

UNIVERSITY OF CALIFORNIA

Los Angeles

Child Causatives:

Acquisition of Bi-clausal Structures in Japanese

A dissertation submitted in partial satisfaction of the
requirements for the degree Doctor of Philosophy
in Linguistics

by

Reiko Okabe

2008

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The dissertation of Reiko Okabe is approved.

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2008

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ACKNOWLEDGEMENTS

I was very fortunate to have met so many people who have supported me and made these years at UCLA so amazing. I do not know how to thank all of them enough for their support and cheer throughout these years. Without them, this dissertation could not have been finished.

First, my deepest gratitude goes to my adviser and committee chair, Nina Hyams. I am grateful to Nina for her tireless support, encouragement, advice, feedback, patience, and more than everything that an adviser could ever do to her student. She has taught me to think clearly and logically, look at data from various perspectives, write convincingly, and not to use determiners anywhere I want. Whenever I was stuck in the middle of thinking, I would knock on the door of her office. She was always willing to spend time listening to my confused thoughts and point to the right directions. She helped me with every aspect of this dissertation as well as an academic life at UCLA. Working with you as your teaching assistant, taking your classes, and discussing various topics with you made my vision much clearer and wide-open. I was so lucky to be your student, Nina!

I am also grateful to my other committee members. I thank Susie Curtiss from the heart for her being the most thoughtful and caring person. I learned a lot from her academic attitude toward experimental designs and data. Her continuous encouragement and support definitely made my dissertation better. I also thank Carson Schütze for his energy and patience. I gained a lot from discussions with him and he helped immensely with both syntactic and processing argumentations in this dissertation. I am also thankful to Andrew Simpson for his constant encouragement as well as his super warm, kind personality. His gentle, thoughtful guidance helped me regain little confidence every time I talked with him.

Besides my committee, I also learned and benefited a lot from other faculty members in this department. Tim Stowell, Anoop Mahajan, Daniel Buring, Bruce Hayes, Pat Keating, Ed Keenan, Hilda Koopman, Pamela Munro, Dominique Sportiche, Megha

Sundara, Colin Wilson, Kie Zuraw. They are all tremendous teachers and brilliant linguistics who showed me how fascinating and profound studies of languages are.

I would also like to thank my cohort. I cannot mention all of them, but some of them are; Jeff Heinz, Sarah VanWagenen, Jill Gilkerson, Julia Berger-Morales, Kuniko Nielsen, Shabnam Shademan, Heather Wilson, Ying Lin, Lawrence Cheung, Sameer Khan, Christina Kim, Chacha Mwita, Molly Shilman, Lauren Verner, Asia Furmanska, Vincent Homer, Tomoko Ishizuka, and Ji Eun Kim. I am deeply indebted to them for their cheer and friendship. I enjoyed sharing invaluable times with them all these years.

Even outside of the department, there are countless people who must be thanked and acknowledged. Before anybody else, my deepest gratitude goes to my former adviser at University of Tokyo, Takane Ito. She is the first person who introduced a world of linguistics to me when I was an undergraduate. I sincerely thank her for nurturing my interest in linguistics, being there for me whenever I needed help, and making me believe that linguistics was something that I could do the rest of my life.

My thanks also extend to Tetsuya Sano, Yukio Otsu, Jeannette Schaeffer, and Kamil Ud Deen, who helped me, encouraged me, and helped me to make my dream of studying linguistics at UCLA come true. It would not have been possible for me to pursue a Ph.D. in the U.S. without their encouragement and constant support.

It has also been my good fortunate to have great friends and research colleagues who have supported at various stages and given me many insightful comments on my work. I thank Flavia Adani, Mika Endo, Takuya Goro, Miwa Isobe, Utako Minai, Motoki Nakajima, Ana Santos, Hiroyuki Shimada, Koji Sugisaki, and Masaya Yoshida, for their support and friendship these many years.

I also thank Misako Nukaga, who has been my dearest friend. She made my life here much easier and full of fun. Thank you for making our apartment a sweet home. Where would I be without you? I just don't know how to express my thanks to you.

Finally, I thank my parents, Hiroo and Kayoko Okabe, for their love and support. They never doubt of my success in this field. Thank you, from the bottom of my heart, for being my parents. This dissertation is dedicated to them.

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ABSTRACT OF THE DISSERTATION

Child Causatives: Acquisition of Bi-clausal Structures in Japanese

by

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Doctor of Philosophy in Linguistics

University of California, Los Angeles, 2008

Professor Nina M. Hyams, Chair

This study provides experimental data on the acquisition of Japanese causatives. It has been observed that children begin to produce analytic causatives at the age of 2-3 years old. However, there have been no studies examining whether the child causatives are identical to adult causatives with respect to their meaning and structure.

Japanese has two types of causatives, the lexical and the productive causative, which share the same verb stem and case-marking pattern, as given below:

Lexical causative

John-ga Mary-ni zibun-no hon-o mise-ta.
John-NOM Mary-DAT self-GEN book-ACC show-PAST
'John showed self' book to Mary.' (self = John, *Mary)

Productive causative

John-ga Mary-ni zibun-no hon-o mi-sase-ta.
John-NOM Mary-DAT self-GEN book-ACC look.at-CAUS-PAST
'John made Mary look at self' book.' (self= John, Mary)

As indicated, the lexical causative is unambiguous as to the antecedent of the anaphor *zibun*, whereas the productive causative is ambiguous. Given that *zibun* must be bound by a subject, it is assumed that the lexical causative is mono-clausal, while the productive causative is bi-clausal. Also, the lexical causative exclusively denotes 'direct causation' while the productive causative expresses 'indirect causation.'

A series of experiments investigated whether children aged 4-6 know the semantic and syntactic differences between the two causatives. Although the first two experiments revealed that children as old as 6 disallowed the embedded subject of the productive causative to function as "subject", the third experiment with slightly changed scenarios revealed that the same children assigned a bi-clausal structure to the productive causative and a mono-clausal structure to the lexical causative.

Children's comprehension of other constructions with bi-clausal structure, such as complex sentences with finite embedded clauses and benefactives, was also examined and compared to that of the causatives in order to clarify the non-adult-like performance on the causatives. Based on the finding that children also had difficulty with the benefactives, I suggest that incremental processing and difficulty with on-line reanalysis account for the children's non-adult-like responses. I also discuss how children might acquire the semantic and structural properties of Japanese causatives under "poverty of the stimulus" situations.

CHAPTER 1

INTRODUCTION

1.1 Goal

This dissertation is an attempt to provide new experimental data on children's comprehension of Japanese causative constructions and to discuss what kind of linguistic knowledge and ability children are endowed with and what factors might make children perform differently from adults with respect to the comprehension of the causative constructions.

