>13</td>
<td>12</td>
<td>8</td>
<td>7</td>
<td>10</td>
<td>8</td>
<td>67</td>
</tr>
<tr>
<td>Korean</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>10</td>
<td>11</td>
<td>10</td>
<td>72</td>
</tr>
</tbody>
</table>

4.4.3. The Task

The experiment for both English and Korean consisted of a comprehension task. In order to test the child's ability to answer the argument multiple Wh question appropriately, the experimenter showed the child a picture depicting, for example, a car hitting a tree, a hammer hitting a glass, a stone hitting a window, and a ball hitting a table, and asked a question (What is hitting what? in this case)
regarding the picture. I included four situations in the picture to emphasize the fact that multiple Wh questions require a family of answers.

Figure 4.6: Picture for English and Korean argument multiple Wh questions (the what-what type)

The child is then supposed to answer the question by saying, 'The car is hitting a tree, the hammer is hitting a glass, the stone is hitting a window, and the ball is hitting a table.'

To test the child's ability to answer the adjunct multiple Wh question properly, the experimenter showed the child a picture depicting a rabbit running at night, a cow running in the morning, a goat running in the afternoon, and a mouse running at night, and asked a question (*Who is running when?) about the picture.
If the child interprets the question despite its ungrammaticality, he would answer it by saying, 'The rabbit is running at night, the cow is running in the morning, the goat is running in the afternoon (or evening), and the mouse is running at night.' A sample interaction is given in (8).

(8) Sample Interaction (for both English and Korean) [see the appendix for the Korean version of the instruction]
* Pretest:
  Experimenter: I'm going to show a picture (see figures 4.1 and 4.2) and I'm going to ask you a question about the picture. Let's try one. Are you ready?
  a. Who is eating an apple?
  b. Where is the woman sleeping?
  c. When is the man running?
  d. How is the man going to school?
  Child: (is supposed to either say the answer or, if feasible, point to the correct animal or object)

* Test:
  Experimenter: Very good. Now I'm going to show you some more pictures and see if you can answer my questions about what is going on in the picture. Are you ready to try one?
  e. Who is eating what?
  f. * Who is going how?
...  
  Child: (is supposed to say the answer or, if feasible, point to the correct animal or object)
In the actual test, five 'argument multiple Wh questions' and two 'adjunct multiple Wh questions' were arranged in random order. Each question was initially presented once; if the child indicated confusion, a failure to understand, or hesitation, the question was presented a second and final time. Regardless of the child's response, the experimenter said, 'OK. Now let's try another one.' If the child responded by pointing instead of verbalizing the answer, the pointing answer was recorded. If the child both pointed and verbalized, both were recorded.

The experiment was conducted in a quiet room in the child's preschool or kindergarten, except for the 7 and 8 year old Korean children, who participated in the experiment at the experimenter's home in Inchen, Korea. All the sessions were tape-recorded.

4.5. Results
4.5.1. Scoring

In the control study, all adult subjects answered the multiple Wh question by providing paired answers. The multiple Wh question and the appropriate answer for the question provided by adult subjects are given in (9).

(9) Multiple Wh question and the answer for the question given by adult subjects (see figure 4.3 in section 4.3)

**Question:** Who is eating what?
**Answer:** The cat is eating a sandwich, the rabbit is eating an apple, the elephant is eating a banana, and the dog is eating an ice cream cone.
The answers from the children were scored as correct, only if the children provide paired answers like adult subjects did. All other answers, including an answer such as providing a single pair (for example, the cat is eating a sandwich as an answer for the question Who is eating what? with the picture depicting four different animals eating four different things), were marked as incorrect. These other answers are analyzed in detail in section 4.5.3.

(Error Analysis).

William O'Grady (personal communication) has pointed out that since the pictures used in my experiment involve four situations (four different animals eating four different things, for example), they might have caused a processing problem for children (since they had to provide four pairs of answers in order to respond correctly by my criterion). If children really had processing difficulty, they might provide only two or three pairs of answers rather than four. However, this type of error occurred only once—with an English-speaking 2 year-old. This implies that having four situations in the pictures did not cause a processing problem for children.

Among the seven test questions exemplified in (7), the what-who type deserves our special attention. This pattern turned out to be the most difficult for both English- and Korean-speaking children. As discussed in section 3.1.1, since who has animacy features, it can be readily associated with the agent role and the subject relation, just as what
is easily identified with the patient role and the object relation because it has no animacy features. But the what-who type is the opposite of this tendency. The inanimate what (which can be easily regarded as a patient and an object) appears in the subject position, and the animate who (which can be readily regarded as an agent and a subject) appears in the object position. This reversal caused confusion to the children and they did have difficulty answering this type of question. Since this type of question is complicated by the animacy effect, it is difficult to compare this type directly with the other six types which do not seem to show an animacy effect (see section 3.6 for discussion of this issue).

In contrast, the animacy effect is not involved in adjunct multiple Wh questions. All adjunct questions have who in the subject position and the modifier (time or manner) in the sister of V' position. See the tree diagram for the adjunct multiple Wh question repeated here as (10).
Due to the animacy effect involved in the what-who type, the results from this type were eliminated from calculation of the results. That is, only the remaining four argument type questions (who-who, who-what, and what-what, who-where) and the two adjunct type questions (who-when and who-how) were considered in the comparison.

4.5.2. Results from the Actual Experiment

Tables 4.6 - 4.7 show the number and percentage of correct responses for the seven types of multiple Wh questions in English and Korean, respectively (five argument types and two adjunct types).
Table 4.6: Number of correct responses and percentage for 135 the multiple Wh question given by English-speaking children

<table>
<thead>
<tr>
<th>Type of Q</th>
<th>Age 2</th>
<th>Age 3</th>
<th>Age 4</th>
<th>Age 5</th>
<th>Age 6</th>
<th>Age 7</th>
<th>Age 8</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>who-who</td>
<td>1/9</td>
<td>4/13</td>
<td>8/12</td>
<td>6/8</td>
<td>6/7</td>
<td>10/10</td>
<td>7/8</td>
<td>42/67</td>
</tr>
<tr>
<td></td>
<td>(11%)</td>
<td>(31%)</td>
<td>(67%)</td>
<td>(75%)</td>
<td>(86%)</td>
<td>(100%)</td>
<td>(88%)</td>
<td>62.7%</td>
</tr>
<tr>
<td></td>
<td>(22%)</td>
<td>(31%)</td>
<td>(58%)</td>
<td>(63%)</td>
<td>(71%)</td>
<td>(100%)</td>
<td>(75%)</td>
<td>58.2%</td>
</tr>
<tr>
<td>what-what</td>
<td>1/9</td>
<td>2/13</td>
<td>7/12</td>
<td>6/8</td>
<td>6/7</td>
<td>10/10</td>
<td>7/8</td>
<td>39/67</td>
</tr>
<tr>
<td></td>
<td>(11%)</td>
<td>(15%)</td>
<td>(58%)</td>
<td>(75%)</td>
<td>(86%)</td>
<td>(100%)</td>
<td>(88%)</td>
<td>58.2%</td>
</tr>
<tr>
<td>what-who</td>
<td>0/9</td>
<td>1/13</td>
<td>2/12</td>
<td>3/8</td>
<td>4/7</td>
<td>7/10</td>
<td>6/8</td>
<td>23/67</td>
</tr>
<tr>
<td></td>
<td>(0%)</td>
<td>(8%)</td>
<td>(17%)</td>
<td>(38%)</td>
<td>(57%)</td>
<td>(70%)</td>
<td>(75%)</td>
<td>34.3%</td>
</tr>
<tr>
<td>who-where</td>
<td>2/9</td>
<td>3/13</td>
<td>7/12</td>
<td>6/8</td>
<td>5/7</td>
<td>9/10</td>
<td>6/8</td>
<td>38/67</td>
</tr>
<tr>
<td></td>
<td>(22%)</td>
<td>(23%)</td>
<td>(58%)</td>
<td>(75%)</td>
<td>(71%)</td>
<td>(90%)</td>
<td>(75%)</td>
<td>58.2%</td>
</tr>
</tbody>
</table>

Table 4.7: Number of correct responses and percentage for the multiple Wh question given by Korean-speaking children

<table>
<thead>
<tr>
<th>Type of Q</th>
<th>Age 2</th>
<th>Age 3</th>
<th>Age 4</th>
<th>Age 5</th>
<th>Age 6</th>
<th>Age 7</th>
<th>Age 8</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>who-who</td>
<td>0/9</td>
<td>0/10</td>
<td>0/10</td>
<td>9/12</td>
<td>8/10</td>
<td>10/11</td>
<td>9/10</td>
<td>36/72</td>
</tr>
<tr>
<td></td>
<td>(0%)</td>
<td>(0%)</td>
<td>(0%)</td>
<td>(75%)</td>
<td>(80%)</td>
<td>(91%)</td>
<td>(90%)</td>
<td>50%</td>
</tr>
<tr>
<td>who-what</td>
<td>0/9</td>
<td>0/10</td>
<td>0/10</td>
<td>6/12</td>
<td>8/10</td>
<td>9/11</td>
<td>9/10</td>
<td>32/72</td>
</tr>
<tr>
<td></td>
<td>(0%)</td>
<td>(0%)</td>
<td>(0%)</td>
<td>(50%)</td>
<td>(80%)</td>
<td>(82%)</td>
<td>(90%)</td>
<td>44.4%</td>
</tr>
<tr>
<td>what-what</td>
<td>0/9</td>
<td>0/10</td>
<td>0/10</td>
<td>7/12</td>
<td>7/10</td>
<td>10/11</td>
<td>9/10</td>
<td>33/72</td>
</tr>
<tr>
<td></td>
<td>(0%)</td>
<td>(0%)</td>
<td>(0%)</td>
<td>(58%)</td>
<td>(70%)</td>
<td>(91%)</td>
<td>(90%)</td>
<td>45.8%</td>
</tr>
<tr>
<td>what-who</td>
<td>0/9</td>
<td>0/10</td>
<td>0/10</td>
<td>4/12</td>
<td>5/10</td>
<td>7/11</td>
<td>9/10</td>
<td>25/72</td>
</tr>
<tr>
<td></td>
<td>(0%)</td>
<td>(0%)</td>
<td>(0%)</td>
<td>(33%)</td>
<td>(50%)</td>
<td>(64%)</td>
<td>(90%)</td>
<td>34.7%</td>
</tr>
<tr>
<td>who-where</td>
<td>0/9</td>
<td>0/10</td>
<td>0/10</td>
<td>6/12</td>
<td>7/10</td>
<td>9/11</td>
<td>9/10</td>
<td>31/72</td>
</tr>
<tr>
<td></td>
<td>(0%)</td>
<td>(0%)</td>
<td>(0%)</td>
<td>(50%)</td>
<td>(70%)</td>
<td>(82%)</td>
<td>(90%)</td>
<td>43.1%</td>
</tr>
<tr>
<td>who-how</td>
<td>0/9</td>
<td>0/10</td>
<td>0/10</td>
<td>6/12</td>
<td>8/10</td>
<td>9/11</td>
<td>9/10</td>
<td>32/72</td>
</tr>
<tr>
<td></td>
<td>(0%)</td>
<td>(0%)</td>
<td>(0%)</td>
<td>(50%)</td>
<td>(80%)</td>
<td>(82%)</td>
<td>(90%)</td>
<td>44.4%</td>
</tr>
<tr>
<td>who-when</td>
<td>0/9</td>
<td>0/10</td>
<td>0/10</td>
<td>6/12</td>
<td>8/10</td>
<td>9/11</td>
<td>9/10</td>
<td>32/72</td>
</tr>
<tr>
<td></td>
<td>(0%)</td>
<td>(0%)</td>
<td>(0%)</td>
<td>(50%)</td>
<td>(80%)</td>
<td>(82%)</td>
<td>(90%)</td>
<td>44.4%</td>
</tr>
</tbody>
</table>

As we can see in tables 4.6 and 4.7, one major difference between English and Korean is that at least in the experimental setting the first correct responses to multiple Wh question pattern (although at a very low rate) emerge earlier in English than in Korean by a factor of...
three years (at the age of 2 in English versus at the age of 5 in Korean).

As mentioned in section 4.1.1, the second issue in this chapter has to do with whether there is any difference in the degree of difficulty of various multiple Wh questions in English and Korean. As discussed in section 4.5.1, the what-who type was the most difficult for both English- and Korean-speaking children, due to the animacy effect.

The second hardest pattern in English was the who-when type (with a mean score of 37.3%). But a more careful examination of the table reveals that the low score is mainly due to the poor performance by 6 year-olds (only 29%). This low score is not representative of the general tendency of English-speaking older children (63% for 5 year-olds and 100% for 7 year-olds). Therefore, I interpret the English-speaking 6 year-olds' low score as unrepresentative. For this reason, I did not take into account the poor performance by English-speaking 6 year-olds on the who-when type in the comparison of various types of multiple Wh questions. (Moreover, for the reason noted earlier, I also ignore the results from the what-who type.)

Among the six types (who-who, who-what, what-what, who-where, who-how, who-when), the who-who type was the easiest overall in both English and Korean (with mean scores of 62.7% for English and 50% for Korean). The who-how type and the who-when type were hardest in English (except for the what-who type), even when we do not take into consideration
the poor performance by English-speaking 6 year-olds on the who-when type. If we exclude the what-who type and the who-when type from calculation of the results for the reason noted earlier, the smallest difference showed up between the who-where type and the who-how type in English (56.7% vs. 49.3%). I calculated Z score for this difference and it is statistically significant.

\[ Z = \frac{\text{success rate} - 50}{\sqrt{\frac{0.5 \times 0.5}{N(\# \text{ of subjects})}}} \]

success rate: the number of cases where the children got the who-where type correct but the who-how type wrong / (divided by) the total number of cases where the children got only one of the two types correct (either the who-where type or the who-how type, but not both)

Z=5.846 >1.96)

However, Korean-speaking children did not show this tendency. All other five types (who-what, what-what, who-where, who-how, who-when) were equally easy (or difficult) in Korean.

4.5.3. Error Analysis

The children made various kinds of error in the actual experiment. For example, for the question Who is eating what? (with the picture depicting four different animals eating four different things), some subjects point to all the animals, some point to all the things, some point to a single animal or a single thing, instead of giving paired
answers. (Precise figures for each type of error will be given in tables 4.9 and 4.10 below.) All of these kinds of error indicate the children's inability to comprehend the multiple Wh questions. Let us call these kinds of error 'type I errors'.

A second type of error is of special interest. As mentioned above, the multiple Wh questions with the picture including various animals doing various things require a set of paired answers.²

![Figure 4.8: Picture for English and Korean argument multiple Wh questions (the who-what type)](image)

However, some subjects simply provided a single paired answer. For instance, for the question Who is eating what? with the same picture mentioned above, some subjects answered by saying The rabbit is eating an apple, instead of giving four paired answers (i.e. The rabbit is eating an apple, the elephant is eating an ice cream cone, the cat is eating a sandwich, and the dog is eating a banana). This type of response (which I will call a 'type II error') is
different from the type I error in that it indicates a partial ability to answer the multiple Wh question. In this example question, both who and what are interpreted as a request for information. But the type II error is different from the correct answer in that it is not a complete set of answers. The type II error occurred only with 3 to 4 year-olds in English and with 4 to 7 year-olds in Korean.³

Some of the English-speaking 6 year-olds, 7 year-olds and 8 year-olds made yet another type of error, answering the multiple Wh question using 'collective' lexical items such as everyone, everything, the stuff, the thing, etc. For example, for the question What is hitting who?, one child answered by saying Everything is hitting everyone and another child simply by saying Everything. In Korean, this type of error occurred only with some of 8 year-olds. This type of error is different from both type I and type II and hence is called a 'type III error'. The type III error is a more sophisticated strategy than the type I and type II error. The children who made type III errors seem to know how to answer multiple Wh questions but just collapsed all the animals and all the objects involved in the picture under a collective term. These three types of errors are summarized in table 4.8.
Table 4.8: Summary of error types

<table>
<thead>
<tr>
<th>Types of errors</th>
<th>Description of the error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>pointing to incorrect things or animals unable to comprehend the multiple Wh questions.</td>
</tr>
<tr>
<td>Type II</td>
<td>a single paired answer. partial ability to answer the multiple Wh question.</td>
</tr>
<tr>
<td>Type III</td>
<td>collective lexical item. able to answer the multiple Wh question.</td>
</tr>
</tbody>
</table>

Tables 4.9 and 4.10 show the incidence of these three types of error for the seven types of multiple Wh question (who-who, who-what, what-what, what-who, who-where, who-how, and who-when) in English and Korean, respectively.

Table 4.9: Incidence of type I, II and III errors in English (the number in the parentheses next to the age refers to the number of subjects)

<table>
<thead>
<tr>
<th>Age</th>
<th>Type I</th>
<th>Type II</th>
<th>Type III</th>
<th>Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>2(9)</td>
<td>56/63(88.9%)</td>
<td>0/63(0%)</td>
<td>7/63(11.1%)</td>
<td></td>
</tr>
<tr>
<td>3(13)</td>
<td>66/91(72.5%)</td>
<td>8/91(8.8%)</td>
<td>17/91(18.7%)</td>
<td></td>
</tr>
<tr>
<td>4(12)</td>
<td>45/84(53.6%)</td>
<td>2/84(2.4%)</td>
<td>37/84(44%)</td>
<td></td>
</tr>
<tr>
<td>5(8)</td>
<td>19/56(33.9%)</td>
<td>0/56(0%)</td>
<td>37/56(66.1%)</td>
<td></td>
</tr>
<tr>
<td>6(7)</td>
<td>13/49(26.5%)</td>
<td>4/49(8.2%)</td>
<td>32/49(65.3%)</td>
<td></td>
</tr>
<tr>
<td>7(10)</td>
<td>4/70(5.7%)</td>
<td>1/70(1.4%)</td>
<td>65/70(92.9%)</td>
<td></td>
</tr>
<tr>
<td>8(8)</td>
<td>7/56(12.5%)</td>
<td>5/56(8.9%)</td>
<td>44/56(78.6%)</td>
<td></td>
</tr>
</tbody>
</table>
Table 4.10: Incidence of type I, II and III errors in Korean
(the number in the parentheses next to the age refers to the number of subjects)

<table>
<thead>
<tr>
<th>Age</th>
<th>Type I</th>
<th>Type II</th>
<th>Type III</th>
<th>Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>2(9)</td>
<td>63/63(100%)</td>
<td>0/63(0%)</td>
<td>0/63(0%)</td>
<td></td>
</tr>
<tr>
<td>3(10)</td>
<td>70/70(100%)</td>
<td>0/70(0%)</td>
<td>0/70(0%)</td>
<td></td>
</tr>
<tr>
<td>4(10)</td>
<td>53/70(75.7%)</td>
<td>17/70(24.3%)</td>
<td>0/70(0%)</td>
<td></td>
</tr>
<tr>
<td>5(12)</td>
<td>26/84(30.9%)</td>
<td>14/84(16.7%)</td>
<td>44/84(52.4%)</td>
<td></td>
</tr>
<tr>
<td>6(10)</td>
<td>16/70(22.9%)</td>
<td>3/70(4.3%)</td>
<td>51/70(72.9%)</td>
<td></td>
</tr>
<tr>
<td>7(11)</td>
<td>7/77(9.1%)</td>
<td>7/77(9.1%)</td>
<td>63/77(81.8%)</td>
<td></td>
</tr>
<tr>
<td>8(10)</td>
<td>2/70(2.9%)</td>
<td>5/70(7.1%)</td>
<td>63/70(90%)</td>
<td></td>
</tr>
</tbody>
</table>

As can be seen in tables 4.9 and 4.10, the most frequent error in both English and Korean is the type I error, which indicates the children's inability to comprehend the multiple Wh questions. The frequency of this type of error decreases as children grow older. When the children are at the intermediate stage (from age 3 to age 4 in English and from age 4 to age 7 in Korean), they make type II errors, which indicate children's partial ability to answer the multiple Wh question; they can interpret the two Wh-words in a multiple Wh question as a request for information, but they cannot supply a full set of answers. As children grow older (at age 5 in English and at age 8 in Korean), they give up this strategy in favor of the type III error. Especially, the type II error occurs fairly frequently at age 4 and 5 in Korean, at which Korean-speaking children...
give their first correct answers to the multiple Wh questions (precisely at age 5). This tendency tells us that Korean-speaking children frequently (24.3% for age 4 and 16.7% for age 5) use this strategy (type II error) at the early stage of development of multiple Wh question pattern. After age 6, Korean-speaking children gradually give up this strategy and at age 8 they abandon this strategy completely. The type III error, which is the most sophisticated strategy among the three types of error (the children are able to answer the multiple Wh questions, but they just collapsed all the referents under a single 'group' term), first occurs at age 6 in English and at age 8 in Korean. English-speaking children keep on using this strategy until age 8 (we do not know whether 9 year-olds and older also use this strategy in English and Korean, because this issue is beyond the scope of my experiment.)