As we will see soon, there have been quite a few studies of children's production of complex sentences including causative constructions in their naturalistic speech data (Limber 1973, Bowerman 1974, Bloom et al. 1989, Bloom 1991, Diessel 2004 for English, Courtney 2002 for Quechua, Murasugi et al. 2004 for Japanese, among others). Children come to produce complex sentences in which at least two propositions are

combined between ages of 2 and 3 (Limber 1973, Diessel 2004, among others). Analytic causative sentences with verbs like *make* and *have* are also observed in child speech during that period. However, there have been only a few experimental studies concerning children's comprehension of causative constructions (Ammon and Slobin 1979), and virtually no experimental study that directly tests children's ability to build a complex structure for the causative sentences. Thus, the current study will provide the first experimental data showing not only whether Japanese-learning children correctly comprehend the causative sentences but also what kind of structures they are assuming for the causative constructions while they interpret them in the controlled experimental situations.

In this introductory chapter, I will review some fundamental assumptions in the framework of generative grammar within which the current experimental research is based on. Section 1.2 reviews the logical and the developmental problems of language acquisition which I believe are fundamental research questions that any linguistic research within the framework of generative grammar is attempting to account for. In section 1.3, we will briefly look at how and when children come to produce and understand complex sentences by surveying some previous studies on the acquisition of complex sentences including causatives. We also examine why it is necessary and intriguing to look at children's comprehension of Japanese causative constructions. Section 1.4 describes the organization of this dissertation.

1.2 The Problems of Language Acquisition

How do children acquire their target grammar effortlessly, rapidly, and uniformly even in the face of impoverished input data? Since Chomsky (1965), generative linguists have been trying to account for this "logical problem of language acquisition" (cf. Hornstein and Lightfoot 1981, Baker and McCarthy 1981).

When given sentences such as in (1), every adult native English speaker can instantly tell that the anaphor *himself* in (1a) should refer to *John*, whereas *himself* in (1b) and (1c) cannot.

- (1) a. John likes himself.
b. John's brother likes himself.
c. John thinks that Bob likes himself.

This linguistic knowledge is uniform among each and every adult native speaker of English. It is also complex and abstract in the sense that the distinction concerning the interpretations of the anaphor *himself* in (1) should be accounted for by introducing some linguistic-specific notions such as *c-command*¹ and *clause*. In other words, the rules constraining the interpretations of sentences in (1) cannot be perceived from the surface strings of words and speakers are unconsciously following the rules when interpreting the sentences.

On the other hand, the input data children are exposed to in the course of language acquisition is far less than perfect. The data are simple and full of performance errors. Morgan (1986), for example, analyzed the input sentences for three English-learning

¹ Reinhart (1976) states that "node A c-commands node B if neither A nor B dominates the other and the first branching node which dominates A dominates B."

children (Adam, Eve, and Sarah; Brown 1973) and found that more than 90% of the child-directed speech was simple sentences with no embedding. Furthermore, children basically do not receive any formal instruction until school age, and children do not receive correction regarding their grammar: children are rarely corrected, and even when they are, they resist the correction (McNeill 1966). More importantly, children are not systematically exposed to negative evidence, i.e. explicit information telling that a certain sentence is ungrammatical. Despite the apparent gap between the impoverished input data and the grammar that they eventually attain, i.e. the "poverty of the stimulus", each and every child can acquire his/her target grammar within a few years.

As an answer to the question of why language acquisition is possible under the poverty of the stimulus situation, generative grammar assumes that human beings are genetically equipped with a Language Acquisition Device (LAD) which consists of Universal Grammar (UG) and learning principles, enabling children to acquire their target languages through interaction of the LAD with linguistic experience. This acquisition model is based on an assumption of instantaneous acquisition. In other words, the time course of language development is abstracted away from in this ideal, simplified language acquisition model (Chomsky 1965, 1986). Discovering the principles of UG has been an ultimate goal of language acquisition research.

However, real language acquisition takes time. Language acquisition does not proceed instantaneously but it is a gradual process. Here arises another question: the "developmental problem of language acquisition." We have to answer to the question as to why real time language acquisition proceeds gradually. Children produce non-target-

like sentences such as "Don't giggle me" (Bowerman 1982) and it is observed that English-learning children often omit subjects in their early developmental stage (Hyams 1986) among many other elements. Besides their production, children find some sentences difficult and interpret them differently from adults. For example, when provided with a sentence in (2), children often wrongly interpret the pronoun *her* as coreferential with the subject *Mama bear* (Chien and Wexler 1990, and others), apparently violating Condition B of the Binding Theory (Chomsky 1981) which states that a pronominal must be free within its clause.

(2) Mama bear is touching her.

It has also been observed in many studies that children have difficulty with comprehension of full passives such as "The dog was chased by the cat" in many languages (Borer and Wexler 1987, Pierce 1992, Fox and Grodzinsky 1998, Minai 2001, Okabe and Sano 2002, among others).

It seems obvious that children undergo non-adult-like language acquisition stages until they eventually acquire grammar of their first language. The factors that might affect the gradual process of language acquisition can be language-specific lexical learning (e.g. Pinker 1984, 1989), parameter setting (e.g. Hyams 1986, Wexler 1998), maturation of certain principles (e.g. Borer and Wexler 1987), processing limitations (e.g. Trueswell et al. 1999) and many others.

Thus, the language acquisition research faces both the logical problem and the developmental problem of language acquisition. For a better understanding of language

acquisition, when we encounter situations in which children perform differently from adults with respect to both their production and comprehension, we need to elucidate whether children's grammar is different from the adults' or something other than their grammar, such as processing mechanisms, is different from adults.

1.3 Acquisition of Causatives and Complex Sentences

We mentioned above that language acquisition proceeds gradually and children go through various developmental stages. Among such things that do not seem to appear at an early stage but are observed later in the course of acquisition process, the emergence of complex sentences in child grammar is a milestone in grammatical development. And as we mentioned above, it has been reported that this happens between the ages of 2 and 3, during which children come to produce sentences involving coordination, complementation, and relative clauses (Limber 1973, Bloom et al. 1989, Diessel 2004, among others). According to these studies of spontaneous speech data, it seems that by the age of 3, children become aware that more than one proposition can be expressed by one sentence and know how to combine them using recursive rules.