In sum, we can say that both English- and Korean-speaking children go through type I (step I), type II (step II), and type III (step III), in that order, finally reaching adult grammar (able to answer the multiple Wh questions correctly).

4.6. Discussion

In the previous section, two differences between English and Korean were observed in the acquisition of multiple Wh questions. The first difference is that the first correct responses to multiple Wh question pattern
emerge earlier in English than in Korean by three years (age 2 in English versus age 5 in Korean). The second difference is that English who-how and who-when type questions are hardest (except for what-who type), while there is no such difference in the acquisition of Korean multiple Wh questions. In this section, the possible reasons for these two differences will be suggested and discussed.

4.6.1. Emergence of Multiple Wh Questions

The reason why the multiple Wh question pattern emerges much earlier in English may be due to the difference in the input the English- and Korean-speaking children are exposed to. Clancy (1989:324) argues that cognition and input work together to shape the order in which children produce (simple) Wh questions. She further claims that input differences are a potential source of discrepancies in acquisition order across languages and cultures. If we apply Clancy's claim to the emergence of the multiple Wh question pattern, we can speculate that the English-speaking children acquire multiple Wh questions earlier than Korean-speaking children, because their caretakers use more multiple Wh questions than do Korean-speaking children's caretakers. However, since no developmental study has compared the frequency of the multiple Wh question in English with that in Korean, our speculation cannot be confirmed at this moment. This comparison can be a topic for future developmental study.
4.6.2. Difficulty of Who-how and Who-when Type in English

4.6.2.1. Introduction

As mentioned above, the who-how and the who-when type questions are the hardest (except for what-who type) in the acquisition of English multiple Wh questions, whereas there is no such difference in difficulty among various types of multiple Wh questions in Korean (see section 4.5.2). What creates this difference between the two languages?

Huang (1982) observed that in Chinese when and where pattern together with who and what, not with why and how, in terms of extractability out of an island. Consider (11).

(Huang 1982:525 ff).

(11) Complex NP Constraint (CNPC) in Chinese
i. [NP[CP shei xie] de shu]zui youqu?  
'Books that who wrote are the most interesting'

ii. [NP[CP ta taolu sheme] de shu]zui youqu?  
'Books in which he discusses what are most interesting'

iii. [NP[CP ta zai nali pail de dianying] zui hao?  
'Movies that he filmed where are the best?'

iv. [NP[CP ta (zai) shemeshihou pai] de dianying] zui hao?  
'Movies that he filmed when are the best?'

v. * [NP[CP ta weisheme xie] de shu]zui youqu?  
'Books that he wrote why are most interesting'

vi. * [NP[CP ta zeme xie] de shu]zui youqu?  
'Books that he wrote how are most interesting'
As can be seen in (11), the Wh-words who, what, where, and when can be extracted out of a complex NP, whereas why and how cannot. Huang attributed this asymmetry to the ECP (A trace should be either lexically governed (governed by a lexical category) or antecedent-governed).

A Wh-word should be raised to the matrix SPEC of CP position to be interpreted as a request for information. This Wh movement takes place at LF in Chinese. In (11i), the trace of who is lexically governed by Infl and it satisfies the ECP (Huang argues that Infl is lexical in Chinese). In (11 ii, iii, iv), the trace is lexically governed by the preposition (or the null preposition), consistent with the ECP. On the other hand, in (11 v, vi), the trace of why and how should be antecedent-governed, because why and how are not accompanied by a (null) preposition that could serve as lexical governor. But the trace cannot be antecedent-governed, either. In order for an antecedent to govern its trace, it must occur within the same maximal phrase, i.e. the same CP or NP where the trace occurs, or there must be an intermediate trace in the SPEC of CP (=Comp) within the same CP where the original trace occurs (strict locality). Why in (11v) does not directly govern its own trace because of the intervening maximal node NP. Since NP lacks a Comp node, the option of having the trace locally controlled (antecedent-governed) by an intermediate trace is not available. This is illustrated in (12).
(12) An ECP violation in Chinese

\[
\text{LF for (11v)}
\]
\[
[\text{CP weilsheme } [\text{IP[NP[CP ta t xie] de shu]} zui youqu]]?
\]

cannot antecedent-govern (locally control) because of NP why he write book most interesting
'
Books that he wrote why are most interesting?'

Alternatively, following Barriers system (Chomsky 1986), we can say that the trace of weilsheme 'why' is not antecedent-governed, because the CP which modifies the NP is not L-marked (not selected by a lexical category) and therefore a barrier. This barrier blocks the proper government (or antecedent-government) of the trace by weilsheme 'why'.

Korean shows a slightly different picture from Chinese. In Korean, not only when and where but also how pattern together with who and what. See the following examples.

(13) CNPC in Korean

i. \text{[CP[NP[CP nwu-ka ssun] chayk-i]} caymiiss-ni?]

'Who Nom write book-Nom interesting-be-Q'

ii. \text{[CP[NP[CPChelswu-ka mwe-l nonuyhan] chayk-i]} caymiiss-ni?]

'What Acc discuss book-Nom interesting-be-Q'

iii. [CP[NP[CP Chelswu-ka eti-se ssun]chayk-i caymiiss-ni?]

'Where at write book-Nom interesting'

iv. [CP[NP[CPChelswu-ka encey-(ey) ssun]chayk-i caymiiss-ni?]

'When (at) write book-Nom interesting'

v. [CP[NP[CPChelswu-ka ettehkey ssun]chayk-i caymiiss-ni?]

'How write book-Nom interesting'

vi. * [CP[NP[CPChelswu-ka way ssun]chayk-i caymiiss-ni?]

'Why write book-Nom interesting'

'Why write book-Nom interesting'
I consulted six native speakers of Korean regarding the grammaticality of the questions in (13). Table 4.11 shows the result of the survey.

Table 4.11: Sentence judgement in Korean (the numbers indicate the individuals)

<table>
<thead>
<tr>
<th>Q-type</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>∨</td>
<td>∨</td>
<td>∨</td>
<td>∨</td>
<td>∨</td>
<td>∨</td>
</tr>
<tr>
<td>iii</td>
<td>∨</td>
<td>∨</td>
<td>∨</td>
<td>∨</td>
<td>*</td>
<td>∨</td>
</tr>
<tr>
<td>iv</td>
<td>∨</td>
<td>∨</td>
<td>∨</td>
<td>∨</td>
<td>∨</td>
<td>∨</td>
</tr>
<tr>
<td>v</td>
<td>∨</td>
<td>?</td>
<td>?*</td>
<td>?</td>
<td>∨</td>
<td>∨</td>
</tr>
<tr>
<td>vi</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

Table 4.11 shows that question v is acceptable (sometimes marginally) to the majority of the consultants whereas question vi is hopelessly ungrammatical. Then why does how behave like an adjunct (together with why) in Chinese, while it behaves like an argument (together with who, what, when, where) in Korean? To find out the reason, we need to analyze the Korean Wh-words morphologically.

(14) Morphological Analysis of the Wh-words in Korean

nwu-ka mwe-l eti-se encey ette-ha-key way
who-Nom what-Ace where-at when how-do-ADV why

Huang (1982:530) argues that there is good reason to believe that both where and when are NPs in Chinese, since nali 'where' is always preceded by the preposition zai 'at', and when is rendered as 'what time' as in shemeshihou, with
sheme 'what' modifying shihou 'time'. He further argues that where and when are dominated by NP in the position \([pp \ P \ [NP \ ]]\), where the P may or may not be phonetically realized. Where and when, then, are NP complements of prepositions that can serve as their lexical governor.

In Korean also, encey 'when' can be accompanied by postpositions. This means that encey 'when' in Korean is an NP and argument, as in Chinese. Consider the contrast between encey 'when' and way 'why' in Korean.

(15) Encey 'when' and way 'why' in Korean
a. encey-pwute encey-kkaci
   when-since when-until
   'since when'  'until when'
b. *way-ttaymwuney
   why-because of
   '*because of why'

Following Huang (ibid.), I assume encey 'when' is accompanied by a null preposition. As can be seen in (14), eti 'where' in Korean is always followed by -se 'at'.

On the other hand, ette 'how' is accompanied by a light verb ha-, while way 'why' does not occur as complement of any such morpheme. (I suggest that the light verb ha- 'do' selects a manner complement ette 'how' in Korean.) This difference causes (13 vi) to be ungrammatical.

In particular, I argue that when eti 'where', encey 'when', and ette 'how' move to the SPEC of CP position at LF in Korean, they leave the postposition or the light verb stranded. And the stranded postposition or verb lexically
governs the trace. In this way, the ECP is satisfied. On the other hand, way 'why' is not followed by any postposition or verb and nothing can lexically govern the trace left at LF. Hence, the trace must be antecedent-governed to satisfy the ECP. But this option is not available, either. As discussed earlier, in order for an antecedent to govern its trace, it must occur within the same maximal phrase, i.e. the same CP or NP where the trace occurs, or there must be an intermediate trace in the SPEC of CP within the same CP where the original trace occurs (strict locality). Way 'why' does not directly govern its own trace in (13vi) because of the intervening maximal node NP.

(13vi).*[CP[CPChelswu-ka way ssun]chayk-i caymiiss-ni?] why write book-Nom interesting 'The book that Chelswu wrote why is interesting?'

Since NP lacks a Comp (SPEC of CP) node, the option of having the trace locally controlled (antecedent-governed) by an intermediate trace is not available. Therefore, (13vi) is ungrammatical in Korean. This is illustrated in (16).
(16) Difference between ette 'how' and why 'why' in Korean

a. LF for ette 'how' question

(I propose the head of AP (-key) takes VP (ette ha- 'how') as its complement, following Williams (1980). As mentioned above, I also suggest that the light verb ha- 'do' selects a manner complement ette 'how' in Korean. h in etteh is a contracted form of the verb ha- and -key is an adverbializer.)
b. LF for way 'why' question

(The antecedent way 'why' is not within the smallest maximal projection containing its trace; the trace is within the highlighted NP and way 'why' is outside of it. Hence, the Wh-word cannot antecedent-govern its trace. Some people argue that way 'why' in Korean is a sentential adverb and that it attaches to IP rather than to V'. But, even if this is the case, way 'why' cannot antecedent-govern its trace due to the reason mentioned above.)

In (16a), the trace of ette 'how' is lexically governed by the verb ha-, satisfying the ECP. In (16b), however, the trace of way 'why' is neither lexically governed nor antecedent-governed, resulting in an ECP violation. This is why ettehkey 'how' behaves like an argument (the same account can be applied to encey 'when' and eti-se 'where').

In sum, thanks to the accompanying postposition or light verb, encey 'when', eti-se 'where', and ettehkey 'how'
behave like arguments in Korean. But in English when and how are adjuncts and therefore should be antecedent-governed, because there is no lexical governor. However, this is impossible, because the subject trace should also be antecedent-governed and two instances of antecedent-government (antecedent-government of the subject trace and the adjunct trace) in a monoclausal sentence is prohibited, as explained in section 4.1.

Let us reconsider the following ungrammatical example.

(3) Index percolation (Comp indexing)

```
  CP
   / \   IP
  /   \  /   |
NP   who1 NPj
   |     I  |
  |     /   |
when1 t   I  VP
   |     /   |
  V'   NPj
       |     |
       V    t
       | running
```

* Who is running when?

I propose to account for the ungrammaticality of this sentence by using an "updated" version of the proposal put forward by Huang (1982:554 ff). In particular, I assume that LF movement of a syntactically unmoved Wh-phrase (when in (3), for example) in English is carried out by placing the Wh-phrase within the SPEC of CP--adjoining it to the Wh-phrase that has already moved there to create a "generalized
quantifier" (May 1985, Chomsky 1995). Following Aoun, Hornstein, and Sportiche (1981), there is a rule that identifies, by way of index percolation, the SPEC of CP with the higher Wh-phrase: thus the generalized quantifier when-who bear the index of who, the first element that moved to the SPEC of CP position.

In (3), who moves at SS whereas when moves at LF. Thanks to "index percolation", the higher NP who (NP_i) can antecedent-govern the trace in the SPEC of IP position, but it cannot antecedent-govern NP_j in the modifier of the verb position (it bears a different index from NP_j). The trace of when cannot be lexically governed by the verb, either, because the verb does not assign a theta-role to when, which is an adjunct. In sum, the trace of when is neither antecedent-governed nor lexically governed, resulting in a violation of the ECP. This is why the sentence Who is running when? is ungrammatical in English (the same argument can be applied to Who is going how?).

On the other hand, Who is sleeping where? is grammatical in English. As noted in section 4.1, locatives are optional arguments of the verb. Therefore, the verb sleep can lexically govern its optional argument where. For this reason, where in English patterns together with argument Wh-words (who, what) rather than with adjunct Wh-words (when, how, why).

In sum, Nwu-ka eti-se cani? 'Who is sleeping where?'; Nwu-ka encey ttwini? 'Who is running when?', and Nwu-ka
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etutehkey kani? 'Who is going how?' are grammatical in Korean, whereas Who is running when? and Who is going how? are ungrammatical in English.

4.6.2.2. Difficulty of Who-how and Who-when Type in English

Let us return to our second issue. Why are the who-when and the who-how type questions harder than other multiple Wh questions in English, but not in Korean? There are two possible reasons for this. The first possible reason is that the who-when type and the who-how type are harder in English because they include when and how, which are quite late acquisitions in English (the first correct answers to the how question occur at age 4 and those to the when question at age 5; see table 4.1 in section 4.2).

The other possible reason has to do with the ungrammaticality of the two types of questions. On this view, the who-when type and the who-how type questions are harder in English because they are ungrammatical. On the other hand, the two types are as easy (or difficult) as the other types in Korean, because they are grammatical in that language.

In order to choose between these two possible explanations, let us review the results from the pretest and the actual test. As mentioned above, how and when are the hardest in the Korean pretest (involving simple Wh questions), just as they were in English. However, the who-when type and the who-how type questions in Korean are not
harder, even though they include when and how, which are the hardest in the simple Wh questions in Korean. This suggests that the second explanation (which has to do with the ungrammaticality of the who-when type and the who-how type in English) is the better. This, in turn, suggests that English-speaking children are sensitive to the ungrammaticality of the who-when type and the who-how type questions and that, accordingly, they perform poorly on these two types of question.

4.7. Conclusion

In this chapter, the acquisition of multiple Wh questions in English and Korean was studied. The results from the experiment showed two things. One is that English-speaking children acquire (or can properly respond to) multiple Wh question patterns much earlier than Korean-speaking children (as early as age 2 in English versus at age 5 in Korean). The other is that the who-when type and the who-how type questions are the hardest among the six types of multiple Wh questions (except for the what-who type) in English, but not in Korean.

The first finding was tentatively attributed to input difference between English and Korean. English multiple Wh questions are acquired earlier than Korean multiple Wh questions, because English-speaking children may be exposed to more multiple Wh questions than Korean-speaking children.
The second finding was attributed to the ungrammaticality of the who-when type and the who-how type questions in English. The who-when type and the who-how type are the hardest in English, because they are ungrammatical. On the other hand, the two types are as easy (or difficult) as the other types in Korean, because they are grammatical in that language.

Notes
1. When I first designed this experiment, I thought who-who, who-what, what-what, and what-who can be grouped together while who-where, who-when, and who-how can be put together. This grouping gives 4 tokens of the argument type and 3 tokens of the adjunct type. However, in the actual experiment, the who-where behaved like an argument type in both English and Korean. For this reason, I gave up the original division.

2. Not all multiple Wh questions require a family of answers.

Q: What is where?
A: The book is in the bag.

3. As mentioned in section 4.5.1, only one English-speaking 2 year-old gave two paired answers (i.e. The rabbit is eating an apple, the elephant is eating an ice cream cone), ignoring the other two pairs depicted in the picture.
5.1. Introduction

In chapters 2 to 4, the acquisition of Wh questions (simple and multiple) has been studied without reference to any other construction (for example, a quantifier phrase). In this chapter, the acquisition of Wh questions will be studied with reference to quantifier phrases (henceforth, 'QP'). Specifically, the scope interaction between a Wh phrase and a QP will be investigated.

A QP is defined as a phrase containing a quantifier (for example, everything or someone for English and motwu 'everybody' or motun kes 'everything' for Korean). A sample sentence containing both a Wh phrase and a QP is illustrated in (1).

(1) Sample sentence containing a Wh phrase and a QP
Who is eating everything?

As mentioned in the previous chapters, every Wh phrase must be in the SPEC of CP position either at SS or at LF to be interpreted as a request for information. On the other hand, it is assumed in the linguistic literature that QPs are also raised (adjointed to IP or VP,) at LF to have either wide or narrow scope interpretation. Let us consider the following example.

(2) Scope interaction between two QPs
SS
Everyone loves someone.
The example sentence in (2) has two meanings, depending on its LF structure. If everyone is higher in the tree structure than someone in LF, the sentence means that everyone has his own loved one. For instance, John loves Mary, Tom loves Betty, Jim loves Caroline, etc... If someone is higher in the tree structure, the sentence means that there is a single person who everybody loves. For example, John, Tom and Jim all love Susan.

When a sentence contains a Wh phrase and a QP, the two phrases interact with each other in terms of scope. For instance, consider the following example.

(3) Scope interaction between a Wh phrase and a QP

SS
What did everyone see?

LF
[CP what [IP everyone [IP xi [VP t [VP see xj]]]]]]

In this sentence, what and everyone can have scope over each other. If what has scope over everyone, the sentence presupposes that there is one thing everyone saw. For example, Jane, Karl, and Bob saw a big ball. On the other hand, if everyone has scope over what, the same sentence presupposes that everyone saw different things. For
example, Jane saw a book, Karl saw a pencil, Bob saw a notebook, etc...

When a sentence involves a Wh phrase and a QP, there are two possible patterns (if we limit our discussion only to simple transitive sentences). One pattern is a type of sentence in which the Wh phrase appears in the subject position and the QP occupies the object position. The other is a type of sentence in which the QP shows up in the subject position and the Wh phrase ends up in the object position. These two types of sentences are illustrated in (4).

(4) Two types of sentences including a Wh phrase and a QP
a. Who saw everything?
b. What did everyone see?

Aoun and Li (1993:204) report that (4b) is ambiguous (along the lines noted above) in adult language whereas (4a) is not. As discussed above, (4a) presupposes that there is one person who saw everything and requires identification of that person. On the other hand, (4b) has two meanings. One meaning presupposes that there is one thing everyone saw and (4b) demands identification of that thing. The other meaning presupposes that there are a number of people and things and that each person saw a different thing. In this case, (4b) requires identification of all the different things that each person saw. The issue in this chapter is
whether the same asymmetry (i.e. the ambiguity of (4b) and the unambiguity of (4a)) appears in children.

The organization of this chapter is as follows. This section presents previous research regarding the issue of the scope interaction between a Wh phrase and a QP. Section 5.2 describes a pretest and section 5.3 describes a control study. Section 5.4 describes materials and procedure used in the experiment, while section 5.5 presents the results. Section 5.6 provides discussion. Finally, section 5.7 offers a conclusion.

5.1.1. Aoun and Li (1991)

Aoun and Li (1991) accounted for the ambiguity of (4b) and the unambiguity of (4a) using the Minimal Binding Requirement (MBR) and the Scope Principle under the assumption that Wh phrases are raised to the SPEC of CP position either at SS or at LF and that quantificational elements undergo raising at LF. Aoun and Li (ibid.) defined the MBR and the Scope Principle as follows:

(5) The MBR
A variable must be bound by the most local potential A'-binder. (A qualifies as a "potential" A'-binder for B iff A c-commands B and the coindexing of (A, B) would not violate the binding principles.)

(6) The Scope Principle
An operator A may have scope over an operator B iff A c-commands B or an A'-element in the chain headed by B.
Let us consider the two sentences in (4), which have the following LF representations.

(7) LFs for (4 a, b)

a. LF for (4a)
\[ \text{[CP who}_i \text{ [IP } x_i \text{ [VP everything}_j \text{ [VP saw } x_j]]]} \]

b. LF for (4b)
\[ \text{[CP what}_j \text{ [IP everyone}_i \text{ [IP } x_i \text{ [VP } t_j \text{ [VP see } x_j]]]} \]

The QP in (4b) is adjoined to IP, as in (7b). In this representation, \( t_j \) is the most local potential A'-binder for \( x_j \), and the raised \( \text{everyone}_i \) is the most local potential A'-binder for \( x_i \). The raised \( \text{everyone}_i \) is not a potential A'-binder for \( t_j \), although it is the most local one: the coindexing of the raised \( \text{everyone} \) with \( t_j \) would make the object variable \( x_j \) coindexed with the subject variable \( x_i \) (\( i = j \)), thus creating a violation of Principle C. So, what is the most local potential A'-binder for \( t_j \) as defined, and the LF is well-formed.

According to the Scope Principle, in (7b) both the Wh-operator and the QP can have wide scope: the Wh-operator because it ccommands the QP, and the QP because it ccommands the intermediate trace \( t_j \) (an A' element) bound by the Wh-operator.

Aoun and Li (ibid.) argue that the QP in (7a) cannot adjoin to IP or CP; if it did, an MBR violation would occur.\(^1\) Therefore, the only well-formed LF representation of (4a) is (7a), where both variables are bound by the most local potential A'-binder. Since *everything* does not c-
command who or an A'-element in the chain headed by who, it cannot have scope over who. On the other hand, since who c-
commands everything in (7a), it has scope over everything.

In a later paper, Aoun and Li (1993) provided a slightly different explanation for the contrast between (4a) and (4b), assuming nonraising of Wh-in-situ. Aoun and Li (1993:200) argue that Wh-elements in situ need not raise to the SPEC of Comp in the LF component. They further argue that Wh-elements in situ are coindexed and interpreted with respect to a question operator (Qu-operator) that is raised to the appropriate SPEC of Comp position by S-Structure. In other words, not only English but also Chinese (which has been assumed to have no overt Wh movement) has overt raising of a Qu-operator and that the scope of a Wh-in-situ is determined by reference to the Qu-operator it is coindexed with.

Even though their argument results in a drastic change in the analysis of Wh-in-situ patterns, the working of the MBR and the Scope Principle is basically the same as in the old system (Aoun and Li 1991). And since this change in explaining the contrast shown in (4) is irrelevant to my own acquisition research, I will assume Aoun and Li's (1991) framework in this chapter.

This chapter will focus on whether the contrast illustrated in (4) appears in children, using English and Korean data. If the contrast does not show up, the reason for its absence will be sought.
5.1.2. Miyamoto (1992)

Miyamoto (1992) examined the scope interaction between a Wh-phrase and a pronoun in English. According to Miyamoto (1992:18), they (or other plural pronouns) can behave as a quantifier in child grammar. He further argues that there exists a covert each (accompanying they), which makes they behave as a quantifier. If his claim is correct, they may behave in a way similar to everyone or everything in terms of quantification. Therefore, Miyamoto's study is relevant to my own research, even though the test questions in my experiment includes everyone and everything instead of they. His results suggest that the Scope Principle is available in early child grammar and that it is part of innate Universal Grammar.

Miyamoto (ibid.:31) specifically examined the scope interaction between they on the one hand and how many + N, who, and what on the other hand. Consider the following example.

(8) Scope interaction between a Wh-phrase and a pronoun
   a. Who did they meet?
   b. Who met them?

As discussed in the previous section (using Who saw everything? and What did everyone see?), (8a) is ambiguous in adult language, whereas (8b) is not. That is, (8a) allows both the collective and distributive responses, but
(8b) allows only the collective response. The possible question-answer pairs for (8a, b) are exemplified in (9).

(9) Question-answer pair
a. Q: Who did they meet?
   Answer I (distributive answer): Tom met Mary, Bill met Betty, Bob met Christina, etc...
   Answer II (collective answer): Tom, Bill, and Bob all met Amy.

b. Q: Who met them?
   Answer I (collective answer): Baker did (or Baker met them).
   Answer II (distributive answer): impossible
   * Tom met Mary, Bill met Betty, Bob met Christina, etc...

The issue in Miyamoto's paper is whether the asymmetry between (8a) and (8b) also holds in child language.

Even though Miyamoto examined the scope interaction between how many + N and they on the one hand and between who/what, and they on the other hand, only the scope interaction between who/what and they will be reviewed in this subsection, because the test questions used in my experiment involve only who and what.

Miyamoto's experiment consisted of a picture verification task. The subjects consisted of two male and three female children (mean age = 3;7, age range = 3;2 to 5;5); three adults were also tested as a control group.

The materials used in Miyamoto's experiment consisted of two types of question; those in which a Wh-phrase originates in an object position and those in which a Wh-phrase originates in a subject position. The two types of Wh question are illustrated in (10).
Test questions used in Miyamoto’s experiment

i) Object questions [No leading sentences are given for questions a and b in Miyamoto’s experiment]

a. What do they have?

b. What are they playing with?

c. I want to meet Sue and Matthew. Who did they meet?

ii) Subject questions

d. I'm hungry. I want apples and bananas. I'm wondering who has them (=apples and bananas) in his hands (or in his baskets).

e. I’m hungry. I want apples and bananas. I'm wondering who has them (=apples and bananas).

f. I want to play tennis and baseball. So, I need a tennis racket and baseball bat. I'm wondering who has them (=a tennis racket and a baseball bat) in his hands.

g. I want to play tennis and baseball. So, I need a tennis racket and baseball bat. I'm wondering who has them (=a tennis racket and a baseball bat).

h. (There were many people. And) there was a huge earthquake. Too bad! What hit them (people)? [Italics are added by the author of this dissertation]

In (11d, f), the PP-adverbial was added for the following reason. Following Higginbotham and May (1981), May (1988) points out the inherent ambiguity of who (plural reading vs. singular reading). This allows for responses which can be understood as having the distributive interpretation. Hoji (1986) then suggests that the plural nature of who can be controlled (i.e. the plural meaning of who can be eliminated) by adding phrases (e.g. PPs) which contain bound variable anaphora.

To find out whether children give a collective or distributive response to the subject Wh question (who has them?), the experimenter shows the child a picture depicting, for example, two boys holding an apple and a banana each and a boy holding only an apple (see figure 5.1 below) and says, ‘I'm hungry. I want apples and bananas.'
I'm wondering who has them in his hands?' If a child pointed to two boys who have both apples and bananas, this was interpreted as a collective response. On the other hand, if s/he said, 'This guy has an apple, this guy has an apple and a banana, and this guy has an apple and a banana,' this was taken to be a distributive response.

Figure 5.1: Picture used in Miyamoto's experiment

Table 5.1 shows the results from Miyamoto's experiment.
Table 5.1: Mean percentage of collective and distributive responses in Miyamoto's experiment

<table>
<thead>
<tr>
<th>Questions</th>
<th>Collective</th>
<th>Distributive</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Object Wh questions</strong> (e.g. What do they have?)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>b</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>c</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td><strong>Subject Wh questions</strong> (e.g. Who has them?)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>e</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>f</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>g</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>h</td>
<td>60</td>
<td>40</td>
</tr>
</tbody>
</table>

Based on these results, Miyamoto concludes that the children observed the same subject/object asymmetry as adults; object Wh questions (for example, What do they have?) are ambiguous in child language whereas subject Wh questions (for example, Who has them in his hands?) are not. Miyamoto reports that adults in the control group gave collective responses to all the target questions. Further, when asked whether or not those collective answers were the only possible ones for the target questions, they generally gave the distributive responses as well only for the object Wh questions.

Miyamoto (ibid.:58) accounted for the subject/object asymmetry (the ambiguity of object Wh questions and the unambiguity of subject Wh questions) by arguing that the Scope Principle (Aoun and Li 1989) constrains the possible
interpretations and does not allow the distributive interpretations for subject Wh questions. As discussed in the previous section, object Wh questions have two possible LF representations, while subject Wh questions have only one possible LF representation. And this causes the asymmetry between object Wh questions and subject Wh questions.

However, Miyamoto’s explanation has two problems. They have to do with the methodology used in his experiment. When the experimenter tested adult subjects, he first provided test questions (object and subject Wh questions), and then asked the adult subjects whether or not the answers they gave were the only possible ones for the target questions (object and subject Wh questions). When asked this follow-up question, adult subjects generally gave the distributive responses only for the object Wh question. This means that the experimenter elicited distributive responses for object Wh questions from adult subjects in one way or another. But, when the experimenter tested children, he did not ask the follow-up questions. This amounts to saying that the experimenter did not elicit the distributive responses from children. The answers from children in table 5.1 are all spontaneous ones. Using this faulty methodology, Miyamoto concludes that object Wh questions are ambiguous while subject Wh questions are not in adult and child language. In order to draw this conclusion, however, Miyamoto should have used the same methodology for both adults and children.
The second problem in Miyamoto's experiment has to do with the formulation of the test questions. In his subject questions (see (10) above), all the questions are preceded by lead-in sentences. On the other hand, in his object questions, only question c is preceded by a lead-in sentence. The other two (questions a and b) are formulated without any lead-in. This inconsistency could easily have influenced the results. Miyamoto should have given lead-in sentences for all the questions.

5.1.3. Roeper and de Villiers (1991)

Roeper and de Villiers (1991) investigated the emergence of bound variable structures using various constructions such as multiple Wh questions, questions involving a Wh-phrase and a QP, indirect questions, and sentences including QPs. What they found was that the bound variable reading (distributive answers) is overgeneralized in child language.

For their experiment, Roeper and de Villiers found a minimal pair for which the bound variable reading (BV reading henceforth) was obligatory in one case, and forbidden in the other. The pairs of sentences below (from May 1985) were used to see if children would select (11a) for a group reading.

(11) Test questions used in Roeper and de Villiers (1991)
a. Who pulled everyone?
b. Who did everyone pull?
As mentioned earlier, the paired reading is blocked for (11a) in adult language, which has to mean: "Who pulled the whole group?" In (11b) it is possible to get a distributive reading: "Which person pulled each person?" (as well as a collective reading: "Everyone pulled somebody. And who is he?") In order to test whether the same asymmetry appears in child language, the experimenter gave children four sets of pictures in which, for example, a series of people were pulling one another (see figure 5.2) and asked two questions of type (11a) and two of type (11b) of each child.

Figure 5.2: Picture used in Roeper and de Villiers (1991)

Roeper and de Villiers explored this contrast with several groups of children at the 3-4 year old range, varying the stimuli and the preamble in certain ways. The preambles used in their experiment are given in (12).

(12) The preambles used in Roeper and de Villiers (1991)

a. The first procedure consisted in giving the full story: e.g. "This little boy was out in the country one day when he got stuck in the mud. His sister tried to pull him out but he was really stuck. Then the Dad came and tried to pull the sister but it was no use. Then a horse came along and pulled the Daddy and look! Out came the boy!"
b. In the second procedure, Roeper and de Villiers tried to balance the preamble to de-emphasize the pairings: they told the same story, and ended it with: "So the horse pulled this long line of people and this long line of people pulled the boy."

The BV (distributive) reading called for a pairwise description of what was happening (this one pulled this one, and this one pulled this one, etc.), while the group reading called for the children to point to the one character (he is pulling all the people). Roeper and de Villiers found that the BV (distributive) reading was overgeneralized. The children were just as eager to take the BV reading for (11a) as for (11b). Table 5.2 shows the results from Roeper and de Villiers' experiment.

<table>
<thead>
<tr>
<th>Responses to Procedure 1 as a function of question type (N=16; ages 3;2 to 5;4)</th>
<th>&quot;group&quot; answers</th>
<th>BV answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who pulled everyone?</td>
<td>25.5%</td>
<td>69.1%</td>
</tr>
<tr>
<td>Who did everyone pull?</td>
<td>11.2%</td>
<td>72.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Responses to Procedure 2 as a function of question type (N=19, ages 3;4 to 5;2)</th>
<th>&quot;group&quot; answers</th>
<th>BV answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who pulled everyone?</td>
<td>77.2%</td>
<td>15.2%</td>
</tr>
<tr>
<td>Who did everyone pull?</td>
<td>73.5%</td>
<td>23.9%</td>
</tr>
</tbody>
</table>

Roeper and de Villiers (1991:248) take overgeneralization of BV reading in (11a, b) as a case of "quantifier spreading"—the assignment of sentential scope to a quantifier regardless of its linear position. Quantifier spreading also takes place in other constructions such as multiple Wh questions, indirect Wh questions, and
sentences including QPs. Their basic hypothesis to analyze the phenomenon of quantifier-spreading is as follows:

(13) Roeper and de Villiers' hypothesis (the adverbial analysis)
   a. Quantifiers are analyzed as adverbs
   b. Adverbs can be given sentential scope
   c. Therefore all NPs within a clause are within the scope of the adverb

This hypothesis fits the notion of "free adjunction" suggested by Lebeaux (1988) as a default property of grammars:

Default: Adjoin new material to the highest node possible

That is, children can freely attach adjuncts to higher nodes to represent new input.

Roeper and de Villiers attribute the adverbial analysis to the absence of a full NP structure which pushes the child toward an adverbial analysis. This idea is summarized as the following hypothesis.

(14) Adverbial analysis due to absence of a full NP
    Quantifiers are adverbs until the Spec of NP is fixed.

According to Roeper and de Villiers, this hypothesis can be interpreted in at least two ways. The first possibility is that the Spec of NP is absent at first, and only when it is triggered, can quantifiers be appropriately accommodated within the NP. (If we assume that there is a Determiner
Phrase which dominates the NP, then it will be the Spec of DP which must be fixed, in order to allow quantifiers.) The second possibility is that the Spec of NP already exists, but that the lexical variation means that each quantifier has to be separately justified as belonging to some node in the NP, and before that, each quantifier is analyzed as an adverb.

Based on this hypothesis, Roeper and de Villiers (ibid.:260) provided a detailed explanation for why sentences like *Who saw everyone?* initially receive a misanalysis, allowing wide scope for *everyone*. Movement to Spec of CP at LF guarantees wide-scope for *who* and narrow scope for *everyone* which in turn produces the group reading (15a). [This is the case in adult language.]

(15) Two possible LFs in Roeper and de Villiers' explanation

**LF in adult language**
a. \[ CP \{ SPEC who\} [ C +wh] [ IP t \{ VP saw everyone\}] \]

**LF in child language**
b. \[ C [ IP who\] [ VP saw everyone]\]

If, however, there is initially no Spec of CP (see (15b)), then this would block the movement of the Wh-phrase at SS and lead to the prediction that either the Wh-phrase or *everyone* could receive wide scope at LF, just as we find with *Someone saw everyone*. Their explanation can apply in a parallel fashion to object Wh questions.
(16) Object Wh question
[C [TP everyone did see what]]

If we assume that what occurs inside of the IP in (16), the same explanation applies here.

Roeper and de Villiers went a step further. They generalize their hypothesis by arguing that it holds for all phrases (NP, CP, IP, VP etc.). They proposed the following general hypothesis and corollary.

(17) Hypothesis
Heads do not automatically project Maximal Projection nodes.

(18) Corollary
The Spec node must be specifically triggered for each Maximal Projection.

Parametric variation: some Spec nodes are optional.

Roeper and de Villiers state that their hypothesis is a specific version of the general claim that functional categories are delayed in emergence in child grammar. But they do not support the maturational hypothesis. (According to this hypothesis, children do not have the same grammar as adults at the outset. Their grammar become "mature" as they grow. For example, Radford (1990) has proposed that children do not have functional categories at the beginning.) Their proposal is simply that functional categories require specific triggers. Those triggers are more or less opaque depending upon the language. A language where all quantifiers are uniformly to the left of the NP (e.g. every man, some people, but * man every, * people...
some will be easier to acquire than a language where a quantifier, like all, can appear on both sides (e.g. all the people, they all).

Roeper and de Villiers' hypothesis (17) amounts to saying that the Spec node is absent, for example, in CP and in NP. The absence of a Spec node in the CP would mean that the CP was not a maximal projection. There are many consequences to this claim. Roeper and de Villiers list a few:

(19) Consequences of absence of Spec node of CP
a. An absence of inversion of auxiliaries in children's Wh-questions [In the maturational hypothesis, it is assumed that the Spec node is absent in CP. Hence, the Wh-word moves to C, not to the Spec of CP. Since C position is occupied by the Wh-word, Aux cannot move into C position. This is, the maturationalists argue, why there is no subject-aux inversion in early child English. (see Radford 1994 for detailed discussion of this issue)]
b. Copying of the initial and medial Wh-word in children's grammars (for discussion, see Roeper and de Villiers ibid.:259)
c. An absence of subcategorization of indirect questions (for discussion, see Roeper and de Villiers ibid.:235)

We could thus test Roeper and de Villiers' claim by finding out, for example, whether the children who overgeneralize the BV reading also lack inversion of auxiliaries in Wh questions. Previous research on inversion in Wh questions (e.g. Bellugi 1971:97-9) suggests that Roeper and de Villiers' claim is not correct. According to Bellugi, Adam acquired inversion in Wh questions at 3;8. However, in Roeper and de Villiers' experiment, even 5 year-olds overgeneralize the BV reading. If the
overgeneralization of the BV reading is due to lack of the Spec node of all maximal projections (CP, IP, NP, etc.), inversion should not occur in Wh questions for the reason discussed above. But inversion occurs at age 3. It follows that 5 year-olds also have inversion. This in turn means that 5 year-olds have the Spec node. But they still overgeneralize the BV reading. Therefore, lack of the Spec node of all maximal projections cannot be a reason why children overgeneralize the BV reading. Five year-olds have the Spec node at least in CP but still overgeneralize the BV reading, and this undermines Roeper and de Villiers' claim that the overgeneralization of the BV reading is due to lack of the Spec node of all maximal projections in child language.

5.2. Pretest

To test whether Korean children acquired the lexical item motunkes 'everything' and to make sure that 'nobody' is a possible answer for the task in both languages, a pretest consisting of four questions was given. To test Korean children's acquisition of motunkes 'everything', the experimenter showed the following two pictures separately and asked, 'Does the tiger have everything?' for (a) and 'Does the goat have everything?' for (b).
Since I assumed that *everything* is frequently used by English-speaking children and that all the English-speaking children who participated in my experiment had acquired the lexical item *everything*, I did not carry out the pretest for *everything* with the English-speaking children. (All the English-speaking children in my experiment seemed to have no difficulty understanding the lexical item *everything*.)

To make sure that 'nobody' is a possible answer for the task, the experimenter showed the following two pictures and asked, 'Who is sitting in the chair?' for (a) and (b).
Tables 5.3 and 5.4 show the results from the pretest regarding 'nobody' answers for English and Korean, respectively (with the picture depicting an empty chair and a chair with a man in it; see figure 5.4).