Let us survey some previous studies on the acquisition of causatives in various languages. As for the acquisition of causatives in English, Bowerman (1974, 1982) observed that her own daughter Christy began to produce periphrastic causative constructions with *make* and *get* such as "I made back wet" at about 24 to 26 months, during which time she also came to productively utter other complex sentences using *think* or *want*. She also made an intriguing discovery: Christy began to make errors

involving the use of noncausative verbs in a causative sense around the same period when she started producing periphrastic causatives. For example, she said, "I'm just gonna *fall* this on her" (2;9) as she held a piece of paper and dropped it. Bowerman (1974) observed many other sentences involving causative use of noncausative verbs (both intransitive and transitive verbs) as follows:

- (3) a. Daddy go me around. (2;8) (= make me go around)
- b. I'm singing him. (3;1) (= making him sing)
- c. See, she can't eat. But I can't eat her. (3;3) (= make her eat; feed her)

Christy continued making this type of error until she was about 5 years old. By then, she clearly acquired the periphrastic causative and used it productively. Bowerman (1982) argues that this overlap of the periphrastic causative and the lexical causative error is not just a coincidence. Rather she claims that the acquisition of the periphrastic causative is prerequisite for the lexical causative errors in which noncausative verbs are used in the causative sense. She further pointed out that at an early stage children do not differentiate periphrastic causatives from lexical causatives with respect to their meanings. Compare the causative sentences in (4) and (5) below, cited from Bowerman (1974).

- (4) a. John moved Bill.
- b. John made Bill move.

- (5) a. John stood the child up.
- b. John had/made/got the child (to) stand up.

In lexical causative sentences in (4a) and (5a) the causer (in this case *John*) physically manipulates the causee (*Bill* in (4a) and *the child* in (5a)) in bringing the event about,

such that the causee is involved as a nonvolitional patient. In contrast, in (4b) and (5b), the causer gives directions to the volitional causee to bring about the event. We will use a term "direct causation" for the former situation in which the causer manipulate the causee and the causee is nonvolitional, and a term "indirect causation" for the latter situation in which the causer gives orders to the agentive/volitional causee to bring about the caused event. According to Bowerman, lexical and periphrastic causative forms are synonymous for children for some period of time: both forms are used to refer indiscriminately either to direct causation or indirect causation,² or at least overlap very heavily in their range of application. She observed that Christy used a lexical causative – either an existing causative verb of English or a novel causative created from a non-causative – to express a meaning for which an adult would have chosen a periphrastic causative because no direct physical manipulation was involved in the scene. The opposite type of error was attested during the same period as well: the child used a periphrastic causative even when direct physical manipulation was involved such that a lexical causative is called for. Bowerman claims that this apparent overlap of the lexical and periphrastic causatives shows that the structures for the both causatives are closely linked. She did not, however, discuss how children "unlearn" the misuse of noncausative verbs and come to know that the periphrastic causative and the lexical causative have different meanings and cannot be used interchangeably.

² Bowerman (1974) uses a term "manipulative" for direct causation and "directive" for indirect causation. We will use "direct" vs. "indirect" causations throughout this dissertation. We will come back to the semantic difference between these two types of causatives in Chapter 2.

There are some other previous studies on causatives in different languages. Courtney (2002) examined the naturalistic speech of five children aged 2;4 to 3;5 learning Quechua, an agglutinative language with morphologically complex verbs formed through suffixation. Quechua has a morphological type of causative, as contrasted with the periphrastic causative in English. Courtney discovered that the children initially interpreted all complement subjects, i.e. embedded subjects, of morphological causatives as directly affected patients lacking volitional control. In other words, the children did not use the morphological causatives to describe indirect causation situations, which is compatible with what Bowerman (1974, 1982) pointed out in that children do not semantically differentiate the lexical causative and the analytic (both periphrastic and morphological) causative at their early stage.

Allen (1996) also examined the spontaneous speech data of causative constructions in Inuktitut, an Eskimo language spoken in northern Canada. Inuktitut has both analytic and lexical causatives. The analytic causative in Inuktitut is a morphological causative instead of periphrastic causative, with an overt causative morpheme being suffixed to the main verb. Based on the longitudinal speech data of 4 children aged 2;0 through 3;6, it was found that the timing of causative acquisition in Inuktitut is consistent with other reports in that it appears sometime between 2 and 3 years of age. The study also showed that the causative morpheme is used at the earliest stage in fixed and unanalyzed forms involving command-type imperative structures. Not until the age of 3;2 or later do the children start using the morphological causative for describing indirect causations.

A similar observation was made in a longitudinal study of causative constructions in Japanese by Shirai et al. (2001): children's early use of the causative morpheme is associated with request forms and they do not use the morphological causative to express situations in which a causer forces a causee to bring about an event (indirect causation).

In crosslinguistic experimental research on the causative construction, Ammon and Slobin (1979) tested children learning English, Italian, Serbo-Croatian, and Turkish, between the ages of 2;0 and 4;4. The first three languages have periphrastic causatives with two separate verbs, i.e. one causative verb such as *make* and *have* and one main verb, whereas Turkish has a morphological causative in which causative particles are inserted in the verb, making a verbal complex. They investigated the children's comprehension of causative constructions adopting an act-out task. They examined if the children could interpret the sentences such as "The horse makes the camel run" correctly. The children had to demonstrate the action by manipulating toy animals. They found that by 3 years of age, children learning all of these languages correctly interpret the causative sentences.

To summarize, all of the previous studies on child causatives we have surveyed so far agreed at least on the observation that children began to produce and understand the analytic causatives (periphrastic or morphological) by the ages of 2 to 3. Children learning languages with periphrastic causative constructions such as English and Italian know what the causative verbs are and how to use them along with main verbs in sentences. Children whose languages encode causatives by suffixation like Turkish and Japanese know what the morphemes are and how to combine them with verb stems. Those studies did not, however, directly examine the issue as to whether the children

distinguish the analytic causative from the lexical causative with respect to both meaning and structures. Although some previous studies (e.g. Bowerman 1972, Courtney 2002) pointed out the possibility that children might be using the analytic and lexical causatives interchangeably as we saw above, no research has been done as far as I know which attempts to examine if children have different semantics and different structures for each of the two causative constructions at their early developmental stage. Also, their arguments concerning children's early non-adult-like use of causative constructions are based solely on the children's naturalistic speech data. Thus, as an attempt to investigate children's knowledge of semantic and syntactic differences, it is necessary to examine their comprehension of both analytic and lexical causatives adopting an experimental method that enables us control the contexts in which the causatives are used.

When we attempt to examine children's knowledge of the semantic and structural differences between the lexical and the analytic causatives, Japanese has some advantages. Unlike languages like English which have periphrastic causative forms, Japanese encodes indirect causation by means of suffixation of a causative morpheme to a verb stem, forming one verbal complex rather than having two independent verbs. Hence the analytic causative in Japanese resembles a simple ditransitive sentence with respect to its case-marking pattern and number of words in the sentences. Furthermore, there is a small group of verb stems that can appear in both analytic and lexical causative sentences.³ An example of such a causative pair is given in (6).

³ We will use a term "productive causative" for the Japanese analytic causative, given the fact that the Japanese analytic causative is formed by suffixation of a causative morpheme and the suffixation is productive, i.e. the causative morpheme can be attached to any kind of verb. We will examine the syntactic and semantic properties of both the productive and the lexical causatives in more detail in the next chapter.

(6) a. Productive causative

John-ga Mary-ni hon-o mi-sase-ta.
John-NOM Mary-DAT book-ACC look.at-CAUS-PAST
'John made Mary look at the book.'

b. Lexical causative

John-ga Mary-ni hon-o mise-ta.
John-NOM Mary-DAT book-ACC show -PAST
'John showed the book to Mary.'

As we can see, both causatives have exactly the same case-marking pattern, and share the verb stem *mi-* 'look at.' Thus, on the surface, they differ minimally in that the productive causative in (6a) contains the causative morpheme *-sase* while the lexical causative in (6b) has an idiosyncratic verbal ending. As the translations for each sentence show, they are semantically different: the productive causative denotes indirect causation while the lexical one expresses direct causation. They are structurally different as well: it is assumed that the productive causative is bi-clausal whereas the lexical one has a mono-clausal structure.⁴ Therefore, Japanese causative constructions are appropriate targets of investigation because they are minimally different at the surface but have different meanings and structures.

I conducted a total of five experiments, which will be reported in the following chapters. The experimental studies examined a total of 82 children aged 4 to 7, and enabled us to investigate the children's linguistic knowledge of both productive and lexical causatives in Japanese whose structural properties cannot be observed in naturalistic speech data. We also examine children's comprehension of other

⁴ We will survey the semantic and syntactic differences between the two types of causative in Japanese more in detail in the next chapter.

constructions with bi-clausal structures: complex sentences with a finite embedded clause and indirect benefactives.⁵ Comparing the comprehension of these constructions with that of causatives will provide insight not only into the comprehension of causatives but also into the comprehension of bi-clausal structures in general. We will investigate what kind of knowledge young children have with respect to constructions with bi-clausal structure and in what way children are different from adults when they exhibit non-adult-like performance in the experiments. The goal of this dissertation is to give answers to these questions.

1.4 Organization

This dissertation is organized as follows. Chapter 2 provides syntactic analyses of Japanese causatives and other constructions with bi-clausal structure. We will first survey how the productive and the lexical causatives are different in terms of their semantic and structural characteristics. We will also look at analyses of other constructions, such as complex sentences with finite embedded clauses and indirect benefactives, and compare them to the causatives.

In Chapter 3, after a brief overview of some previous acquisition studies of Japanese causatives, I will report on two experimental studies I conducted that examined children's semantic and syntactic knowledge of the two types of causatives in Japanese. In the experiments, children's non-target-like performance on the productive causative was observed.

⁵ Their syntactic characteristics will be examined in section 2.3 of the next chapter.

In order to elucidate the source of difficulty the children demonstrated in the first two experiments, three additional experiments were conducted, which will be reported in detail in Chapter 4. Comprehension of complex sentences with finite embedded clauses and that of indirect benefactives in Japanese were also tested in these experiments and compared to that of causatives.

Chapter 5 discusses two major issues: one on the nature of the non-target-like performance observed in the experiments and the other on the learnability problem regarding the causative constructions. We first address the issue of why the children had problem dealing with the productive causative in a certain circumstance and discuss possible processing accounts. We also explore in this chapter the nature of children's linguistic knowledge that enables them to acquire constructions with bi-clausal structure within a few years of exposure even in the face of the poverty of the stimulus situations.

Chapter 6 concludes this dissertation by summarizing the findings of the present experimental study.

CHAPTER 2

CAUSATIVES AND COMPLEX SENTENCES IN JAPANESE

2.1 Introduction

In this chapter, we survey some syntactic analyses of Japanese causatives, the acquisition of which is the main target of inquiry in this thesis. Before examining how young children acquire the causative constructions, we need to know what types of causatives Japanese has and what structure the causatives are assumed to have.

In section 2.2, we will closely look at syntactic analyses of Japanese causatives and introduce three types of causatives. We observe that they are different from each other both syntactically and semantically.

In section 2.3, we also deal with other constructions that are supposed to have a bi-clausal structure: the complex sentence with finite embedded clause and the indirect benefactive. We will point out that these constructions share some properties with the

causative but differ from the causative in other ways. The acquisition of these constructions was also tested and compared to that of the productive causative in the experiments to be reported in chapters 3 and 4.

2.2 Syntactic Analyses of Japanese Causatives

Since Kuroda's (1965a, b) analyses of causative constructions, there have been a number of studies in this field. Much of the work on the Japanese causative has focused on the construction formed by a verb stem and the productive causative affix *-(s)ase*. In this section, we will describe two distinct types of causatives in Japanese; the "productive causative"⁶ and the "lexical causative." The most important syntactic difference between these causative constructions is that the productive causative shows properties associated with a bi-clausal structure, while the lexical one has a mono-clausal structure (Kuroda 1965a, Kuno 1973, Shibatani 1976, among others). Section 2.2.1 deals with the productive *-(s)ase* causatives. In section 2.2.2, we will examine the lexical causative. In section 2.2.3, we compare productive and lexical causatives, and reconfirm that these two types of causative constructions have different structures. In the last subsection 2.2.4, we will introduce some literature (Matsumoto 1996, Kato and Koizumi 2006) that argues for the existence of another type of causative called "lexical *-sase* causative," which I believe is worth considering when we discuss issues related to causative acquisition.

⁶ The "productive causative" is called "morphological causative" in some literature.

2.2.1 Productive Causative

Since Kuroda (1965a), a number of studies have proposed an analysis of the Japanese causatives as formed by a verb stem and the causative affix *-(s)ase*.⁷ Traditionally, the productive causative has further been divided into the *make*-causative (coercive) and the *let*-causative (permissive).⁸ Examples of each type are given in (1) below.

- (1) a. John-ga Mary-o niwa-de asob-ase-ta.⁹ (*make*-causative)
John-NOM Mary-ACC garden-in play-CAUS-PAST
'John made Mary play in the garden.'
- b. John-ga Mary-ni niwa-de asob-ase-ta. (*let*-causative)
John-NOM Mary-DAT garden-in play-CAUS-PAST
'John let Mary play in the garden.'

When a causee is marked with accusative *-o*, the sentence receives the coercive interpretation, as shown in the English translation. When a causee is marked with dative case *-ni*, on the other hand, we easily obtain the permissive interpretation. Due to this case-marking distinction, the former is sometimes called *o*-causative, the latter *ni*-causative, respectively. The distinction in case marking on the causee disappears when the verbs which the causative morpheme *-(s)ase* attaches to are transitive verbs. This is illustrated in (2) below.

⁷ When a verb stem ends with a consonant, the causative affix which attaches to it is *-ase*, while *-sase* attaches to a stem which has a vowel ending.