Table 5.3: Number of 'nobody' answers in English pretest

<table>
<thead>
<tr>
<th>Age</th>
<th># of subjects</th>
<th>Nobody</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>9</td>
<td>4/9(44.4%)</td>
<td>5/9(55.6%)</td>
</tr>
<tr>
<td>3</td>
<td>13</td>
<td>8/13(61.5%)</td>
<td>5/13(38.5%)</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
<td>12/12(100%)</td>
<td>0/12(0%)</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>8/8(100%)</td>
<td>0/8(0%)</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>7/7(100%)</td>
<td>0/7(0%)</td>
</tr>
<tr>
<td>7</td>
<td>10</td>
<td>10/10(100%)</td>
<td>0/10(0%)</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>8/8(100%)</td>
<td>0/8(0%)</td>
</tr>
<tr>
<td>Total</td>
<td>67</td>
<td>57/67(85.1%)</td>
<td>10/67(14.9%)</td>
</tr>
</tbody>
</table>

Figure 5.4: Pictures used in the pretest (for 'nobody')
Table 5.4: Number of 'nobody' answers in Korean pretest

<table>
<thead>
<tr>
<th>Age # of subjects</th>
<th>Nobody</th>
<th>Don't know</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>9</td>
<td>0/9(0%)</td>
<td>9/9(100%)</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>2/10(20%)</td>
<td>1/10(10%) 7/10(70%)</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
<td>2/10(20%)</td>
<td>4/10(40%) 4/10(40%)</td>
</tr>
<tr>
<td>5</td>
<td>12</td>
<td>9/12(75%)</td>
<td>1/12(8%) 2/12(17%)</td>
</tr>
<tr>
<td>6</td>
<td>10</td>
<td>10/10(100%)</td>
<td>0/10(0%)</td>
</tr>
<tr>
<td>7</td>
<td>10</td>
<td>10/10(100%)</td>
<td>0/10(0%)</td>
</tr>
<tr>
<td>8</td>
<td>10</td>
<td>10/10(100%)</td>
<td>0/10(0%)</td>
</tr>
<tr>
<td>Total</td>
<td>71</td>
<td>43/71(60.6%)</td>
<td>6/71(8.5%) 22/71(30.9%)</td>
</tr>
</tbody>
</table>

As can be seen in the tables, English-speaking children provided 'nobody' answers at an earlier stage than Korean-speaking children. This can be attributed to the lexical difference between English and Korean. In English, one can answer the question, 'Who is sitting in the chair?' (with a picture depicting an empty chair), by simply saying, 'Nobody'. However, in Korean, there is no single word corresponding to 'nobody'. The notion of 'nobody' is expressed by a Negative Polarity Item (NPI) plus a verb, amwuto epseyo 'Nobody exists' or amwuto ancaissci anhayo 'Nobody is sitting'. Amwuto cannot be used in isolation. Therefore, amwuto(-yo) is not an appropriate answer to Who is sitting in the chair. We can say that the NPI plus a verb (amwuto epseyo) in Korean is more complex than the single word nobody in English. This complexity may cause delay in the emergence of 'nobody' answer in Korean.
As the above tables show, all the English-speaking 4 year-olds show their ability to provide 'nobody' answers at the age of 4, while Korean-speaking children do not do so until the age of 6. But the results from Korean 4 year-olds deserve our attention. At this stage, it seems that the common way to answer a 'nobody' question in Korean is saying, 'I don't know' (40%). If we regard this as a correct answer for a 'nobody' question, we can conclude that 60% of Korean-speaking children know how to answer a 'nobody' question at the age of 4 (either by using the NPI amwuto (20%) or by saying, 'I don't know' (40%)).

Tables 5.5 and 5.6 show the results from the pretest regarding the acquisition of the lexical item motunkes 'everything' in Korean. The test questions used in this pretest and the correct answers for them are given in (20) and the corresponding pictures in figure 5.5.

(20) Test questions used in the pretest regarding the acquisition of motunkes 'everything' in Korean
a. Yemso-ka motunke-l kacikoiss-ni?  
goat-Nom everything-Acc have-Q  
'Is the goat holding everything?' (with a picture depicting a goat holding a ball, a hat, a bat, and a glove)
b. Holangi-ka motunke-l kacikoiss-ni?  
tiger-Nom everything-Acc have-Q  
'Is the tiger holding everything?' (with a picture depicting a tiger holding a ball out of several)

Correct answers
a. Yes, (he is holding everything.)
b. No, (he is not holding everything. He is holding only one ball.)
Figure 5.5: Pictures used in the pretest for motunkes 'everything'

Table 5.5: Pretest regarding the acquisition of motunkes 'everything' in Korean; Question (a). Number and percentage of various types of answers to a motunkes 'everything' question. The number in the parentheses next to age refers to the number of subjects for each age group.

<table>
<thead>
<tr>
<th>Age</th>
<th>Yes</th>
<th>No</th>
<th>Enumeration</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>2(9)</td>
<td>1/9(11.1%)</td>
<td>2/9(22.2%)</td>
<td>6/9(66.7%)</td>
<td></td>
</tr>
<tr>
<td>3(10)</td>
<td>1/10(10%)</td>
<td>3/10(30%)</td>
<td>6/10(60%)</td>
<td></td>
</tr>
<tr>
<td>4(10)</td>
<td>4/10(40%)</td>
<td>4/10(40%)</td>
<td>2/10(20%)</td>
<td></td>
</tr>
<tr>
<td>5(12)</td>
<td>5/12(41.7%)</td>
<td>1/12(8.3%)</td>
<td>5/12(41.7%)</td>
<td>1/12(8.3%)</td>
</tr>
<tr>
<td>6(10)</td>
<td>3/10(30%)</td>
<td>1/10(10%)</td>
<td>5/10(50%)</td>
<td>1/10(10%)</td>
</tr>
<tr>
<td>7(10)</td>
<td>1/10(10%)</td>
<td>1/10(10%)</td>
<td>7/10(70%)</td>
<td>1/10(10%)</td>
</tr>
<tr>
<td>8(10)</td>
<td>1/10(10%)</td>
<td>6/10(60%)</td>
<td>3/10(30%)</td>
<td></td>
</tr>
<tr>
<td>Total(71)</td>
<td><strong>16/71(22.5%)</strong></td>
<td><strong>3/71(4.2%)</strong></td>
<td><strong>32/71(45.1%)</strong></td>
<td><strong>20/71(28.2%)</strong></td>
</tr>
</tbody>
</table>
Table 5.6: Pretest regarding the acquisition of motunkes 'everything' in Korean; Question (b). Number and percentage of various types of answers to a motunkes 'everything' question. The number in the parentheses next to age refers to the number of subjects for each age group.

<table>
<thead>
<tr>
<th>Age</th>
<th>No</th>
<th>Yes</th>
<th>The ball</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1/9(11.1%)</td>
<td>5/9(55.6%)</td>
<td>3/9(33.3%)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>9/10(90%)</td>
<td></td>
<td>1/10(10%)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2/10(20%)</td>
<td>1/10(10%)</td>
<td>6/10(60%)</td>
<td>1/10(10%)</td>
</tr>
<tr>
<td>5</td>
<td>6/12(50%)</td>
<td>4/12(33.3%)</td>
<td>2/12(16.7%)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>5/10(50%)</td>
<td></td>
<td></td>
<td>5/10(50%)</td>
</tr>
<tr>
<td>7</td>
<td>2/10(20%)</td>
<td></td>
<td>8/10(80%)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1/10(10%)</td>
<td></td>
<td></td>
<td>9/10(90%)</td>
</tr>
<tr>
<td>Total</td>
<td>16/71(22.5%)</td>
<td>2/71(2.8%)</td>
<td>56/71(79.4%)</td>
<td>7/71(12.6%)</td>
</tr>
</tbody>
</table>

It should be noted that the most frequent answer to question (a) was enumeration (i.e. enumerating all the objects in the picture) and to question (b) 'the ball'. Even older children (7 to 8 year-olds) gave this type of answer most of the time. There is a reason why enumeration should be considered as a correct answer for questions (a) and (b). Consider the following question-answer pair.

(21) Question-answer pair
Q: Is there anything in your bag?

Even though the question in (21) is a yes-no question, it does not necessarily elicit a yes or no answer. Hence, it seems that enumeration can be a proper answer to questions (a) and (b) in a certain context in adult language. If we
assume this is correct, we can conclude that 67.6% (22.5% for a yes answer plus 45.1% for enumeration answer) of the Korean-speaking children acquired the lexical item motunkes 'everything', based on the results from question (a) (87.3%, if based on the results from question (b)).

5.3. Control Study

The subjects for the control study consisted of 10 adult native speakers of English and 10 adult native speakers of Korean studying at the University of Hawaii at Manoa. The four types of questions used for both English and Korean in the control study are illustrated in (22). Each type is represented by one token. The pictures used in the control study are given in figure 5.6.

(22) Four types of test questions used in the control study for both English and Korean (see the appendix for the Korean version of test questions in the control study)
Type I: Who is holding everything? (with a picture depicting a cat holding four different umbrellas)
Type II: Who is holding everything? (with a picture depicting a rabbit, an elephant, a cat, and a dog each holding a different umbrella)
Type III: What is everyone holding? (with a picture depicting an elephant, a cat, a dog, and a rabbit holding a big umbrella together)
Type IV: What is everyone holding? (with a picture depicting a rabbit, an elephant, a cat, and a dog each holding a different umbrella)

Correct answers for each type
Type I: The cat. (collective interpretation)
Type II: Nobody. (distributive interpretation is blocked)
Type III: An umbrella. (collective interpretation)
Type IV: The rabbit is holding this umbrella (with pointing), the cat this umbrella, the dog this umbrella, the elephant this umbrella. (distributive interpretation)
The pictures used in the control study are a little different from those used in the actual experiment. Due to naming difficulty, all the umbrellas in experiments with children are replaced by various objects such as a dish, a spoon, a purse, etc.

The experiment in the control study consisted of a comprehension task. To test whether What is everyone holding? is ambiguous to adult native speakers of English and Korean, the experimenter presented the subject with a picture depicting four different animals holding four different umbrellas each (the type IV picture above), and asked, 'What is everyone holding?' The subject is supposed to answer by saying, 'The cat is holding this umbrella, the elephant this umbrella...' And then the experimenter showed the subject a type III picture (depicting four different animals holding one big umbrella) and asked the same question. The subject is supposed to answer by saying, 'The
umbrella.' In order to figure out whether *Who is holding everything?* is not ambiguous, the experimenter showed a type I picture (depicting a cat holding four different umbrellas) and asked, 'Who is holding everything?' The subject is supposed to answer by saying, 'The cat.' Then, the experimenter showed the subject a type II picture (depicting four different animals holding four different umbrellas) and asked, 'Who is holding everything?' This time, the subject is supposed to answer by saying, 'Nobody.' This 'nobody' answer indicates that *Who is holding everything?* is not ambiguous (only collective reading is available.) (This will be discussed in section 5.4.)

Tables 5.7 and 5.8 show the results from the control study. The letters of the alphabet refer to individuals. /\ here refers to the correct answers illustrated in (21) above.

**Table 5.7: Results from the control study for English**

<table>
<thead>
<tr>
<th>Individuals</th>
<th>Type</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>\ /</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II</td>
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<td>\ all</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>[\ / = None]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>\ /</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>\ /</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>thing /</td>
</tr>
</tbody>
</table>
Table 5.8: Results from the control for Korean

<table>
<thead>
<tr>
<th>Individuals</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>O</th>
<th>P</th>
<th>Q</th>
<th>R</th>
<th>S</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>II</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>all /</td>
</tr>
<tr>
<td>[/=None]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>N.A. /</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>IV</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>N.A. /</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
</tbody>
</table>

With one exception, the question *Who is holding everything?* elicited only collective answers (the \/ response for the type I and the 'none' response for the type II). On the other hand, *What is everyone holding?* elicited both collective and distributive readings, as answers to the type III and IV questions show, respectively. This means that *What is everyone holding?* was ambiguous to most of the adult native speakers of both languages, while *Who is holding everything?* is not,--just as the theory outlined at the outset predicts.

All adult subjects answered the type I and III questions properly except for one Korean subject, who could not get the intended meaning for the type III. Nine subjects out of ten in both English and Korean answered the type II question by saying, 'Nobody (or None)', which is the correct answer for this type. One subject out of ten in both English and Korean answered the same question by giving the "group" answer (All)--a response which I and other speakers of English and Korean take to be at least
marginally acceptable. Eight subjects out of ten gave correct distributive answers (a family of answers) to the type IV question. Two English-speaking subjects gave a "group" answer using the lexical item thing(s) for this question. One Korean-speaking subject gave the same type of "group" answer for the type IV, while another could not get the intended meaning at all.

5.4. Materials and Procedure

5.4.1. Materials for English

The materials used in my experiment for English consisted of 22 pictures. Two pictures out of the 22 were used to make sure that nobody is a possible answer for the test questions. The other twenty were used to find out whether Who is eating everything? is unambiguous while What is everyone eating? is ambiguous for children as it is for adults.

The four types of test question used in the experiment for English and sample pictures for each type are given in (23) and figure 5.7, respectively.

(23) Four types of test question used in the experiment for English (see the appendix for the complete list of test questions)
Type I: Who is eating everything? (with a picture depicting a cow eating grapes, a carrot, corn, and a potato)
Type II: Who is eating everything? (with a picture depicting a rabbit eating an apple, an elephant a banana, a cat a sandwich, and a dog an ice cream cone)
Type III: What is everyone throwing away? (with a picture depicting an elephant, a mouse, a lion, and a rabbit throwing away a big ball)
Type IV: What is everyone throwing away? (with a picture depicting a monkey throwing away a spoon, an elephant a branch, a cow a dish, and a cat a purse)

The correct answers to the test questions in adult language are given in (24).

(24) Correct answers in adult language
Type I: The cow.
Type II: Nobody.
Type III: A ball.
Type IV: The monkey is throwing away a spoon, the elephant a branch, the cow a dish, and the cat a purse.

The 'nobody' answer to the type II question is noteworthy. In the control study, the experimenter showed the type II picture and asked, 'Who is eating everything?' The answer from adult subjects was 'nobody (or none)'. This 'nobody' answer to the type II question indicates that who is eating everything? is not ambiguous in adult language. If children answer the type II question by saying 'nobody', it indicates that the type II question is not ambiguous for children, in accordance with the situation for adults. However, if they answer the same question by saying, 'The
rabbit is eating an apple, the elephant a banana...,' it indicates that the distributive reading of *Who is eating everything?* is available to children unlike adults.

I deliberately used two different types of picture for a single test question in order to elicit the collective and distributive reading. If we provide children only one of the two pictures (for example, either of the type I or the type II picture) or the two pictures simultaneously, children might give the more prominent answer of the two possible readings (collective and distributive). For example, if we show the type IV picture and ask, 'What is everyone throwing away?,' children could answer by saying, 'The monkey is throwing away a spoon, an elephant a branch, a cow a dish, and a cat a purse (distributive answer).' If this is the end of the experiment, we cannot find out whether the collective reading of the question *What is everyone throwing away?* is also available to children.

Since we separated the two different situations and provided each situation in isolation, we were able to elicit the two kinds of reading (both collective and distributive). The same holds in the type I and type II questions and pictures.

Each type of test question is represented by five tokens, giving a total of twenty tokens. The verbs used in the experiment are *carry, break, throw away, eat, and hold.*
5.4.2. Materials for Korean

Four more types of test question were added for Korean. Suh (1990) reports that in Korean the scope of the Wh-phrase and the QP changes in some cases, if scrambling takes place. Specifically, scrambling brings about a scope change in the type IV question. This is illustrated with relevant pictures in (25).

(25) Scope change in Korean scrambled sentences
a. SOV
Motwu-ka mwe-l tencye? (Type IV)
everyone-Nom what-Acc throw away
'What is everyone throwing away?'

Correct answer for (a) in adult language: The monkey is throwing away a spoon, the elephant a branch, the cow a dish, and the cat a purse.

b. QSV
Mwe-l motwu-ka tencye?
what-Acc everyone-Nom throw away
'What is it that everyone is throwing away together?'

Correct answer for (b) in adult language: Nothing.

In Motwu-ka mwe-l tencye? 'What is everyone throwing away?', both the Wh-phrase (mwe-l) and the QP (motwu-ka) can have wide scope over each other. However, in Mwe-l motwu-ka
tencye? 'What is it that everyone is throwing away together?', only the Wh-phrase (\( mwe-l \)) can have wide scope over the QP (\( motwu-ka \)), not vice versa. For this reason, the only correct answer to the scrambled question with the picture given above is 'nothing'. If the scrambled question is presented with the type III picture, then the answer will be 'the ball'. That is, the only possible situation for the scrambled question is the situation depicted in the type III picture.

In order to keep the parallelism among the four types of question, all four types were scrambled, even though there is no scope change in the types I, II, and III. This makes a total of eight types and a total of 40 tokens (8 types \( \times \) 5 tokens = 40 tokens). The eight types of test question and the correct answers to them are given in (26).

(26) Test questions used in the experiment for Korean (see the appendix for the complete list of test questions)

a. **SOV**

**Type I**

\[ Nwu-ka \ motunke-1 \ meke? \]

who-Nom everything-A Acc eat

'Who is eating everything?' (with a picture depicting a cow eating grapes, a carrot, corn, and a potato)

**Type II**

\[ Nwu-ka \ motunke-1 \ meke? \]

who-Nom everything-A Acc eat

'Who is eating everything?' (with a picture depicting a rabbit eating an apple, an elephant a banana, a cat a sandwich, and a dog an ice cream cone)

**Type III**

\[ Motwu-ka \ mwe-1 \ tencye? \]

everyone-Nom what-A Acc throw away

'What is everyone throwing away?' (with a picture depicting an elephant, a mouse, a lion, and a rabbit throwing away a big ball)
**Type IV**

Motwu-ka mwe-l tencye?  
everyone-Nom what-Acc throw away

'What is everyone throwing away?' (with a picture depicting a monkey throwing away a spoon, an elephant a branch, a cow a dish, and a cat a purse)

b. **OSV**

**Type V** (scrambled out of Type I)

Motunke-l nwu-ka meke?  
everything-Acc who-Nom eat

'Who is eating everything?' (with a picture depicting a cow eating grapes, a carrot, corn, and a potato)

**Type VI** (scrambled out of Type II)

Motunke-l nwu-ka meke?  
everything-Acc who-Nom eat

'Who is eating everything?' (with a picture depicting a rabbit eating an apple, an elephant a banana, a cat a sandwich, and a dog an ice cream cone)

**Type VII** (scrambled out of Type III)

Mwe-l motwu-ka tencye?  
what-Acc everyone-Nom throw away

'What is everyone throwing away?' (with a picture depicting an elephant, a mouse, a lion, and a rabbit throwing away a big ball)

**Type VIII** (scrambled out of Type IV)

Mwe-l motwu-ka tencye?  
what-Acc everyone-Nom throw away

'What is it that everyone throwing away together?' (with a picture depicting a monkey throwing away a spoon, an elephant a branch, a cow a dish, and a cat a purse)

---

**Correct answers** in adult language

Type I and V: So 'the cow'  
Type II and VI: Amwuto epseyo 'Nobody exists (who is eating everything)'
Type III and VII: Kong 'The ball'

Type IV: Wenswungi-nun swuce tenci-ko, khokkili-nun namwukaci tenci-ko, so-nun cepsi tenci-ko, koyangi-nun kapang tencye-yo. 'The monkey is throwing away a spoon, the elephant a branch, the cow a dish, and the cat a purse.'

Type VIII: Amwukesto epseyo 'Nothing exists (that everybody throws away together)'

5.4.3. Subjects

The subjects consisted of 67 English monolingual children aged 2 to 8 and 71 Korean monolingual children of the same age range. The English-speaking 2 to 4 year-olds attended the University of Hawaii Children's Center in Honolulu, Hawaii. The English-speaking 5 year-olds attended the University of Hawaii Lab School (equivalent to a kindergarten), which is a branch of the University's Curriculum Research Development Group of the College of Education. The English-speaking 6 to 8 year-olds attended the elementary school level of the same school. The Korean-speaking 2 year-olds attended Hankwuk Preschool in Inchen, Korea, while the Korean 3 year-olds and some of the 4 year-olds were preschoolers at Ttolay Preschool and Ttolaytto Preschool in Inchen, Korea. The rest of the Korean 4 year-olds and the Korean 5 to 6 year-olds were kindergartners at Somyeng Kindergarten in Inchen, Korea. The 7 to 8 year old Korean subjects were elementary school pupils living in the experimenter's neighborhood in Inchen, Korea. The number of subjects by age group is given in table 5.9.
Table 5.9: Number of subjects by age group

<table>
<thead>
<tr>
<th>Age</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>9</td>
<td>13</td>
<td>12</td>
<td>8</td>
<td>7</td>
<td>10</td>
<td>8</td>
<td>67</td>
</tr>
<tr>
<td>Korean</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>71</td>
</tr>
</tbody>
</table>

5.4.4. The Task

The experiment for both English and Korean consisted of a comprehension task, using the materials and procedure discussed above. For example, in order to find out whether *What is everyone eating?* is ambiguous (whereas *Who is eating everything?* is not) in both child English and Korean as in adult English and Korean, the experimenter showed the child a picture depicting a rabbit eating an apple, an elephant a banana, a cat a sandwich, and a dog an ice cream cone and asked a question (*What is everyone eating?*) regarding the picture.