⁸ Shibatani (1976, 1990) proposes that there are four types of the productive causative, by further dividing the two types mentioned above into subtypes based on their meanings. Matsumoto (2000) argues within the framework of LFG that Japanese has five subtypes. We will not go into these issues of subtypes in this thesis.

⁹ Abbreviations used throughout this dissertation are: NOM=nominative case, DAT=dative case, ACC=accusative case, GEN=genitive case, TOP=topic marker, COMP= complementizer, intr=intransitive verb, tr=transitive verb, gerund=gerundive form, PAST=past tense, NEG=negation, BEN=benefactive affix, and CAUS=causative affix.

- (2) a. *John-ga Mary-o piza-o tabe-sase-ta.
 John-NOM Mary-ACC pizza-ACC eat-CAUS-PAST
 'John made Mary eat the pizza.'
- b. John-ga Mary-ni piza-o tabe-sase-ta.
 John-NOM Mary-DAT pizza-ACC eat-CAUS-PAST
 'John made/let Mary eat the pizza.'

The sentence in (2a) is blocked by the Double-*o* Constraint (Harada 1973, Inoue 1976), which prohibits there being more than one NP marked with accusative case *-o* in a single tensed clause. Thus, both the *make*-causative and the *let*-causative have exactly the same case-marking pattern when the verb is transitive.

In this dissertation, we will mainly deal with the *make*-causative with a transitive verb stem and compare it to the lexical causative. In what follows we will examine both syntactic and semantic characteristics of the productive causative with a transitive verb stem. An example of this type of productive causative (= (2a)) is repeated in (3) below.

- (3) John-ga Mary-ni piza-o tabe-**sase**-ta.
 John-NOM Mary-DAT pizza-ACC eat-CAUS-PAST
 'John made Mary eat the pizza.'

A causer (*John* in (3)) appears in the matrix subject position, with nominative case *-ga*. A causee and subject of *eat* (*Mary* in (3)) is marked with dative *-ni*. The causative affix *-(s)ase* attaches to the verb stem of *tabe-ru* 'eat'.

Although there has been controversy as to where and how a causee, which is case-marked with dative, is generated, most analyses agree that the productive causative with

–(s)*ase* is a complex construction. In other words, the productive causative is assumed to have bi-clausal structure more or less as in (4).

- (4) John-ga [Mary-ni piza-o tabe]-sase-ta.
John-NOM Mary-DAT pizza-ACC eat-CAUS-PAST
'John made Mary eat the pizza.'

In this dissertation, a "clause" is defined as any type of constituent involving a subject and a predicate. As shown in (4), the causative affix –(s)*ase* takes a clausal complement and the construction has an embedded structure. The underlying subject of the embedded clause, which is generated in the spec of vP (subject of *tabe*- 'eat'), has dative case in the surface causative construction. Although there have been debates concerning which category the embedded clause belongs to, we assume here that the causative affix takes a vP complement, following Kubo (1990, 1992)¹⁰, Pylkkänen (2002),¹¹ Hasegawa (2001), Harley (2005), and Saito (2006). Kuroda (1965a, b), Kuno (1973), Miyagawa (1999), among others assume that the embedded clause is IP (or S depending on the frameworks), and Terada (1990) assumes CP as the embedded verbal complement of –(s)*ase*. However, since the embedded verb does not bear its own tense and there is some evidence showing

¹⁰ Although the main target of Kubo's (1990, 1992) study is passives, she suggests that the same structure for the indirect (gapless) passives can be applied to the productive causatives. She proposes a structure with two VPs, one of which is embedded in the other. We can translate her VP into vP in the later framework (Chomsky 1995).

¹¹ Pylkkänen (2002) introduced CAUSE-P and argued that it can be divided into three types: Root-selecting CAUSE, Verb-selecting CAUSE, and Phrase-selecting CAUSE. She did not specifically mention which type the Japanese productive causative affix belongs to, but it is implied that Japanese causative morpheme –(s)*ase* belongs to the last type: phrase-selecting CAUSE. This suggests that her analysis is compatible with the assumption here that the complement is vP. She also pointed out that the Japanese lexical causative is an example of Root-selecting CAUSE.

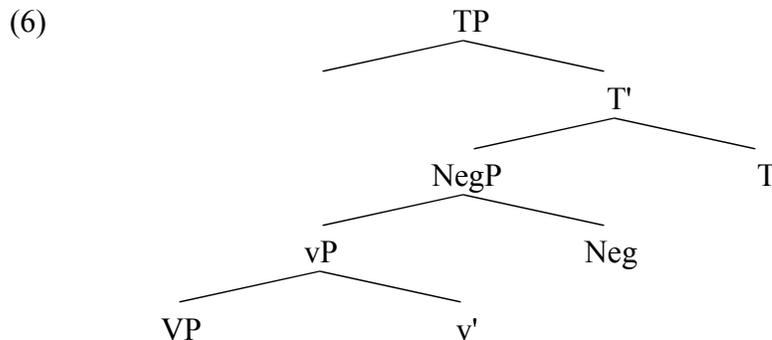
that the embedded complement of the productive causative cannot be IP or CP, we will regard the complement of the causative affix as vP.

The behaviors of the productive causative with negative polarity items (NPIs), such as *daremo* '(not) anyone', provide evidence that the complement in the productive causative is vP.

But before examining productive causative sentences, we need to investigate basic properties of NPIs. In Japanese, negation *-nai* 'not' appears on a clause-final predicate as a bound morpheme between the verb root and the tense morpheme, as in (5).

- (5) John-ga Mary-o tataka-**nakat**¹²-ta.
 John-NOM Mary-ACC hit-NEG-PAST
 'John didn't hit Mary.'

Assuming that the negation morpheme *-nai* is the head of a functional projection NegP, its relative position within the verbal complex suggests that NegP is located between vP and TP, as shown in (6).



¹² Although the basic form of negation is *-nai*, it is inflected depending on what element follows it. When the past tense morpheme *-ta* follows the negation, *-nai* becomes *-nakat*.

The licensing of negative polarity items, such as *daremo* '(not) anyone' and *nanimo* '(not) anything', is said to be clause-bound. In other words, the NPIs generally require clause-mate negation *-nai* in order to be licensed, as shown in (7).

- (7) a. **Daremo** gakkoo-ni ika-**nakat**-ta.
 anyone school-to go-NEG-PAST
 'No one went to school.'
- b. *John-ga [_{CP} [_{TP} **daremo** gakkoo-ni it-ta] to] iwa-**nakat**-ta.
 John-NOM anyone school-to go-PAST COMP say-NEG-PAST
 '(intended) John said that no one went to school.'
- c. John-ga **nanimo** mi-**nakat**-ta.
 John-NOM anything see-NEG-PAST
 'John didn't see anything.'
- d. *John-ga [_{CP} [_{TP} Mary-ga **nanimo** mi-ta] to] iwa-**nakat**-ta.
 John-NOM Mary-NOM anything see-PAST COMP say-NEG-PAST
 '(intended) John said that Mary didn't see anything.'

If we translate this clause-mate condition into "an NPI cannot be licensed by the negation morpheme which is beyond the CP boundary," we can account for the grammaticality of the sentences in (8) below, and our assumption that the embedded complement of the productive causative should be vP will be justified.

Now let us look at the productive causative sentences with the NPI *daremo* '(not) anyone'. Notice that in (8a), the negation morpheme *-nai* 'not' is located right after the second element of each verbal complex. In (8b), on the other hand, negation is attached to the first element of the verbal complex.

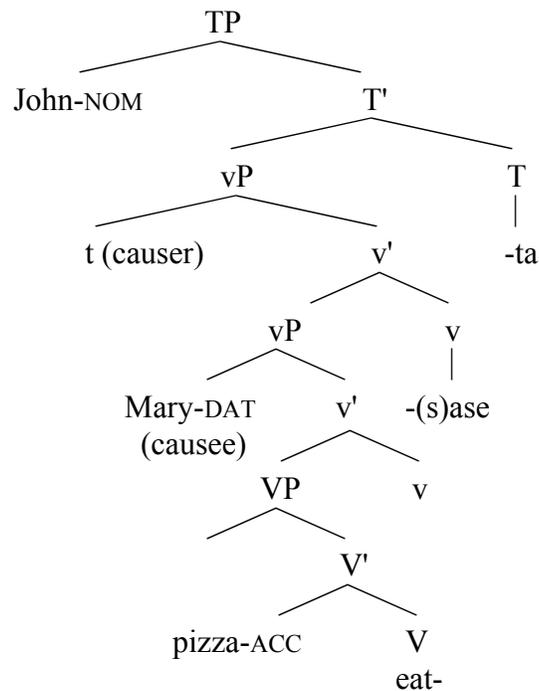
(8) Productive causative with NPI

- a. John-ga **darenimo**¹³ hon-o yom-ase-**nakat**-ta.
John-NOM anyone book-ACC read-CAUS-NEG-PAST
'John didn't make anyone read the book.'
- b. *John-ga **darenimo** hon-o yoma-**naku**-sase-ta.
John-NOM anyone book-ACC read-NEG-CAUS-PAST
'John didn't make anyone read the book.'

The negation morpheme *-nai* cannot intervene between the verb stem and the productive causative morpheme *-(s)ase*. Given that NegP is located between vP and TP, and that the complement of the construction is vP, the grammaticality in (8) can naturally be accounted for. If the complement were TP or CP, the sentence in (8b) would turn out to be grammatical. For example, suppose the complement were a TP. Since the NegP is generated between vP and TP, there would be two different positions where the negation morpheme could appear, making the sentence in (8b), grammatical. Since that is not the case, the complement that the productive causative morpheme selects should be vP. And hence, the Japanese productive causative is assumed to have the structure in (9).

¹³ When the negative polarity item *daremo* '(not) anyone' appears with the dative case marker, it carries the case by inserting *-ni* between *dare* and *mo*, yielding *darenimo*.

(9) Productive causative



As shown in (9), the subject of *-(s)ase* is generated at Spec of vP and moves up to Spec of TP to receive a nominative case, and the subject of a verb in an embedded vP is generated in Spec of a lower vP, which receives dative case.

Another important property of this type of causative is that it is fully productive. Any kind of verb can appear in this type of causative. Thus, intransitive verbs can also appear in this construction, as in (1), as well as transitive verbs as in (3). This property leads us to assume that causatives of this type are syntactically derived, contrary to the other type of causatives, which we will discuss shortly.

Yet another characteristic of the productive causative is that the dative-marked NP, the causee, must be agentive animate. Thus, an inanimate causee cannot appear in this construction, as indicated in (10).

- (10) *John-ga bou-ni magar-ase-ta.
John-NOM stick-DAT bend (intr)-CAUS-PAST
'(intended) John made the stick bend.'

Note that this fact also supports the validity of assuming vP to be a complement of –(s)ase. Since the NP in Spec vP position should be agentive subject, as Hasegawa (2001) pointed out, the structure in (9) correctly predicts that the dative –ni marked NP is always an agentive causee and the internal argument like *bou* 'stick' in (10) cannot appear in the productive causative.

Furthermore, the productive causative generally denotes situations of "indirect causation"¹⁴ in which an individual orders another individual to bring about the event denoted by the embedded verb phrase. In other words, there are always two separate events involved in the productive causative, and the two events can take place at different times. This property is closely connected to the characteristic of the causee that it must be agentive animate. As the second event must be brought about independent of the first event, the causee is the one that can make the second event happen.

2.2.2 Lexical Causative

The other type of causative in Japanese is the lexical causative. In contrast to the productive causative, the lexical causative is assumed to have a mono-clausal structure, and it cannot be formed freely from a verb stem and an affix (Miyagawa 1989, Shibatani 1976, 1990).

¹⁴ The terms 'indirect causation' and 'direct causation' (cf. section 2.2.2) were first used in Shibatani (1976).

It has been observed that there are quite a number of lexical causatives in Japanese, such as *okos-u* 'wake up' in (11a) and *mage-ru* 'bend' in (12a). Most of them have unaccusative counterparts sharing a similar stem.

(11) a. John-ga Mary-o okosi-ta.
 John-NOM Mary-ACC wake.up (tr)-PAST
 'John woke Mary up.'

 b. Mary-ga oki-ta.
 Mary-NOM wake.up (intr)-PAST
 'Mary woke up.'

(12) a. John-ga bou-o mage-ta.
 John-NOM stick-ACC bend (tr)-PAST
 'John bent the stick.'

 b. Bou-ga magat-ta.
 stick-NOM bend (intr)-PAST
 'The stick bent.'

As we notice, they are mostly morphologically distinct from their unaccusative counterparts in (11b) and (12b), unlike English. For example, *-os* appears in causative transitive forms such as *ok-os-u* 'wake up (tr)' in (11a), whereas the unaccusative counterpart does not have such a morpheme, as in *ok-ir-u* 'wake up (intr)' in (11b). Also, most of the alternation patterns of causative/unaccusative seem to be quite arbitrary and idiosyncratic. Sixteen different patterns of causative/unaccusative pairs are listed in Jacobsen (1992). Some of them are shown in Table 2.1 below.