![Figure 5.9: Picture for scope interaction in English and Korean (Type IV)](image)

The child is then supposed to answer the question by saying, 'The rabbit is eating an apple, the elephant is eating a
banana, the cat is eating a sandwich, and the dog is eating an ice cream cone.' Since the test questions include every, the objects or the animals depicted in the picture should be at least more than two. This is because we cannot use every for two things or animals in English.

Each English-speaking child was given two pretest pictures (to elicit a 'nobody' answer) and then twenty pictures (five tokens for each of the four types) arranged in random order. On the other hand, each Korean-speaking child was given four pretest pictures (to verify acquisition of motunkes 'everything' as well as the 'nobody' answer) and then forty pictures (five tokens for each of the eight types; four SOV types and four OSV types) arranged in random order. A sample interaction is given in (27).

(27) Sample interaction for scope interaction (see the appendix for the Korean version of the instruction)
* Pretest:
  **Experimenter:** I'm going to show you a picture and I'm going to ask you about the picture. Let's try one. Are you ready?
  a. Does the tiger have everything? (only for Korean-speaking children)
  b. Does the goat have everything? (only for Korean-speaking children)
  c. Who is sitting in the chair?
  d. Who is sitting in the chair?
  **Child:** (is supposed to say, 'Yes' or 'No' for (a, b) and 'The man' for (c) and 'Nobody' for (d))

  * Test:
  **Experimenter:** Very good. Now I'm going to show you some more pictures and ask you some more questions. Are you ready?
  e. Who is eating everything?
  f. Who is throwing away everything?
  g. What is everyone eating?
  h. What is everyone throwing away?
  (in random order)
Child: (is supposed to either to point to the correct animal or thing or to verbalize the answer)

Each question was initially presented once; if the child indicated confusion, failure to understand, or hesitation, the question was presented a second and final time. Regardless of the child's response, the experimenter said, 'OK. Now let's try another one.' If the child responded by pointing instead of verbalizing the answer, the pointing answer was recorded. If the child both pointed and verbalized, both were recorded.

The experiment was conducted in a quiet room in the child's preschool or kindergarten, except for the 7 and 8 year old Korean children, who participated in the experiment at the experimenter's home in Inchen, Korea. All the sessions were tape-recorded.

5.5. Results
5.5.1. Scoring

The answers from the children were scored as correct, only if the children provided the same correct answers as adult subjects. Both verbal and pointing answers were marked as correct in the types I and III, as long as the subjects said or pointed to the correct animal or thing. Only 'nobody' was regarded as a correct answer in the type II. Since the "group" answer (all for the type II and thing(s) for the type IV) is not of concern in this chapter, which focuses on the contrast between the distributive and
collective interpretations, it is included under the column other. All other answers were marked as incorrect. These other answers are analyzed in detail in 5.5.3. (Error Analysis).

There are two possible answers to the type IV question (What is everyone throwing away? with a picture depicting four animals throwing away four different things). One is providing a set of paired answers, such as 'The monkey is throwing away a spoon, the elephant a branch, the cow a dish, and the cat a purse.' The other is just naming (or pointing to) the four things (i.e. a spoon, a branch, a dish, and a purse) ignoring the referent of the subject in each pair. Hence, the answers from the children were marked as correct, if they either provided the paired answers or said (or pointed to) the four things. In scoring the results for the Korean OSV pattern, these two types of answer were distinguished and presented separately, in order to put focus on the overgeneralized distributive paired answers to the type VIII questions (see table 5.12 below).

5.5.2. Results from the Actual Experiment

Tables 5.10 to 5.12 show the number and percentage of correct responses for the four types of Wh question involving a QP (eight types for Korean due to scrambling), and the number and percentage of overgeneralized distributive answers for the type II (for English, and Korean SOV) and the type VI and VIII (for Korean OSV), in
English, Korean SOV, and Korean OSV, respectively. The column under 'other' includes various types of error, which will be discussed in detail in section 5.5.3.

Table 5.10: Number of Correct and Overgeneralized Distributive responses given by English-speaking children

<table>
<thead>
<tr>
<th></th>
<th>Correct</th>
<th>Error (Overgeneralized Distributive)</th>
<th>Other (Errors)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>36/45 (80%)</td>
<td>N.A.</td>
<td>9/45 (20%)</td>
</tr>
<tr>
<td>III</td>
<td>34/45 (75.6%)</td>
<td>N.A.</td>
<td>11/45 (24.4%)</td>
</tr>
<tr>
<td>2(9)II</td>
<td>0/45 (0%)</td>
<td>6/45 (13.3%)</td>
<td>39/45 (86.7%)</td>
</tr>
<tr>
<td>IV</td>
<td>11/45 (24.4%)</td>
<td>N.A.</td>
<td>34/45 (75.6%)</td>
</tr>
<tr>
<td>I</td>
<td>64/65 (98.5%)</td>
<td>N.A.</td>
<td>1/65 (1.5%)</td>
</tr>
<tr>
<td>III</td>
<td>49/65 (75.4%)</td>
<td>N.A.</td>
<td>16/65 (24.6%)</td>
</tr>
<tr>
<td>3(13)II</td>
<td>0/65 (0%)</td>
<td>6/65 (9.2%)</td>
<td>59/65 (90.8%)</td>
</tr>
<tr>
<td>IV</td>
<td>30/65 (46.2%)</td>
<td>N.A.</td>
<td>35/65 (53.8%)</td>
</tr>
<tr>
<td>I</td>
<td>59/60 (98.3%)</td>
<td>N.A.</td>
<td>1/60 (1.7%)</td>
</tr>
<tr>
<td>III</td>
<td>59/60 (98.3%)</td>
<td>N.A.</td>
<td>1/60 (1.7%)</td>
</tr>
<tr>
<td>4(12)II</td>
<td>0/60 (0%)</td>
<td>14/60 (23.3%)</td>
<td>46/60 (76.7%)</td>
</tr>
<tr>
<td>IV</td>
<td>36/60 (60%)</td>
<td>N.A.</td>
<td>24/60 (40%)</td>
</tr>
<tr>
<td>I</td>
<td>40/40 (100%)</td>
<td>N.A.</td>
<td>0/40 (0%)</td>
</tr>
<tr>
<td>III</td>
<td>40/40 (100%)</td>
<td>N.A.</td>
<td>0/40 (0%)</td>
</tr>
<tr>
<td>5(10)II</td>
<td>4/40 (10%)</td>
<td>1/40 (2.5%)</td>
<td>35/40 (87.5%)</td>
</tr>
<tr>
<td>IV</td>
<td>28/40 (70%)</td>
<td>N.A.</td>
<td>12/40 (30%)</td>
</tr>
<tr>
<td>I</td>
<td>35/35 (100%)</td>
<td>N.A.</td>
<td>0/35 (0%)</td>
</tr>
<tr>
<td>III</td>
<td>34/35 (97.1%)</td>
<td>N.A.</td>
<td>1/35 (2.9%)</td>
</tr>
<tr>
<td>6(7)II</td>
<td>1/35 (2.9%)</td>
<td>0/35 (0%)</td>
<td>34/35 (97.1%)</td>
</tr>
<tr>
<td>IV</td>
<td>16/35 (45.7%)</td>
<td>N.A.</td>
<td>19/35 (54.3%)</td>
</tr>
<tr>
<td>I</td>
<td>50/50 (100%)</td>
<td>N.A.</td>
<td>0/50 (0%)</td>
</tr>
<tr>
<td>III</td>
<td>50/50 (100%)</td>
<td>N.A.</td>
<td>0/50 (0%)</td>
</tr>
<tr>
<td>7(10)II</td>
<td>3/50 (6%)</td>
<td>4/50 (8%)</td>
<td>43/50 (86%)</td>
</tr>
<tr>
<td>IV</td>
<td>43/50 (86%)</td>
<td>N.A.</td>
<td>7/50 (14%)</td>
</tr>
<tr>
<td>I</td>
<td>40/40 (100%)</td>
<td>N.A.</td>
<td>0/40 (0%)</td>
</tr>
<tr>
<td>III</td>
<td>39/40 (97.5%)</td>
<td>N.A.</td>
<td>1/40 (2.5%)</td>
</tr>
<tr>
<td>8(8)II</td>
<td>1/40 (2.5%)</td>
<td>3/40 (7.5%)</td>
<td>36/40 (90%)</td>
</tr>
<tr>
<td>IV</td>
<td>24/40 (60%)</td>
<td>N.A.</td>
<td>16/40 (40%)</td>
</tr>
<tr>
<td>I</td>
<td>324/335 (96.7%)</td>
<td>N.A.</td>
<td>11/335 (3.3%)</td>
</tr>
<tr>
<td>III</td>
<td>305/335 (91%)</td>
<td>N.A.</td>
<td>30/335 (8.95%)</td>
</tr>
<tr>
<td>TotalII</td>
<td>9/335 (2.7%)</td>
<td>34/335 (10.1%)</td>
<td>292/335 (87.2%)</td>
</tr>
<tr>
<td>IV</td>
<td>188/335 (56.1%)</td>
<td>N.A.</td>
<td>147/335 (43.9%)</td>
</tr>
</tbody>
</table>

* Leftmost column: Age
- Number in parentheses next to age: Number of subjects
- Roman numerals: Types of the questions
  Type I: Who is eating everything? (with a picture depicting a single animal eating four things)
  Type II: Who is eating everything? (with a picture depicting four animals eating four things)
Type III: What is everyone eating? (with a picture depicting four animals eating one thing)
Type IV: What is everyone eating? (with a picture depicting four animals eating four things)

Table 5.11: Number of Correct and Overgeneralized Distributive responses given by Korean-speaking children (SOV)

<table>
<thead>
<tr>
<th></th>
<th>Correct</th>
<th>Error (Overgeneralized Distributive)</th>
<th>Other (Errors)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>24/45(53.3%)</td>
<td>N.A.</td>
<td>21/45(46.7%)</td>
</tr>
<tr>
<td>III</td>
<td>25/45(55.6%)</td>
<td>N.A.</td>
<td>20/45(44.4%)</td>
</tr>
<tr>
<td>2(9)II</td>
<td>0/45(0%)</td>
<td>0/45(0%)</td>
<td>45/45(100%)</td>
</tr>
<tr>
<td>IV</td>
<td>0/45(0/5)</td>
<td>N.A.</td>
<td>45/45(100%)</td>
</tr>
<tr>
<td>I</td>
<td>30/50(60%)</td>
<td>N.A.</td>
<td>20/50(40%)</td>
</tr>
<tr>
<td>III</td>
<td>31/50(62%)</td>
<td>N.A.</td>
<td>19/50(38%)</td>
</tr>
<tr>
<td>3(10)II</td>
<td>0/50(0%)</td>
<td>0/50(0%)</td>
<td>50/50(100%)</td>
</tr>
<tr>
<td>IV</td>
<td>5/50(10%)</td>
<td>N.A.</td>
<td>45/50(90%)</td>
</tr>
<tr>
<td>I</td>
<td>38/50(76%)</td>
<td>N.A.</td>
<td>12/50(24%)</td>
</tr>
<tr>
<td>III</td>
<td>37/50(74%)</td>
<td>N.A.</td>
<td>13/50(26%)</td>
</tr>
<tr>
<td>4(10)II</td>
<td>0/50(0%)</td>
<td>5/50(10%)</td>
<td>45/50(90%)</td>
</tr>
<tr>
<td>IV</td>
<td>12/50(24%)</td>
<td>N.A.</td>
<td>38/50(76%)</td>
</tr>
<tr>
<td>I</td>
<td>52/60(86.7%)</td>
<td>N.A.</td>
<td>8/60(13.3%)</td>
</tr>
<tr>
<td>III</td>
<td>55/60(91.7%)</td>
<td>N.A.</td>
<td>5/60(8.3%)</td>
</tr>
<tr>
<td>5(12)II</td>
<td>0/60(0%)</td>
<td>36/60(60%)</td>
<td>24/60(40%)</td>
</tr>
<tr>
<td>IV</td>
<td>46/60(76.7%)</td>
<td>N.A.</td>
<td>14/60(23.3%)</td>
</tr>
<tr>
<td>I</td>
<td>48/50(96%)</td>
<td>N.A.</td>
<td>2/50(4%)</td>
</tr>
<tr>
<td>III</td>
<td>50/50(100%)</td>
<td>N.A.</td>
<td>0/50(0%)</td>
</tr>
<tr>
<td>6(10)II</td>
<td>1/50(2%)</td>
<td>35/50(70%)</td>
<td>14/50(28%)</td>
</tr>
<tr>
<td>IV</td>
<td>44/50(88%)</td>
<td>N.A.</td>
<td>6/50(12%)</td>
</tr>
<tr>
<td>I</td>
<td>46/50(92%)</td>
<td>N.A.</td>
<td>4/50(8%)</td>
</tr>
<tr>
<td>III</td>
<td>50/50(100%)</td>
<td>N.A.</td>
<td>0/50(0%)</td>
</tr>
<tr>
<td>7(10)II</td>
<td>0/50(0%)</td>
<td>42/50(84%)</td>
<td>8/50(16%)</td>
</tr>
<tr>
<td>IV</td>
<td>49/50(98%)</td>
<td>N.A.</td>
<td>1/50(2%)</td>
</tr>
<tr>
<td>I</td>
<td>50/50(100%)</td>
<td>N.A.</td>
<td>0/50(0%)</td>
</tr>
<tr>
<td>III</td>
<td>50/50(100%)</td>
<td>N.A.</td>
<td>0/50(0%)</td>
</tr>
<tr>
<td>8(10)II</td>
<td>0/50(0%)</td>
<td>41/50(82%)</td>
<td>9/50(18%)</td>
</tr>
<tr>
<td>IV</td>
<td>45/50(90%)</td>
<td>N.A.</td>
<td>5/50(10%)</td>
</tr>
<tr>
<td>I</td>
<td>288/355(81.1%)</td>
<td>N.A.</td>
<td>67/355(18.9%)</td>
</tr>
<tr>
<td>III</td>
<td>298/355(83.9%)</td>
<td>N.A.</td>
<td>57/355(16.1%)</td>
</tr>
<tr>
<td>TotalII</td>
<td>1/355(0.28%)</td>
<td>159/355(44.8%)</td>
<td>195/355(54.9%)</td>
</tr>
<tr>
<td>IV</td>
<td>201/355(56.6%)</td>
<td>N.A.</td>
<td>154/355(43.4%)</td>
</tr>
</tbody>
</table>

* Leftmost column: Age
- Number in parentheses next to age: Number of subjects
- Roman numerals: Types of the questions
  - Type I: Nwu-ka motunke-l meke? 'Who is eating everything?' (with a picture depicting a single animal eating four things)
  - Type II:Nwu-ka motunke-l meke? 'Who is eating everything?' (with a picture depicting four animals eating four things)
Type III: Motwu-ka mwe-l meke? 'What is everyone eating?' (with a picture depicting four animals eating one thing)

Type IV: Motwu-ka mwe-l meke? 'What is everyone eating?' (with a picture depicting four animals eating four things)

Table 5.12: Number of Correct and Overgeneralized Distributive responses given by Korean-speaking children (OSV)

<table>
<thead>
<tr>
<th>Correct</th>
<th>Error (Overgeneralized Distributive)</th>
<th>Other (Errors)</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>29/45 (64.4%)</td>
<td>16/45 (35.6%)</td>
</tr>
<tr>
<td>VII</td>
<td>24/45 (53.3%)</td>
<td>N.A.</td>
</tr>
<tr>
<td>2(9) VI</td>
<td>0/45 (0%)</td>
<td>0/45 (0%)</td>
</tr>
<tr>
<td>V</td>
<td>28/50 (56%)</td>
<td>22/50 (44%)</td>
</tr>
<tr>
<td>VII</td>
<td>26/50 (52%)</td>
<td>24 (48%)</td>
</tr>
<tr>
<td>3(10) VI</td>
<td>0/50 (0%)</td>
<td>1/50 (2%)</td>
</tr>
<tr>
<td>VIII</td>
<td>0/50 (0%)</td>
<td>1/50 (2%)</td>
</tr>
<tr>
<td>V</td>
<td>38/50 (76%)</td>
<td>12/50 (24%)</td>
</tr>
<tr>
<td>VII</td>
<td>33/50 (66%)</td>
<td>17/50 (34%)</td>
</tr>
<tr>
<td>4(10) VI</td>
<td>0/50 (0%)</td>
<td>6/50 (12%)</td>
</tr>
<tr>
<td>VIII</td>
<td>0/50 (0%)</td>
<td>5/50 (10%)</td>
</tr>
<tr>
<td>V</td>
<td>55/60 (91.7%)</td>
<td>5/60 (8.3%)</td>
</tr>
<tr>
<td>VII</td>
<td>52/60 (86.7%)</td>
<td>8/60 (13.3%)</td>
</tr>
<tr>
<td>5(12) VI</td>
<td>0/60 (0%)</td>
<td>38/60 (63.3%)</td>
</tr>
<tr>
<td>VIII</td>
<td>0/60 (0%)</td>
<td>37/60 (61.7%)</td>
</tr>
<tr>
<td>V</td>
<td>48/50 (96%)</td>
<td>2/50 (4%)</td>
</tr>
<tr>
<td>VII</td>
<td>49/50 (98%)</td>
<td>1/50 (2%)</td>
</tr>
<tr>
<td>6(10) VI</td>
<td>0/50 (0%)</td>
<td>33/50 (66%)</td>
</tr>
<tr>
<td>VIII</td>
<td>0/50 (0%)</td>
<td>37/50 (74%)</td>
</tr>
<tr>
<td>V</td>
<td>50/50 (100%)</td>
<td>0/50 (0%)</td>
</tr>
<tr>
<td>VII</td>
<td>49/50 (98%)</td>
<td>1/50 (2%)</td>
</tr>
<tr>
<td>7(10) VI</td>
<td>0/50 (0%)</td>
<td>42/50 (84%)</td>
</tr>
<tr>
<td>VIII</td>
<td>0/50 (0%)</td>
<td>43/50 (86%)</td>
</tr>
<tr>
<td>V</td>
<td>50/50 (100%)</td>
<td>0/50 (0%)</td>
</tr>
<tr>
<td>VII</td>
<td>49/50 (98%)</td>
<td>1/50 (2%)</td>
</tr>
<tr>
<td>8(10) VI</td>
<td>0/50 (0%)</td>
<td>42/50 (84%)</td>
</tr>
<tr>
<td>VIII</td>
<td>0/50 (0%)</td>
<td>41/50 (82%)</td>
</tr>
<tr>
<td>V</td>
<td>298/355 (83.9%)</td>
<td>57/355 (16.1%)</td>
</tr>
<tr>
<td>VII</td>
<td>282/355 (79.4%)</td>
<td>73/355 (20.6%)</td>
</tr>
<tr>
<td>Total</td>
<td>0/355 (0%)</td>
<td>162/355 (45.6%)</td>
</tr>
<tr>
<td>VIII</td>
<td>0/355 (0%)</td>
<td>191/355 (54.4%)</td>
</tr>
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* Leftmost column: Age
- Number in parentheses next to age: Number of subjects
- Roman numerals: Types of the questions

Type I: Motunke-l nwu-ka meke? 'Who is eating everything?' (with a picture depicting a single animal eating four things)

Type II: Motunke-l nwu-ka meke? 'Who is eating everything?' (with a picture depicting four animals eating four things)
Type III: Mwe-l motwu-ka meke? 'What is everyone eating?' (with a picture depicting four animals eating one thing)

Type IV: Mwe-l motwu-ka meke? 'What is it that everyone is eating?' (with a picture depicting four animals eating four things)

The correct answer to the type II questions in adult English and Korean is 'nobody'. English-speaking children gave 'nobody' answers only nine times out of 335, while Korean-speaking children did only one time out of 355. Instead, both English- and Korean-speaking children gave quite a few distributive answers (34 out of 335 times or 10.1% in English and 159 out of 355 times or 44.8% in Korean SOV). But Korean-speaking children gave many more distributive answers to the type II questions (SOV only) than did English-speaking children (44.8% versus 10.1%). I ran ANOVA to find out whether this difference between Korean SOV and English is statistically significant or not. The results show that age, language, and the interaction between age and language are significant factors, and that the difference between the two languages (44.8% vs. 10.1%) is statistically significant ($F(1,124) = 50.344, p < 0.05$). This implies that the type II question (e.g. Nwu-ka motunke-1 meke? 'Who is eating everything?') is ambiguous in child Korean unlike in adult Korean. Korean-speaking children could get the collective reading for this structure (see the results for the type I questions; a mean of 81.1% for SOV and 83.9% for OSV) as well as the distributive reading (see the results for the type II questions; a mean of 44.8% for SOV and 45.6% for OSV). On the other hand, this tendency is
much weaker in English. English-speaking children could also get the collective reading for Who is eating what? (a mean of 96.7%). However, only 10.1% of English-speaking children could get the distributive reading in Who is eating everything? Most English-speaking children could not get the distributive reading in the same question.