Table 2.1. Lexical causatives and unaccusative counterparts

	Unaccusative		Lexical causative
-ar-	<i>mag-ar-u</i> 'bend'	-er-	<i>mag-er-u</i> 'bend'
-er-	<i>kog-er-u</i> 'become scorched'	-as-	<i>kog-as-u</i> 'scorch'
-ir-	<i>ok-ir-u</i> 'wake up'	-os-	<i>ok-os-u</i> 'wake up'
-ø-	<i>nar-ø-u</i> 'ring'	-as-	<i>nar-as-u</i> 'ring'
-ø-	<i>ak-ø-u</i> 'open'	-er-	<i>ak-er-u</i> 'open'
-er-	<i>kir-er-u</i> 'be cut'	-ø-	<i>kir-ø-u</i> 'cut'

As Table 2.1 clearly shows, the causative/unaccusative alternation patterns are totally unpredictable, and thus each of them must be learned and stored in the lexicon. In other words, no syntactic operation is involved. Furthermore, one cannot state that lexical causatives are derived from their unaccusative counterparts or vice versa. However, we still notice that causative morphemes such as *-as-* or *-os-*, which share *-s-* sounds with the productive causative affix, are specific only to causative morphemes.

Another characteristic of the lexical causative is so-called "direct causation". Contrary to the productive causative, the lexical causative involves only one event, denoting causation in which the causer acts on the causee in a direct manner to carry out the caused event. For example, a lexical causative sentence in (13) necessarily implies that John used his own hands and dressed Mary (i.e. direct causation).

- (13) John-ga Mary-ni huku-o kise-ta.
 John-NOM Mary-DAT clothes-ACC dress-PAST
 'John dressed Mary.'

On the other hand, the corresponding productive causative sentence sharing the same verb stem and similar case-marking pattern, exemplified in (14), expresses the situation

where John told or ordered Mary to put her clothes on (i.e. indirect causation), as the English translation shows.

(14) John-ga Mary-ni huku-o kis-ase-ta.
 John-NOM Mary-DAT clothes-ACC dress-CAUS-PAST
 'John made Mary put clothes on.'

Thus, the lexical causatives denote 'direct causation' while the productive causatives denote 'indirect causation' in this sense.

2.2.3 Evidence of Structural Difference

In the previous two sections, we described two types of causatives. Their different properties are summarized in Table 2.2 below.

Table 2.2. Characteristics of productive and lexical causatives

Productive causative	Lexical causative
<ul style="list-style-type: none"> ▪ bi-clausal ▪ productive ▪ indirect causation ▪ agentive dative NP 	<ul style="list-style-type: none"> ▪ mono-clausal ▪ idiosyncratic / unproductive ▪ direct causation ▪ non-agentive dative NP

We mentioned that the productive causatives are bi-clausal, while the lexical causatives are mono-clausal. In this section, we provide some evidence for the structural difference between the productive causative and the lexical causative. Let us take examples of each causative type for comparison, in (15) and (16) below.

(15) Productive causative

Okaasan-ga kodomo-ni bousi-o kabur-ase-ta.
mother-NOM child-DAT hat-ACC put.on-CAUS-PAST
'The mother made the child put the hat on.'

(16) Lexical causative

Okaasan-ga kodomo-ni bousi-o kabuse-ta.
mother-NOM child-DAT hat-ACC put.on-PAST
'The mother put the hat on the child.'

The productive causative in (15) is assumed to have the sentence in (17) below as an embedded clause, and that the verb in the lexical causative in (16), *kabuse-ru* 'put on', shares a morpheme *kabu-* with its corresponding verb *kabu-ru* 'put on' in (17).

(17) Kodomo-ga bousi-o kabut-ta.
child-NOM hat-ACC put.on-PAST
'The child put the hat on.'

Thus, the productive causative sentence in (15) is assumed to have a structure represented in (18).

(18) Okaasan-ga [kodomo-ni bousi-o kabur]-ase-ta.
mother-NOM child-DAT hat-ACC put.on-CAUS-PAST
'The mother made the child put the hat on.'

Now we will examine evidence showing that productive causatives are bi-clausal while lexical causatives are mono-clausal. The first piece of evidence is the interpretation of the reflexive *zibun* 'self.' It is widely known that the productive causatives such as (19) allow two interpretation as to the reflexive *zibun* 'self' (Kuroda 1965a, Kuno 1973, Shibutani 1976, among others). In other words, (19) is ambiguous.

(19) Okaasan_i-ga kodomo_j-ni zibun_{i/j}-no bousi-o kabur-ase-ta.
 mother-NOM child-DAT self-GEN hat-ACC put.on-CAUS-PAST
 'The mother made the child put self's hat on.'

(*zibun* 'self' = mother, child)

The possessor of the hat in (19) can be either the mother or the child. It is assumed that the reflexive pronoun *zibun* 'self' in Japanese can be bound only by a subject.^{15, 16} Given this, the availability of two interpretations in (19) suggests that the productive causatives have an embedded structure as the square brackets in (18) indicate. This bi-clausal structure has two logical subjects: one in the matrix clause with nominative case and the other in the embedded clause with dative case. Thus, it is this bi-clausal structure that makes two different interpretations for the sentence in (19) available.

On the other hand, the lexical causative sentence in (20), which shares the same verb stem with the productive causative in (19), is not ambiguous.

(20) Okaasan_i-ga kodomo_j-ni zibun_{i/*j}-no bousi-o kabuse-ta.
 mother-NOM child-DAT self-GEN hat-ACC put.on-PAST
 'The mother put self's hat on the child.'

(*zibun* 'self' = mother, *child)

¹⁵ *Zibun* 'self' is generally assumed to be a Japanese anaphor (Kuroda 1965, Shibatani 1976, among others). For example, *zibun* 'self' must have its antecedent in the same sentence. Also, like *-self* in English, *zibun* 'self' must be c-commanded by its antecedent. These properties can be accounted for in terms of Binding Condition A in some form or another. However, *zibun* 'self' shows properties distinct from English *-self*. The antecedent of *zibun* 'self' must be a subject, while *-self* does not have such a restriction (subject orientation). *Zibun* 'self' has another property. It can corefer with a long-distance subject. The argumentation in this section is based on these observed properties.

¹⁶ Saito (2006) argues that the possible antecedents for *zibun* 'self' can be defined simply as phrases in vP Spec. He further suggests a refined definition of "subjects" as those phrases that satisfy the EPP requirement either of T or of v.

Zibun 'self' in (20) can refer only to the subject *okaasan* 'mother,' and the hat the mother put on the child has to be the mother's, not the child's. This fact suggests that the lexical causative has only one subject, hence a mono-clausal structure.

The second piece of evidence is the interpretation of subject-oriented adverbs in these two types of causatives (Shibatani 1990). Again, the productive causative as in (21) is ambiguous, whereas the lexical causative in (22) is unambiguous.