Table 5.13 shows the number and percentage of overgeneralized distributive responses for the type II questions in English and Korean SOV.

Table 5.13: Number and percentage of Overgeneralized Distributive responses given by English- and Korean-speaking children

<table>
<thead>
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<th>Age</th>
<th>English</th>
<th>Korean</th>
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</thead>
<tbody>
<tr>
<td>2</td>
<td>6/45(13.3%)</td>
<td>0/45(0%)</td>
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<tr>
<td>3</td>
<td>6/65(9.2%)</td>
<td>0/50(0%)</td>
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<td>4</td>
<td>14/60(23.3%)</td>
<td>5/50(10%)</td>
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<td>5</td>
<td>1/40(2.5%)</td>
<td>36/60(60%)</td>
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<tr>
<td>6</td>
<td>0/35(0%)</td>
<td>35/50(70%)</td>
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<tr>
<td>7</td>
<td>4/50(8%)</td>
<td>42/50(84%)</td>
</tr>
<tr>
<td>8</td>
<td>3/40(7.5%)</td>
<td>41/50(82%)</td>
</tr>
<tr>
<td>Total</td>
<td>34/335(10.1%)</td>
<td>159/355(44.8%)</td>
</tr>
</tbody>
</table>

As we can see in table 5.13, English-speaking children in the younger age group (2 to 4) gave more overgeneralized distributive answers to Who is eating what? than Korean-speaking children (15.3% vs. 3.4%). And this difference
between the two languages is statistically significant
\(F(1,57) = 5.846, p < 0.05\). [Language and age are
significant factors here.] However, in the older age group
(5 to 8), Korean-speaking children gave many more
overgeneralized distributive answers to the same question
than English-speaking children (73.3% vs. 4.8%). And this
difference between the two languages is statistically
significant \(F(1,65) = 87.097, p < 0.05\). [Only language is
a significant factor here.] Taking both age difference and
language difference into consideration, we can say that the
type II question (e.g. \textit{Nwu-ka motunke-1 meke}? 'Who is eating
everything?') is ambiguous in older Korean-speaking children
(ages 5 to 8) unlike in adult Korean.

As can be seen in tables 5.11 and 5.12, there was no
difference in Korean between the canonical word-order
questions (SOV) and the scrambled word-order questions (OSV)
in terms of the type of answer. This implies that the
scrambled questions in Korean were interpreted as the
canonical word-order questions. If this is correct, the
overgeneralized distributive answers to the type VIII
questions (Korean OSV) can be regarded as correct answers.
Distributive answers to the type VIII questions (\textit{Mwe-1
motwu-ka meke}? 'What is it that everyone is eating?') are
forbidden in adult Korean, as discussed in section 5.4.2.
However, if the type VIII questions are reinterpreted as the
type IV questions (\textit{Motwu-ka mwe-1 meke}? 'What is everyone
eating?'), distributive answers become correct answers.
This may be because reconstruction takes place in child Korean. Consider the following example.

(28) Reconstruction in child Korean
Mwe-l motwu-ka meke?
what-Acc everyone-Nom eat
'What is it that everyone is eating?'

As shown in (28), in the scrambled question the object (mwe 'what') appears in the sentence-initial position.

'Reconstruction' takes the object (mwe 'what') back into its original (D-structure) position. We can test whether reconstruction takes place in child Korean by conducting an experiment on 'binding'. As in English, Korean anaphors (e.g. caki 'self') cannot c-command their antecedent in a monoclusal sentence (Principle A of the Binding Principles).

(29) Reconstruction in 'binding'
a. Ku ai-kaː caki-lulɨ ttaylyessta
   the child-Top self-Acc hit
   'The child hit himself.'
b. Caki-lulɨ ku ai-kaː ttaylyessta
   self-Acc the child-Nom hit
   'The child hit himself.'

However, both (29a) and (29b) are grammatical in Korean, even though the anaphor caki 'self' c-commands its antecedent ku ai 'the child' at SS. This indicates that reconstruction takes place in (29b) and puts the object back
into its original (D-structure) position at LF. If reconstruction does not take place, (29b) should be ungrammatical because it violates Principle A (i.e. the anaphor c-commands its antecedent at SS). Lee (1993:29) also argues that reconstruction is obligatory when the binder is a subject and that otherwise reconstruction is impossible.

In sum, reconstruction in binding patterns (such as (29)) is legitimate in both adult and child grammar, whereas it is forbidden in scope patterns (such as (28)) in adult grammar. However, overreconstruction apparently takes place in scope patterns in child grammar.

I suggest that reconstruction is available for children in Korean, and that Korean-speaking children reconstruct the OSV pattern as the SOV pattern in the questions such as Mwe-l motwu-ka meke? 'What is it that everyone is eating?'

5.5.3. Error Analysis

The children made various kinds of errors in the actual experiment. Tables 5.14 to 5.16 show the incidence of all types of error in percentage for the four types of question (eight types for Korean). Highlighted numbers refer to the percentage of possible answers (but they are treated here as if they were errors). As mentioned above, since the scope changes if the type IV question has a scrambled word-order (the type VIII), referring to all the things is not a proper answer to the type VIII question any more.
Table 5.14: Incidence of all types of error in English (Percentage)

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<tr>
<th></th>
<th>A.T.</th>
<th>A.A.</th>
<th>S.T.</th>
<th>S.A.</th>
<th>ALL</th>
<th>S.P.</th>
<th>G.T.</th>
<th>None</th>
<th>Cor</th>
<th>O.D.</th>
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</thead>
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<tr>
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<td>97.5</td>
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</tbody>
</table>

Leftmost column: Age
Number in parenthesis next to age: Number of subjects
Roman numerals: Types of the questions
Cor: Correct O.D.: Overgeneralized Distributive
S.A.: Single Animal ALL: All Animals and All Things
S.P.: Single Pair (a single animal with a single thing)
G.T.: Group Terms such as thing, stuff, food, etc.
None: Nobody or Nothing
*: the total does not equal to 100%, because it includes one incidence of 'I don't know'.
Table 5.15: Incidence of all types of error in Korean SOV 207
(Percentage)

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<th>S.A.</th>
<th>S.P.</th>
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</tbody>
</table>

Leftmost column: Age
Number in parenthesis next to age: Number of subjects
Roman numerals: Types of the questions
Cor: Correct O.D.: Overgeneralized Distributive
S.A.: Single Animal A.A.: All Animals and All Things
S.P.: Single Pair (a single animal with a single thing)
G.T.: Group Terms such as thing, stuff, food, etc.
Other: 'I don't know'
As tables 5.14 to 5.16 show, for the question Who is eating everything? (with the picture depicting a cow eating grapes, a carrot, corn, and a potato: type I), some subjects point
to all the things and some to a single thing, instead of to the cow. The former (pointing to all the things) is more frequent than the latter in English (2.7% vs. 0.6%), whereas the opposite is true in Korean (11.5% for a single thing vs. 5.9% for all things in Korean SOV and 10.7% vs. 4.2% in Korean OSV). This type I error indicates the children's inability to understand the type I question. This type of error was very rare with English-speaking children (3.3%), but more frequent in Korean than in English (17.4% for Korean SOV and 14.9% for Korean OSV).

For the question *What is everyone throwing away?* (with the picture depicting an elephant, a mouse, a lion, and a rabbit throwing away a big ball together: type III), some point to all the animals or a single animal, instead of to (or saying) the ball. This suggests a failure to recognize the Wh question. This type of error was rare in English (8.9%), while it is more frequent in Korean than in English (14% for Korean SOV and 18.6% for Korean OSV). Specifically, pointing to all animals is the most frequent error among the type I errors in English (5.7%), while pointing to a single animal is the most frequent error in Korean (10.9% for Korean SOV and 10.7% for Korean OSV).

For the question *Who is eating everything?* (with the picture depicting a rabbit eating an apple, an elephant a banana, a cat a sandwich, and a dog an ice cream cone: type II), some point to all the things, some to a single animal or thing, and some to a single pair (an animal with a
thing). Among these error types, pointing to all things or a single thing suggests that the children cannot recognize the question. On the other hand, pointing to a single animal indicates that the children are able to interpret *Who is eating everything?* (with the picture depicting various animals eating various things) as a *Wh* question but they cannot get the range of *everything* correct in the question. (We can test this hypothesis by a picture verification task. Showing a picture depicting a boy is eating one thing out of many, the experimenter says, 'The boy is eating everything.' And then the experimenter asks the child whether the statement is correct. If the child says, 'Yes,' it indicates that the child is interpreting *everything* as *something.* The children seem to interpret *everything* as *something* in *Who is eating everything?* If this hypothesis is true, pointing to a single animal can be regarded as a correct answer in child language. In the same vein, if the children interpret everything as something, answering with a single pair can also be regarded as correct. The difference between these two types (pointing to a single animal vs. pointing to a single pair) lies in the fact that the former is a short answer (e.g. *the cat*) while the latter is a long answer (e.g. *the cat (is eating) a sandwich*).

For the type II question (*Who is eating everything?* with the picture depicting four animals eating four different things), pointing to all animals as an answer is of special interest. Almost half of the English-speaking
subjects made this error (137 times out of 335 or 40.9%). This tells us that pointing to all the animals is the most typical way of answering the type II questions in child English. In adult language, the type II question elicits two types of answer. One is 'nobody', because there is no single animal who is eating everything. The other possible answer is 'all of the animals are eating everything' (group reading). As noted in section 5.3, this second type of answer is at least marginally acceptable in adult language, although we did not score it as "correct" in our calculation. The fact that 40.9% of the English-speaking children and 5.1% of Korean-speaking children (6.5% for Korean OSV) gave this type of answer suggests that even though 'nobody' answer is rarely available to children, this second option is highly available to English-speaking children and marginally available to Korean-speaking children. Saying everyone (using a 'group' term) as a answer for the type II question is equivalent to pointing to all the animals. This option was available only to older children (5 year-olds and older in English, 5 year-olds and older in Korean SOV, and 4 year-olds and older in Korean OSV).

In English, pointing to all the animals was the most frequent (40.9%) among all types of answer to the type II question (including the correct answer (i.e. 'nobody') and the overgeneralized answer). Pointing to a single animal occurred 25.4% of the time. This type of error is followed
by overgeneralized distributive answer in terms of frequency (10.1%).

In Korean, pointing to all animals occurs only 5.1% of the time. The most frequent error was overgeneralized distributive answers (44.8%), which are followed by pointing to a single animal in terms of frequency (24.2%). This suggests that Korean-speaking children regard everything as having wider scope than who in Who is eating everything? 44.8% of the time, when the question is presented with a picture depicting various animals eating various things, and that they can interpret the given question as a Wh question but cannot get the range of everything correct 24.2% of the time (they seem to interpret everything as something).

For the question What is everyone throwing away? (with the picture depicting a monkey throwing away a spoon, an elephant a branch, a cow a dish, and a cat a purse: type IV), some point to all the animals, a single thing, or a single animal, while others point to a single pair. Among these errors, pointing to all animals or a single animal suggests that the children cannot interpret What is everyone throwing away? as a Wh question. On the other hand, pointing to a single thing indicates that the children are able to interpret What is everyone throwing away? as a Wh question, but cannot get the range of everyone correct. They seem to interpret everyone as someone, as in the type II questions. (The same test suggested on p.210 can apply here.) If our hypothesis is correct, pointing to a single
thing can be regarded as a correct answer in child language. Pointing to a single pair can be interpreted in the same vein. The only difference between pointing to a single thing and pointing to a single pair consists in the way of answering (short answer vs. long answer), as in the type II question. Using a 'group' term is another way of answering the type IV question. This type of error is a more sophisticated strategy than other types of error. It suggests that the children can answer the type IV question but they just collapse all things under a 'group' term such as food, stuff, etc. This type of error occurs with older children (4 year-olds and older in English, 3 year-olds and older in Korean SOV, and 5 year-olds and older in Korean OSV). This indicates that older children use a more sophisticated strategy than younger children.

The most frequent error in answering the type IV question in English is pointing to a single thing (17%). The second most frequent error is pointing to a single animal (9.9%), which is followed by using a 'group' term (9.3%). In Korean SOV, the most frequent error is pointing to a single animal (16.9%). It is followed by pointing to a single thing (16.6%). The Korean OSV pattern shows the same tendency (18.9% for pointing to a single animal and 17.5% for pointing to a single thing).
5.6. Discussion

In his study on the scope interaction between a Wh-phrase and a plural pronoun (they) in English, Miyamoto (1992) concludes that in child language What do they have? is ambiguous whereas Who has them in his hand? is not, as in adult language. He attributed this asymmetry to the Scope Principle (Aoun and Li 1989).

Miyamoto's results are consistent with my results from the English data (if we assume, following Miyamoto (ibid.), that they is a QP). English-speaking children could get both the collective reading (results for the type III in table 5.10; 91%) and the distributive reading (type IV; 56.1%) for What is everyone throwing away? On the other hand, only the collective reading (type I; 96.7%) was available for Who is eating everything? The number of overgeneralized distributive answers (which imply the potential ambiguity of Who is eating everything?) to this question is very small (only 34 times out of 335 or 10.1%).

The ambiguity of What is everyone throwing away? and the unambiguity of Who is eating everything? in the English-speaking children can also be attributed to the Scope Principle (Aoun and Li 1991) as in adult English.

(6) The Scope Principle
An operator A may have scope over an operator B iff A c-commands B or an A'-element in the chain headed by B.
Following Aoun and Li (1991, 1993), we assume What is everyone throwing away? and Who is eating everything? have the following LF representations.

(30) LFs for Who is eating everything? and What is everyone throwing away?

a. LF for Who is eating everything?

\[
[\text{CP who}_i [\text{IP x}_i [\text{VP everything}_j [\text{VP is eating x}_j]]]]
\]

b. LF for What is everyone throwing away?

\[
[\text{CP what}_j [\text{IP everyone}_i [\text{IP x}_i [\text{VP t}_j [\text{VP is throwing away x}_j]]]]]
\]

In (30a), only who has wide scope, because who c-commands everything and everything does not c-command who or an A'-element in the chain headed by who. On the other hand, in (30b), both what and everyone have wide scope: what because it c-commands everything, and everything because it c-commands the intermediate trace (an A'-element) bound by what.

However, as pointed out in 5.1.2., Miyamot's study has a methodological problem. When Miyamoto tested adult subjects, he provided test questions and then asked as a follow-up question whether the answer the subject gave is the only possible one. When Miyamoto tested children, he only presented test questions and did not ask a follow-up question. Nor did Miyamoto use any other means to elicit another possible answer. In this way, children may have given the more prominent one of the two possible answers (distributive or collective). To remedy this methodological problem, I had two different pictures for two different
possible situations (collective reading versus distributive reading), and provided the child one picture at a time in my own experiment. In this way, I was able to elicit the less prominent reading as well as the more prominent one.

On the other hand, our findings for English are not consistent with those of Roeper and de Villiers (1991:260) who found that both *Who is eating everything?* and *What is everyone eating?* are ambiguous in the English-speaking children unlike in adult English. In their experiment, the distributive reading (= BV reading) was overgeneralized even for *Who pulled everyone?* (69.1%). However, in our experiment, the distributive reading was only slightly (10.1%) overgeneralized for *Who is eating everything?* The difference between Roeper and de Villiers' results and my results (69.1% versus 10.1%) might be ascribed to the difference in methodology. In Roeper and de Villiers' experiment, only one picture was presented for both *Who pulled everyone?* and *Who did everyone pull?*

Figure 5.10: Pictures used in Roeper and de Villiers (1991)
Moreover, different preambles for the two types of question are also given.

(12) The preambles used in Roeper and de Villiers (1991)
a. The first procedure consisted in giving the full story: e.g. "This little boy was out in the country one day when he got stuck in the mud. His sister tried to pull him out but he was really stuck. Then the Dad came and tried to pull the sister but it was no use. Then a horse came along and pulled the Daddy and look! Out came the boy!"

b. In the second procedure, Roeper and de Villiers tried to balance the preamble to de-emphasize the pairings: they told the same story, and ended it with: "So the horse pulled this long line of people and this long line of people pulled the boy."

These preambles may have played a role in eliciting the distributive reading (function of (12a)) and the collective reading (function of (12b)) for both Who pulled everyone? and Who did everyone pull? In contrast, in my experiment, two pictures (corresponding to two situations) were presented for each of the two types of question and no preambles were given.

This difference in methodology may explain why Roeper and de Villiers' subjects gave more overgeneralized distributive answers to Who pulled everyone? than my English-speaking subjects.

However, our findings for Korean are more or less consistent with Roeper and de Villiers' findings for English. The Korean-speaking children in my experiment gave overgeneralized distributive answers to Who is eating
everything? (44.8%), in spite of the methodological difference.

Roeper and de Villiers attributed the ambiguity of Who is eating everything? to lack of Spec node (or non-triggering of Spec node) in child language. In adult language every in everything originates under Spec of NP (if we adopt the NP system) and therefore only modifies thing. However, in child language in which there is no Spec node, every cannot originate under Spec of NP. According to Roeper and de Villiers, every in child language is like a sentential adverb (something like always). So it "modifies" not only thing but also who in Who is eating everything?; namely all NPs in the sentence. This is why children have a bound variable (distributive) reading in Who is eating everything?

Roeper and de Villiers (ibid.) also found that the bound variable (distributive) reading is overgeneralized in many other constructions such as multiple (double) Wh questions, indirect questions, sentences including one QP and an indefinite (which is treated as a QP) (e.g. Every child sat on a horse.) and sentences including plurals (e.g. Do dogs have a tail? or Does a dog have tails?).

William O'Grady (personal communication) points out that if their claim is correct, children should have the following surface structure at some point of development.

(31) Every as a sentential adverb in child English
Every the boy ate cookie.
If children really consider every as a sentential adverb as Roeper and de Villiers argue, it should be possible for every to appear in the sentence-initial position like other sentential adverbs (e.g. definitely). If the above pattern (31) is not attested in child English, Roeper and de Villiers' claim is weakened.

Furthermore, even though our findings for Korean are more or less consistent with Roeper and de Villiers' findings, the Korean facts undermine their explanation for overgeneralization of the distributive reading in *Who is eating everything?*

In English, determiners (the, this, every, some, etc.) cannot precede adjectives. That is, determiners mark the left boundary of an NP. Furthermore, determiners cannot be stacked. This is illustrated in (32).

(32) Determiners in English
a. Positional stability
   every tall man
   * tall every man
b. Prohibition on stacking determiners
   the man
   * the every man
   *every the man

Let us consider the status of Korean QPs. Korean QPs cannot be determiners, unlike English QPs (Let us limit our discussion only to the adjective form of Korean universal QPs; i.e. *motun* 'every'). Consider:
As can be seen in (33), first, Korean QPs can precede an adjective or a demonstrative (they do not mark the left boundary of an NP). Secondly, Korean QPs can be used with other determiner-like elements (e.g. demonstratives; see (33 c, d)). This implies that Korean QPs are not determiners, unlike English QPs. Based on the data in (33), I conclude that Korean QPs do not originate under SPEC of NP, but under Modifier position. That is, motu-n 'every' in Korean is an adjective. This claim is further supported by the morphological analysis of motu-n 'every'. Like other adjectives in Korean (ppalka-n 'red', yeypu-n 'pretty', etc), motu-n 'every' contains an adjective marker -n.

If our analysis of Korean QPs is correct, Roeper and de Villiers' account is not consistent with the Korean facts. As mentioned above, they argue that every in Who is eating everything? has wide scope, because NP in child language lacks a Spec node. As the Spec node is triggered later in
development, every is positioned under the Spec of NP and hence has scope only over the NP. However, as discussed above, since Korean QPs are never positioned under the Spec of NP even in the adult language, Roeper and de Villiers' account cannot be applied to the Korean data. Korean QPs originate under the Modifier position, but 44.8% of Korean-speaking children still give overgeneralized distributive answers to Who is eating everything? (i.e. every has a wide scope in this question).

In sum, my results from the English data are consistent with Miyamoto's; Who is eating everything? is not ambiguous in child English, whereas What is everyone eating? is ambiguous, as in adult language. This is attributed to the Scope Principle, proposed by Aoun and Li (1991). On the other hand, my results from the English data are not consistent with Roeper and de Villiers'. This might be ascribed to the difference in methodology.

My results from the Korean data, however, are more or less consistent with Roeper and de Villiers' results from the English data; both Who is eating everything? (Nwu-ka motunke-1 meke? in Korean) and What is everyone eating? (Motwu-ka mwe-1 meke? in Korean) are ambiguous in the two languages. However, Roeper and de Villiers' explanation does not work for the Korean data. Korean QPs are never positioned under the Spec of NP, but Who is eating everything? is still ambiguous in child Korean.
Unfortunately, I have no alternative explanation to propose at this time.

One final unsolved problem is that in my results from the English and Korean data *Who is eating everything?* is not ambiguous in child English whereas it is in child Korean. What brings about this difference in the two languages? At this moment, I have no answer for this question and will leave this for future research.

5.7. Conclusion

This chapter focuses on the question of whether *Who is eating everything?* is ambiguous in child language unlike in adult language. Our findings show that this pattern is ambiguous in child Korean but not in child English. Our findings for English are consistent with Miyamoto's findings for English but are not consistent with Roeper and de Villiers' findings for English. The ambiguity of *What is everyone throwing away?* and the unambiguity of *Who is eating everything?* in child English and Korean is attributed to Aoun and Li's Scope Principle.

Our findings for Korean are consistent with Roeper and de Villiers' findings for English; both *Who is eating everything?* and *What is everyone throwing away?* are ambiguous, unlike in adult language. However, Roeper and de Villiers' explanation for the ambiguity of *Who is eating everything?* (i.e. non-triggering of the Spec node in early stages of development) does not work for Korean. Even
though Korean QPs are never positioned under the Spec node, Korean-speaking children still give overgeneralized distributive answers to *Who is eating everything? (Nwu-ka motunke-1 meke?)*

Finally, this chapter leaves unsolved the question why *Who is eating everything?* is ambiguous in child Korean while it is not in child English.

**Notes**

1. But their claim is incorrect (i.e. an MBR violation does not occur.) Consider the following "wrong" LFs for (4a).

"Wrong" LFs for (4a)

a. QP adjoined to IP

\[
[CP \text{who}_1 [IP \text{everything}_j [IP x_i [VP \text{saw} x_j]]]]
\]

b. QP adjoined to CP

\[
[CP \text{everything}_j [CP \text{who}_1 [IP x_i [VP \text{saw} x_j]]]]
\]

In (a), \(x_j\) is bound by the most local potential A'-binder (\(\text{everything}_j\)). And \(x_i\) is also bound by the most local potential A'-binder (\(\text{who}_j\)). \(\text{Everything}_j\) is not a potential A'-binder for \(x_i\), because the coindexing of the raised \(\text{everything}_j\) with \(x_i\) would make the object variable \(x_j\) coindexed with the subject variable \(x_j\) \((i = j)\), thus creating a violation of Principle C. The only most local potential A'-binder for \(x_i\) is then \(\text{who}_j\). And \(x_i\) is bound by \(\text{who}_j\). Therefore, according to the MBR, (a) should be a correct LF representation for (4a).

In (b), \(x_i\) is bound by the most local potential A'-binder (\(\text{who}_j\)). And \(x_j\) is also bound by the most local potential A'-binder (\(\text{everything}_j\)). \(\text{Who}_j\) is not a potential A'-binder for \(x_j\), because the coindexing of \(\text{who}_j\) with \(x_j\) would make the object variable \(x_j\) coindexed with the subject variable \(x_j\) \((i = j)\), thus creating a violation of Principle C. Therefore, the MBR predicts that (b) should be another well-formed LF representation for (4b).

The MBR and the Scope Principle successfully account for the ambiguity of (7b). However, the MBR as it is cannot exclude the incorrect LF representations (a,b).

In order to account for the asymmetry between (4a) and (4b) in terms of ambiguity (i.e. the ambiguity of (4b) and the unambiguity of (4a)) in adult language, we need a revised version of the MBR.
2. William O'Grady (personal communication) pointed out that my methodology was too successful. It may have elicited ungrammatical responses that children would not otherwise give.
CHAPTER 6. CONCLUSION

This dissertation has investigated several issues (pied-piping, the subject-object asymmetry, multiple Wh questions, and the scope interaction between a Wh-phrase and a QP) in the acquisition of Wh questions in English and Korean using experimental data.

Chapter 2 addressed the issue of pied-piping in the acquisition of Wh questions in English and Korean. Nishigauchi (1986, 1990) argues that the Subjacency Principle applies at LF and that pied-piping should take place to avoid a violation of the Subjacency Principle when a Wh-phrase is embedded in a complex NP. Choe (1987) applies Nishigauchi's idea to Korean.

Nishigauchi (1986, 1990) adduced several pieces of empirical evidence including the nature of "short answers" for his claim, using data from Japanese. According to Nishigauchi and Choe, the short answer to the question in which the Wh-phrase is embedded in a complex NP should correspond to the whole complex NP involving the Wh-phrase, not only the Wh-phrase. That is, the answer should be a pied-piped one.

(1) Pied-piped answer in English
Question
The cat that who hit is crying? [quizmaster question with falling intonation]

Possible LFs
LF
[CP the cat that who hit [TP t is crying]]? (the cat that who hit occupies the matrix SPEC of CP position)
LF2

$[\text{CP who} [\text{TP} [\text{NP the cat [CP that t hit]]] is crying]]$? (only who occupies the matrix SPEC of CP position)

Possible Answers
a. The cat that the dog hit.

If Nishigauchi's and Choe's claim holds cross-linguistically, we can expect the same type of pied-piped answer to the question in which the $\text{Wh}$-phrase is embedded in a complex NP in English.

Nishigauchi's and Choe's pied-piping hypothesis for LF $\text{Wh}$ movement was checked against adult and child language data in English and Korean. It was shown that the short answer evidence does not support the claim that the Subjacency Principle applies at LF in English and Korean. Most of the children and adults in the actual experiment and the control study for both English and Korean gave non-pied-piped answers to the question in which the $\text{Wh}$-phrase is embedded in a complex NP. In other words, the subjects simply provided information on just the $\text{Wh}$-phrase itself, not on the whole complex NP that contains the $\text{Wh}$-phrase. This suggests that Nishigauchi's and Choe's claim is not correct and that the Subjacency Principle does not hold at LF.

Chapter 3 discussed the issue of a possible subject-object asymmetry in the acquisition of $\text{Wh}$ questions—whether the subject $\text{Wh}$ questions are easier for children than the object $\text{Wh}$ questions in English and Korean. The results from
the experiment showed that subject Wh questions are actually easier than object Wh questions in English and Korean.

These results contradict Stromswold's (1988) claim that object Wh questions are easier than subject Wh questions in English. She attributes the object preference in her longitudinal data to the difference between subject Wh questions and object Wh questions in terms of the type of proper government. She argues that theta-government by a verb is more direct and less complicated than antecedent-government by a Wh-word and that questions with theta-governed gaps (i.e. object Wh questions) should be acquired before questions with antecedent-governed gaps (i.e. subject Wh questions).

In contrast, the results from my experiment are consistent with Tyack & Ingram (1977) and Hanna & Wilhelm (1992). Both Tyack & Ingram and Kunzman & Hanna report that who-subjects were easier than who-objects based on their experimental data.

The subject preference in the acquisition of Wh questions is attributed to the depth of embedding account proposed by W. O'Grady (1994): a structure's computational complexity increases with the number of XP categories (S, VP, etc.) between the Wh word and the associated gap. This relationship in object Wh questions extends over both an S boundary and a VP boundary, whereas it extends over only an S boundary in subject Wh questions. Consistent with O'Grady's depth of embedding account, subject Wh questions
are less computationally complex and easier than object \textit{Wh} questions.

Chapter 4 examined the acquisition of multiple \textit{Wh} questions in English and Korean. The results from my experiment showed that at least in the experimental setting the first correct responses to multiple \textit{Wh} question pattern (although at a very low rate) emerge earlier in English than in Korean by a factor of three years (at the age of 2 in English versus at the age of 5 in Korean). This difference between English and Korean was tentatively attributed to input differences between the two languages. English multiple \textit{Wh} questions are acquired earlier than Korean multiple \textit{Wh} questions, because English-speaking children may be exposed to more multiple \textit{Wh} questions than Korean-speaking children.

Chapter 4 also examined whether there is any difference in terms of degree of difficulty among various types of multiple \textit{Wh} questions; between the multiple \textit{Wh} questions which involve two argument \textit{Wh}-phrases and the multiple \textit{Wh} questions which involve one argument \textit{Wh}-phrase and one adjunct \textit{Wh}-phrase. The results from the experiment showed that the who-when type and the who-how type are the hardest among six patterns of multiple \textit{Wh} questions in English, but not in Korean. (Due to the animacy effect involved in the what-who type, the results from this pattern were not considered in the comparison.) This was attributed to the ungrammaticality of the who-when type and the who-how type
in English: the who-when type and the who-how type are hardest in English, because they are ungrammatical. On the other hand, the two types are as easy (or difficult) as the other types in Korean, because they are grammatical in that language.

Chapter 5 investigated the scope interaction between a Wh-phrase and a QP. The issue in this chapter was whether What is everyone eating? is ambiguous to English- and Korean-speaking children whereas Who is eating everything? is not, as in adult English and Korean. The results from the experiment showed that Who is eating everything? is ambiguous to the Korean-speaking children unlike in adult Korean, but that this pattern was not ambiguous to the English-speaking children. The ambiguity of What is everyone eating? and the unambiguity of Who is eating everything? in child English is attributed to Aoun and Li's Scope Principle.

Roeper and de Villiers' (1991) findings showed that both Who is eating everything? and What is everyone eating? are ambiguous to English-speaking children, unlike in adult English. Our findings for Korean, but not those for English, are consistent with Roeper and de Villiers' findings for English. Roeper and de Villiers attributed the ambiguity of Who is eating everything? to the quantifier-as-adverb hypothesis. According to them, there is no Spec node in child grammar (or the Spec node is not triggered). For this reason, every in Who is eating everything? cannot
originate under the SPEC of NP position. They argue that in child language every behaves like a sentential adverb (something like always) and therefore has a sentential scope. So it "modifies" not only thing but also who in Who is eating everything? (i.e. it has in its scope all NPs in the sentence.) This is why children have a distributive reading in Who is eating everything?

However, it was shown that Roeper and de Villiers' quantifier-as-adverb hypothesis is undermined by the Korean facts. In Korean, motun 'every' in Nwu-ka motun kes-ul mekni? 'Who is eating everything?' is a modifier, not a determiner. Therefore, it is not in the SPEC of NP position even in adult Korean. In spite of this fact, Who is eating everything? was ambiguous in child Korean, which undermines Roeper and de Villiers' claim.

One final unsolved problem in this chapter was that in my results from the English and Korean data Who is eating everything? was ambiguous to the Korean-speaking children whereas it is not to the English-speaking children. At this time, I have no answer for the question of what brings about this difference in the two languages.
APPENDIX

CHAPTER 2. Wh-Questions and Pied-piping

Complete List of Test and Control Sentences for English and Korean

ENGLISH TEST SENTENCES
1. The rabbit that who patted is sleeping?
2. The dog that who pushed fell down?
3. The pig that who bit is crying?
4. The cat that who hit is crying?
5. The elephant that who pinched got angry?

ENGLISH CONTROL SENTENCES
1. The monkey thinks that who is hitting the cow?
2. The monkey thinks that who is pinching the elephant?
3. The monkey thinks that who is touching the cat?
4. The monkey thinks that who is pushing the dog?
5. The monkey thinks that who is biting the pig?

KOREAN TEST SENTENCES
1. I kulim-eyse nwu-ka ssutatumun thokki-ka ca?  
   this picture-in who patted rabbit sleep  
   'In this picture, the rabbit that who patted is sleeping?'
2. I kulim-eyse nwu-ka min kay-ka nemecyesse?  
   this picture-in who pushed dog fell down  
   'In this picture, the dog that who pushed fell down?'
3. I kulim-eyse nwu-ka mwun twayci-ka wule?  
   this picture-in who bit pig cry  
   'In this picture, the pig that who bit is crying?'
4. I kulim-eyse nwu-ka ttablin koyangi-ka wule?  
   this picture-in who hit cat cry  
   'In this picture, the cat that who hit is crying?'
5. I kulim-eyse nwu-ka kkcipun khokkili-ka hwanasse?  
   this picture-in who pinched elephant got angry  
   'In this picture, the elephant who pinched got angry?'

KOREAN CONTROL SENTENCES
1. I kulim-eyse nwu-ka so-lul ttaylintako sayngkakhay?  
   this picture-in who cow hit-Comp think  
   'In this picture, who do you think is hitting the cow?'
2. I kulim-eyse nwu-ka khokkili-lul kkcipnuntako sayngkakhay  
   this picture-in who elephant pinched-Comp think  
   'In this picture, who do you think is pinching the elephant?'
3. I kulim-eyse nwu-ka koyangi-lul kentulintako sayngkakhay?  
   this picture-in who cat touched-Comp think  
   'In this picture, who do you think is touching the cat?'
4. I kulim-eyse nwu-ka kay-lul mintako sayngkakhay?  
   this picture-in who dog pushed-Comp think  
   'In this picture, who do you think is pushing the dog?'
5. I kulim-eyse nwu-ka twayci-lul mwuntako sayngkakhay?
   This picture-in who pig bit-Comp think
   'In this picture, who do you think is biting the pig?'

Pictures Used in the Experiment

Korean Version of the Instructions Used in the Experiment

* Pretest

**Experimenter**: Acessi-ka kulim poyecwuko mwulepolkeya.
   uncle picture show ask
   'I will show a picture and ask about it.'

Acessi-ka malhanunke ciphepwa.
uncle what I say point to
'Point to the animal that I am naming.'

a. Wenswungi ciphepwa.
   monkey point to
   'Point to the monkey.'
b. Twayci-ka ttaylin holangi ciphepwa.
{'Point to the tiger that the pig hit.'}

c. Yemso-ka mancin cwi ciphepwa.
{'Point to the mouse that the goat touched.'}

Child: (is supposed to point to the correct animal)

Experimenter: Cal haysse.
well did
'Well done.'

Ca, icey acessi-ka kulim te poyecwuko kulim-eytayhayse mwule
well, now uncle picture more show picture-about ask
polkeya.
try

'Now I'm going to show you some more pictures and see if you
 can answer my questions about what is going on in the
picture.'

Cwunpitoyessni?
be ready
'Are you ready?'

d. Yemso-ka nwukwu mancye?
   goat-Nom who touch
   'Who is the goat touching?'

e. Holangi-ka nwukwu ttaylye?
   tiger-Nom who hit
   'Who is the tiger hitting?'

Child: (is supposed to either say the answer or point to the
correct animal)

*Test:
Experimenter: Cal haysse. Com te hay poca.
   well did please more do try
   'Well done. Now let's try some more.'

f. I kulim-eyse nwu-ka ttaylin koyangi-ka wule?
   this picture-in who hit cat cry
   'In this picture, the cat that who hit is crying?'
   [the "pied-piped" question]

g. I kulim-eyse nwu-ka so-lul ttaylintako sayngkakhay?
   this picture-in who cow hit-Comp think
   'In this picture, who do you think is hitting the cow?'
   [the non-pied-piped question]

Child: (is supposed to either say the answer or point to the
correct animal)
CHAPTER 3. The Subject-Object Asymmetry.

3.3. Comprehension Task

Complete List of Test and Control Sentences for Korean

<Subject Questions>
1. I kulim-eyse nwu-ka so-lul mile?
   'In this picture, who is pushing the cow?'
2. I kulim-eyse nwu-ka twayci-lul kkocipe?
   'In this picture, who is pinching the pig?'
3. I kulim-eyse nwu-ka twayci-lul ttaylye?
   'In this picture, who is hitting the pig?'
4. I kulim-eyse nwu-ka koyangi-lul kkule?
   'In this picture, who is pulling the cat?'
5. I kulim-eyse nwu-ka holangi-lul mwule?
   'In this picture, who is biting the tiger?'

<Object Questions>
6. I kulim-eyse wenswungi-ka nwukwu-lul ttaylye?
   'In this picture, who is the monkey hitting?'
7. I kulim-eyse koyangi-ka nwukwu-lul kkule?
   'In this picture, who is the cat pulling?'
8. I kulim-eyse holangi-ka nwukwu-lul mwule?
   'In this picture, who is the tiger biting?'
9. I kulim-eyse twayci-ka nwukwu-lul kkocipe?
   'In this picture, who is the pig pinching?'
10. I kulim-eyse koyangi-ka nwukwu-lul mile?
    'In this picture, who is the cat pushing?'

Pictures Used in the Comprehension Task
Pictures for object questions

Korean Version of the Instructions Used in the Comprehension Task

* Practice

**Experimenter:** Acessi-ka kulim poyecwuko mwulepolkeya.
  uncle picture show ask
  'I will show a picture and ask about it.'

Cwunpitoysni?
be ready 'Are you ready?'

a. Nwu-ka cani?
  who-Nom sleep
  'Who is sleeping?'

**Child:** (is supposed to either to point to the correct animal
  or to verbalize the answer)

*Test:

**Experimenter:** Cal haysse.
  well did
  'Well done.'

Ca, icey acessi-ka kulim te poyecwuko kulim-eytayhayse mwule
  well, now uncle picture more show picture-about ask
polkeya.
  try

'Now I'm going to show you some more pictures and see if you can
  answer my questions about what is going on in the picture.'

CwunpitoYesni?
be ready 'Are you ready?'
b. I kulim-eyse nwu-ka so-lul mile?
   this picture-in who-Nom cow-Acc push
   'In this picture, who is pushing the cow?'

c. I kulim-eyse wenswungi-ka nwukwu-lul ttaylye?
   this picture-in monkey-Nom who-Acc hit
   'In this picture, who is the monkey hitting?'

Child: (is supposed to either to point to the correct animal
   or to verbalize the answer)

3.4. Production Task

Complete List of Target Sentences for Korean

<Subject Questions>
1. Nwu-ka so-lul mile?
   who-Nom cow-Acc push
   'Who is pushing the cow?'
2. Nwu-ka twayci-lul ttaylye?
   who-Nom pig-Acc hit
   'Who is hitting the pig?'
3. Nwu-ka koyangi-lul mwule?
   who-Nom cat-Acc bite
   'Who is biting the cat?'
4. Nwu-ka saca-lul kkule?
   who-Nom lion-Acc pull
   'Who is pulling the lion?'
5. Nwu-ka twayci-lul kkocipe?
   who-Nom pig-Acc pinch
   'Who is pinching the pig?'

<Object Questions>
6. Koyangi-ka nwukwu-lul kkule?
   cat-Nom who-Acc pull
   'Who is the cat pulling?'
7. Wenswungi-ka nwukwu-lul kkocipe?
   monkey-Nom who-Acc pinch
   'Who is the monkey pinching?'
8. Wenswungi-ka nwukwu-lul mile?
   monkey-Nom who-Acc push
   'Who is the monkey pushing?'
9. Kay-ka nwukwu-lul ttaylye?
   dog-Nom who-Nom hit
   'Who is the dog hitting?'
10. Koyangi-ka nwukwu-lul mwule?
    cat-Nom who-Acc bite
    'Who is the cat biting?'
Pictures Used in the Production Task

1 2 3
Pictures for subject questions

4 5

6 7 8
Pictures for object questions

9 10

Korean Version of the Instructions Used in the Production Task

* Practice

**Experimenter:** Talun noli haypoca.
another play do
'Let us play another game.'

I kulim-eyse yay-ka chayk-ul ilkkoisse.
this picture-in this guy book-Acc read
'In this picture, this guy is reading a book.'
[Pointing to the covered animal]

Kulentey kalyecye issese moluci?
by the way hidden be do not know
'By the way, since he is hidden from view, we don't know.'
Kuntey Komtoli-nun antay.
However Baby Pooh know
'However, Baby Pooh knows.'

Komitoli-hantey mwulepomyen tap-ul allyecwuntay.
Baby Pooh-to ask-if answer-Acc tell
'If you ask him, he will tell you the answer.'

Ettekey mwulepomyen toylkka?
how ask-if will do
'Do you know how to ask him?'

Child: (is supposed to ask, Nwu-ka chayk-ul ilke? 'Who is reading a book?')

When the child formulates a correct question, then the experimenter proceeds as follows;

Experimenter: Cal haysse. Com te haypoca.
well did please more do
'Well done. Now let us try some more.'

I kulim-eyse kay-ka yay-lul kkulkoisse
this picture-in dog this guy pull
'In this picture, the dog is pulling this guy.'
[Pointing to the covered animal]

Kulentey kalyecye issese moluci?
by the way hidden be do not know
'By the way, since he is hidden from view, we don't know.'

Kuntey Komtoli-nun antay.
However Baby Pooh know
'However, Baby Pooh knows.'

Komitoli-hantey mwulepomyen tap-ul allyecwuntay.
Baby Pooh-to ask-if answer-Acc tell
'If you ask him, he will tell you the answer.'

Ettekey mwulepomyen toylkka?
how ask-if will do
'Do you know how to ask him?'

Child: (is supposed to ask, Nwu-ka kay-lul kkule? 'Who is pulling the dog?')

When the child cannot formulate an appropriate question, then

Experimenter: Ilehkey hamyen toyci.
this way do will do
'You can ask this way.'
Can you repeat it?

Child: (is supposed to repeat, Nwu-ka chayk-ul ilke? 'Who is reading a book?')

Experimenter: Cal haysse. Com te haysse. 'Well done. Now let us try some more.'

I kulim-eyse kay-ka yay-lul kkulkoisse... this picture-in dog this guy pull 'In this picture, the dog is pulling this guy.' [Pointing to the covered animal]

A total of 4 practice examples are given.

*Actual tests. The method is exactly the same as in the practice session.

3.5. Imitation Task
Complete List of Model Sentences for Korean
<br><br><i><b>Subject Questions</b></i>
1. Cikum nwu-ka yemso-lul epkoisse? now who-Nom goat-Acc piggyback 'Who is piggybacking the goat right now?'
2. Cikum nwu-ka pyengali-lul chyetapwa? now who-Nom chicken-Acc look at 'Who is looking at the chicken right now?'
3. Cikum nwu-ka khokkili-lul kkocipe? now who-Nom elephant-Acc pinch 'Who is pinching the elephant right now?'
4. Cikum nwu-ka holangi-lul kentulye? now who-Nom tiger-Acc touch 'Who is touching the tiger right now?'
5. Cikum nwu-ka tokswuli-lul ccochaka? now who-Nom eagle-Acc chase 'Who is chasing the eagle right now?'
<br><br><i><b>Object Questions</b></i>
6. Cikum yewu-ka nwukwu-lul capameke? now fox-Nom who-Acc kill and eat 'Who is the fox killing and eating right now?'
7. Cikum saca-ka nwukwu-lul hyungnaynay? now lion-Nom who-Acc imitate 'Who is the lion imitating right now?'
8. Cikum camcali-ka nwukwu-lul chaca? now dragonfly-Nom who-Acc look for 'Who is the dragonfly looking for right now?'
9. Cikum songaci-ka nwukwu-lul nollye? now calf-Nom who-Nom tease 'Who is the calf teasing right now?'
10. Cikum talamcwi-ka nwukwu-lul koylophye?
   now squirrel-Nom who-Acc annoy
   'Who is the squirrel annoying right now?'

Korean Version of the Instructions Used in the Imitation Task

*Practice

**Experimenter:** Talun noli haypoca.
   another play do
   'Let us play one more game.'

Ipeneynun acessi-ka etten mal-ul halkeya.
this time uncle-Nom some sentence say
'This time, I will say a sentence.'

Kuntey Komtoli-ka mos alatulesstay.
however Baby Pooh not understand
'However, Baby Pooh couldn't hear it.'

Komitoli-ka tasi malhaycwuseyyo hamyen
Baby Pooh again say if
'If he says, 'Please say it again for me.'",

ni-ka tasi malhaycwununkeya.
you again tell
'Could you tell him what I said?'

a. Cikum phyopem-i nwukwu-lang ssawe?
   now leopard who-with fight
   'Who is the leopard fighting with right now?'

Tasi malhaycwuseyyo.
again say
'Please say it again for me?'

(When the experimenter says this sentence, he pretends to be
Baby Pooh.)

**Child:** (is supposed to repeat the model sentence)

*Test

**Experimenter:** Cal haysse. Com te haypoca.
   well did please more do
   'Well done.' 'Let us play some more.'

b. Cikum nwu-ka yemso-lul epkoisse?
   now who-Nom goat-Acc piggyback
   'Who is piggybacking the goat right now?'

Tasi malhaycwuseyyo.
again say
'Please say it again for me.'
Child: (is supposed to repeat the model sentence)
c. Cikum saca-ka nwukwu-lul hyungnaynay?
   now  lion-Nom who-Acc imitate
   'Who is the lion imitating right now?'

Tasi malhaycwuseyyo.
again say
'Please say it again for me.'

CHAPTER 4. The Acquisition of Multiple WH Questions
Korean Version of the Instructions Used in the Experiment

*Pretest:
Experimenter: Acessi-ka kulim poyecwuko mwulepolkeya.
   uncle picture show ask
   'I will show a picture and ask about it.'

Cwunpitoysni?
be ready
'Are you ready?'

a. Nwu-ka sakwa mekni?
   who-Nom apple eat
   'Who is eating an apple?'

b. Yeca-ka eti-se cani?
   woman where-at sleep
   'Where is the woman sleeping?'

c. Namca-ka encey ttwini?
   man-Nom when run
   'When is the man running?'

d. Namca-ka ettehkey hakkyo-ey kani?
   man-Nom how school-to go
   'How is the man going to school?'

Child: (is supposed to either say the answer or, if feasible, point to the correct animal or object)

*Test:
Experimenter: Cal haysse.
   well did
   'Well done.'

Ca, icey acessi-ka kulim te poyecwuko kulim-eytayhayse mwule
well, now uncle picture more show picture-about ask
polkeya.
try
'Now I'm going to show you some more pictures and see if you can answer my questions about what is going on in the picture.'

Cwunpitoyessni?
be ready
'Are you ready?'

e. Nwu-ka mwe-l meke?
who-Nom what eat
'Who is eating what?'

f. Nwu-ka ettehkey ka?
who-Nom how go
'Who is going how?'

Child: (is supposed to say the answer or, if feasible, point to the correct animal or object)

CHAPTER 5. The Scope Interaction between a Wh-phrase and a QP

Complete List of Test Sentences for Korean in the Control Study
<Type I>
Nwu-ka motunke-l kacikoisse?
who-Nom everything-Acc have
'Who is holding everything?'
(with a picture depicting a cat holding four different umbrellas)

<Type II>
Nwu-ka motunke-l kacikoisse?
who-Nom everything-Acc have
'Who is holding everything?'
(with a picture depicting a rabbit, an elephant, a cat, and a dog each holding a different umbrella)

<Type III>
Motwu-ka mwe-l kacikoisse?
everyone-Nom what-Acc hold
'What is everyone holding?'
(with a picture depicting an elephant, a cat, a dog, and a rabbit holding a big umbrella together)

<Type IV>
Motwu-ka mwe-l kacikoisse?
everyone-Nom what-Acc hold
'What is everyone holding?'
(with a picture depicting a rabbit, an elephant, a cat, and a dog each holding a different umbrella)
**Complete List of Test Sentences for English and Korean in the Actual Experiment**

**ENGLISH TEST SENTENCES**

<Type I>
1. Who is carrying everything? (with a picture depicting a pig carrying an umbrella, a book, a pencil, and a bottle)
2. Who is throwing away everything? (with a picture depicting a dog throwing away a book, a dish, a hat, and a ball)
3. Who is eating everything? (with a picture depicting a cow eating grapes, a carrot, corn, and a potato)
4. Who is breaking everything? (with a picture depicting a tiger breaking a clock, a dish, a bottle, and a glass)
5. Who is holding everything? (with a picture depicting a goat holding a baseball bat, a glove, a hat, and a ball)

<Type II>
6. Who is holding everything? (with a picture depicting a lion, a tiger, a rabbit, and a monkey each holding a different thing)
7. Who is breaking everything? (with a picture depicting a cat, a monkey, a rabbit, and a lion each breaking a different thing)
8. Who is carrying everything? (with a picture depicting a cat, a dog, an elephant, and a rabbit each carrying a different thing)
9. Who is eating everything? (with a picture depicting a rabbit, an elephant, a cat, and a dog each eating a different thing)
10. Who is throwing away everything? (with a picture depicting a monkey, an elephant, a cow, and a cat each throwing away a different thing)

<Type III>
11. What is everyone throwing away? (with a picture depicting an elephant, a mouse, a lion, and a rabbit throwing away a big ball together)
12. What is everyone breaking? (with a picture depicting a tiger, a lion, a rabbit, and a mouse breaking a car together)
13. What is everyone carrying? (with a picture depicting a cow, a goat, a dog, and a monkey carrying a log together)
14. What is everyone holding? (with a picture depicting a cat, an elephant, a rabbit, and a dog holding a big umbrella together)
15. What is everyone eating? (with a picture depicting a cat, a mouse, a dog, and a goat eating a big cake together)

<Type IV>
16. What is everyone eating? (with a picture depicting a rabbit, an elephant, a cat, and a dog each eating a different thing)
17. What is everyone carrying? (with a picture depicting a cat, a dog, an elephant, and rabbit each carrying a different thing)
18. What is everyone holding? (with a picture depicting a lion, a tiger, a rabbit, and a monkey each holding a different thing)
19. What is everyone breaking? (with a picture depicting a cat, a monkey, a rabbit, and a lion each breaking a different thing)
20. Who is throwing away everything? (with a picture depicting a monkey, an elephant, a cow, and a cat each throwing away a different thing)

KOREAN (SOV) TEST SENTENCES
<Type I>
1. Nwu-ka motunke-l tencye?
   who-Nom everything-Acc throw away
   'Who is throwing away everything?' (with a picture depicting a dog throwing away a book, a dish, a hat, and a ball)
2. Nwu-ka motunke-l nalla?
   who-Nom everything-Acc carry
   'Who is carrying everything?' (with a picture depicting a pig carrying an umbrella, a book, a pencil, and a bottle)
3. Nwu-ka motunke-l meke?
   who-Nom everything-Acc eat
   'Who is eating everything?' (with a picture depicting a cow eating grapes, a carrot, corn, and a potato)
4. Nwu-ka motunke-l kacikoisse?
   who-Nom everything-Acc hold
   'Who is holding everything?' (with a picture depicting a goat holding a baseball bat, a glove, a hat, and a ball)
5. Nwu-ka motunke-l kkayttulye?
   who-Nom everything-Acc break
   'Who is breaking everything?' (with a picture depicting a tiger breaking a clock, a dish, a bottle, and a glass)

<Type II>
6. Nwu-ka motunke-l nalla?
   who-Nom everything-Acc carry
   'Who is carrying everything?' (with a picture depicting a lion, a tiger, a rabbit, and a monkey each holding a different thing)
7. Nwu-ka motunke-l tencye?
   who-Nom everything-Acc throw away
   'Who is throwing away everything?' (with a picture depicting a cat, a monkey, a rabbit, and a lion each breaking a different thing)
8. Nwu-ka motunke-1 meke?
   who-Nom everything-Acc eat
   'Who is eating everything?'
   (with a picture depicting a cat, a dog, an elephant, and a rabbit each carrying a different thing)

9. Nwu-ka motunke-1 kKayttulye?
   who-Nom everything-Acc break
   'Who is breaking everything?'
   (with a picture depicting a rabbit, an elephant, a cat, and a dog each eating a different thing)

10. Nwu-ka motunke-1 kacikoisse?
    who-Nom everything-Acc hold
    'Who is holding everything?'
    (with a picture depicting a monkey, an elephant, a cow, and a cat each throwing away a different thing)

<Type III>

11. Motwu-ka mwe-1 tencye?
    everyone-Nom what-Acc throw away
    'What is everyone throwing away?'
    (with a picture depicting an elephant, a mouse, a lion, and a rabbit throwing away a big ball together)

12. Motwu-ka mwe-1 pwusye?
    everyone-Nom what-Acc break
    'What is everyone breaking?'
    (with a picture depicting a tiger, a lion, a rabbit, and a mouse breaking a car together)

13. Motwu-ka mwe-1 nalla?
    everyone-Nom what-Acc carry
    'What is everyone carrying?'
    (with a picture depicting a cow, a goat, a dog, and a monkey carrying a log together)

14. Motwu-ka mwe-1 kacikoisse?
    everyone-Nom what-Acc hold
    'What is everyone holding?'
    (with a picture depicting a cat, an elephant, a rabbit, and a dog holding a big umbrella together)

15. Motwu-ka mwe-1 meke?
    everyone-Nom what-Acc eat
    'What is everyone eating?'
    (with a picture depicting a cat, a mouse, a dog, and a goat eating a big cake together)

<Type IV>

16. Motwu-ka mwe-1 tencye?
    everyone-Nom what-Acc throw away
    'What is everyone throwing away?'
    (with a picture depicting a rabbit, an elephant, a cat, and a dog each eating a rabbit)

17. Motwu-ka mwe-1 pwusye?
    everyone-Nom what-Acc break
    'What is everyone breaking?'
18. Motwu-ka mwe-1 nalla?
everyone-Nom what-Acc carry
'What is everyone carrying?'

19. Motwu-ka mwe-1 kacikoisse?
everyone-Nom what-Acc hold
'What is everyone holding?'

20. Motwu-ka mwe-1 meke?
everyone-Nom what-Acc eat
'What is everyone eating?'

21. Motunke-l nwu-ka nalla?
everything-Acc who-Nom carry
'Who is carrying everything?'

22. Motunke-l nwu-ka tencye?
everything-Acc who-Nom throw away
'Who is throwing away everything?'

23. Motunke-l nwu-ka meke?
everything-Acc who-Nom eat
'Who is eating everything?'

24. Motunke-l nwu-ka kkayttulye?
everything-Acc who-Nom break
'Who is breaking everything?'

25. Motunke-l nwu-ka kacikoisse?
everything-Acc who-Nom hold
'Who is holding everything?'

26. Motunke-l nwu-ka nalla?
everything-Acc who-Nom carry
'Who is carrying everything?'

27. Motunke-l nwu-ka tencye?
everything-Acc who-Nom throw away
Who is throwing away everything?
(with a picture depicting a cat, a monkey, a rabbit, and a lion each breaking a different thing)

28. Motunke-l nwu-ka meke?
everything-Acc who-Nom eat
'Who is eating everything?'
(with a picture depicting a cat, a dog, an elephant, and a rabbit each carrying a different thing)

29. Motunke-l nwu-ka kKayttulye?
everything-Acc who-Nom break
'Who is breaking everything?'
(with a picture depicting a rabbit, an elephant, a cat, and a dog each eating a different thing)

30. Motunke-l nwu-ka kacikoisse?
everything-Acc who-Nom hold
'Who is holding everything?'
(with a picture depicting a monkey, an elephant, a cow, and a cat each throwing away a different thing)

<Type VII>

31. Mwe-l motwu-ka tencye?
what-Acc everyone-Nom throw away
'What is everyone throwing away?'
(with a picture depicting an elephant, a mouse, a lion, and a rabbit throwing away a big ball together)

32. Mwe-l motwu-ka pwusye?
what-Acc everyone-Nom break
'What is everyone breaking?'
(with a picture depicting a tiger, a lion, a rabbit, and a mouse breaking a car together)

33. Mwe-l motwu-ka nalla?
what-Acc everyone-Nom carry
'What is everyone carrying?'
(with a picture depicting a cow, a goat, a dog, and a monkey carrying a log together)

34. Mwe-l motwu-ka kacikoisse?
what-Acc everyone-Nom hold
'What is everyone holding?'
(with a picture depicting a cat, an elephant, a rabbit, and a dog holding a big umbrella together)

35. Mwe-l motwu-ka meke?
what-Acc everyone-Nom eat
'What is everyone eating?'
(with a picture depicting a cat, a mouse, a dog, and a goat eating a big cake together)

<Type VIII>

36. Mwe-l motwu-ka tencye?
what-Acc everyone-Nom throw away
'What is it that everyone is throwing away together?'
(with a picture depicting a rabbit, an elephant, a cat, and a dog each eating a different thing)

37. Mwe-l motwu-ka pwusye?
what-Acc everyone-Nom break
(with a picture depicting a cat, a dog, an elephant, and rabbit each carrying a different thing)
38. Mwe-l motwu-ka nalla?
what-Acc everyone-Nom carry
'What is it that everyone is carrying together?'
(with a picture depicting a lion, a tiger, a rabbit, and a monkey each holding a different thing)
39. Mwe-l motwu-ka kacikolisse?
what-Acc everyone-Nom hold
'What is it that everyone is holding together?'
(with a picture depicting a cat, a monkey, a rabbit, and a lion each breaking a different thing)
40. Mwe-l motwu-ka meke?
what-Acc everyone-Nom eat
'What is it that everyone is eating together?'
(with a picture depicting a monkey, an elephant, a cow, and a cat each throwing away a different thing)

Pictures Used in the Experiment for English, Korean SOV, and Korean OSV
Korean Version of the Instructions Used in the Experiment

*Pretest:

Experimenter: Acessi-ka kulim poyecwuko mwulepolkeya.
uncle picture show ask
'I will show a picture and ask about it.'

Cwunpitoyssni?
be ready
'Are you ready?'

a. Holangi-ka motunke-l kacikoissni?
   who-Nom everything-Acc have
   'Does the tiger have everything?' [only for Korean-speaking children]

b. Yemso-ka motunke-l kacikoissni?
   goat-Nom everything-Acc have
   'Does the goat have everything?' [only for Korean-speaking children]
[only for Korean-speaking children]
c. Nwu-ka uyca-ey ancaissni?
   who-Nom chair-in sit
   'Who is sitting in the chair?'
d. Nwu-ka uyca-ey ancaissni?
   who-Nom chair-in sit
   'Who is sitting in the chair?'

**Child:** (is supposed to say, Ney 'Yes' or Anio 'No' for (a, b) and Namca 'The man' for (c) and Amwuto epseyo 'Nobody exists' for (d))

*Test:

**Experimentor:** Cal haysse.
   well did
   'Well done.'

Ca, icey acessi-ka kulim te poyecwuko kulim-eytayhayse mwule
well, now uncle picture more show picture-about ask polkeya.
try

'Now I'm going to show you some more pictures and see if you can answer my questions about what is going on in the picture.'

Cwunpitoyessni?
be ready
'Are you ready?'

e. Nwu-ka motunke-l meke?
   who-Nom everything eat
   'Who is eating everything?'
f. Nwu-ka motunke-l tencye?
   who-Nom everything throw away
   'Who is throwing away everything?'

g. Motwu-ka mwe-l meke?
   everyone what eat
   'What is everyone eating?'
h. Motwu-ka mwe-l tencye?
   everyone what throw away
   'What is everyone throwing away?'

...[in random order]

**Child:** (is supposed to either to point to the correct animal or thing or to verbalize the answer)