(21) Productive causative

Okaasan-ga kodomo-ni isoide bousi-o kabur-ase-ta.
 mother-NOM child-DAT quickly hat-ACC put.on-CAUS-PAST
 'The mother made the child put the hat on in a hurry.'
 i) The manner of the mother's action was in a hurry.
 ii) The manner of the child's action was in a hurry.

(22) Lexical causative

Okaasan-ga kodomo-ni isoide bousi-o kabuse-ta.
 mother-NOM child-DAT quickly hat-ACC put.on-PAST
 'The mother put the hat on the child in a hurry.'
 i) The manner of the mother's action was in a hurry.
 ii) *The manner of the child's action was in a hurry.

In (21), the adverb *isoide* 'quickly' can modify either the mother's action or the child's action. More precisely, the adverb modifies either the vP headed by the causative affix *-(s)ase* or the vP with the verb stem *kabur-* 'put on'. These two interpretations lead us to assume that both *mother* and *child* in (21) are subjects, and that the productive causative has a bi-clausal structure. In (22), on the other hand, the same subject-oriented adverb modifies only the mother's action. This fact shows us that the lexical causative has only one subject, hence is mono-clausal.

2.2.4 Lexical *-sase* Causative

In addition to the two types of causatives we have been looking at, some researchers have pointed out another distinct type of causative in Japanese (Matsumoto 1996, 2000, Kato and Koizumi 2006).

Matsumoto (2000) first noted that the causative constructions containing the causative morpheme *-(s)ase* do not necessarily exhibit bi-clausal properties as previous literature has assumed, and argued for the existence of third type of causative, the "lexical *-sase* causative," in addition to the productive causative and the lexical causative.

Examples of the lexical *-sase* causative are given in (23).

- (23) a. Onnanoko-ga ningyoo-ni miruku-o nom-ase-ta.
girl-NOM doll-DAT milk-ACC drink-CAUS-PAST
'The girl fed a doll with milk.'
- b. Okaasan-ga akachan-ni kutu-o hak-ase-ta.
mother-NOM baby-DAT shoes-ACC put.on-CAUS-PAST
'The mother put the shoes on the baby.'

Matsumoto (2000) pointed to a small class of verbs that can appear in the lexical *-sase* causative construction, a list of which is given in (24).

- (24) *hak-* 'put on' (one's own lower body); *mato-* 'wrap oneself in'; *tabe-* 'eat'; *ku-* 'eat (colloquial)'; *nom-* 'drink'; *su-* 'suck'; *sir-* 'come to know'; *kik-* 'hear'; *mot-* 'come to have'; *migir-* 'grasp'; *o-* 'carry on one's back, bear'

(Matsumoto 2000: 144)

He further suggests that the dative-marked NP can be considered as bearing a goal role and does not need to be agentive animate when these verbs are used in this type of causative. This can be justified by looking at sentences in (25).

- (25) a. *Ningyoo-ga miruku-o non-da.
 doll-NOM milk-ACC drink-PAST
 'The doll drank milk.'
- b. *Akachan-ga kutu-o hai-ta.
 baby-NOM shoes-ACC put.on-PAST
 'The baby put on her shoes.'

Each of the dative-marked NPs in (23) above cannot stand as a matrix subject as the sentences in (25) show. This means that the requirement that the dative-marked NP in the productive causative must be agentive animate does not apply for the lexical *-sase* causative.

We have to note, however, that these verbs can naturally be used in the productive causative construction when the dative-marked NP is agentive animate as we have seen in section 2.2.1.

Moreover, Matsumoto (2000) further pointed out that the lexical *-sase* causative exhibits mono-clausal properties in contrast to the productive causative. Recall that we used the reflexive pronoun *zibun* 'self' as a diagnosis for the structural difference between the productive causative and the lexical causative. The claim that the lexical *-sase* causative has a mono-clausal structure is confirmed by the example in (26).

- (26) Mary_i-ga akatyan_j-ni zibun_{i/*j}-no kususita-o hak-ase-ta.
 Mary-NOM baby-DAT self-GEN socks-ACC put.on-CAUS-PAST
 'Mary put self's socks on the baby.'
- (*zibun* 'self' = Mary, *baby)

As a baby cannot be an agent of putting on socks, the dative NP can only be interpreted as goal. *Zibun* 'self' in this example unambiguously refers to *Mary*. The data above

implies that the productive causative morpheme *-(s)ase* is ambiguous in the adult grammar of Japanese. When a sentence has an agent as a dative marked NP, the causative morpheme takes a vP complement and yields a bi-clausal structure. On the other hand, when a dative subject is not an agent, the sentence has a mono-clausal structure.

2.3 Other Constructions with Bi-clausal Structure

This section provides a brief survey of syntactic analyses of Japanese constructions that are assumed to have a bi-clausal structure. Among them, we will look at complex sentences with finite embedded clauses in section 2.3.1 and so-called indirect benefactives in section 2.3.2. The complex sentences which embed finite clauses will be adopted as stimulus sentences in Experiments I and IV which are to be reported in detail in chapter 3. The indirect benefactives will be used as test sentences in Experiment V as a comparison to the productive causatives. They are undoubtedly bi-clausal but differ from each other and from the productive causative with respect to syntactic category of their complements. In what follows, we will look at their structural similarities and differences.

2.3.1 Complex Sentences with Finite Embedded Clause

We first briefly survey complex sentences with finite embedded clauses as their complement. Among them, we deal with object complementation. In Japanese, object complementation consists of a complement clause followed by a complementizer: *to*, *koto*, *no*, or *tokoro*. Iwasaki (2002) treats *to* differently from the other complementizers

and calls *to* "quotative marker." Examples of complex sentences with each of the complementizers are given in (27).

- (27) a. John-wa [CP [Mary-ga piza-o tabe-ta] to] omot-ta.
 John-TOP Mary-NOM pizza-ACC eat-PAST COMP think-PAST
 'John thought that Mary ate the pizza.'
- b. John-wa [CP [Mary-ga piza-o tabe-ta] koto]-o nagei-ta.
 John-TOP Mary-NOM pizza-ACC eat-PAST COMP-ACC grieve-PAST
 'John grieved over the fact that Mary ate the pizza.'
- c. John-wa [CP [Mary-ga piza-o tabe-ta] no]-o mi-ta.
 John-TOP Mary-NOM pizza-ACC eat-PAST COMP-ACC see-PAST
 'John saw that Mary ate the pizza.'
- d. John-wa [CP [Mary-ga piza-o tabe-ta] tokoro]-o mi-ta.
 John-TOP Mary-NOM pizza-ACC eat-PAST COMP-ACC see-PAST
 'John saw Mary eating the pizza.'

Note that the embedded clause in (27a) with the complementizer *to* is not followed by a case marker, while the other embedded clauses in (27b, c, and d) are case-marked with accusative *-o*. Based on this fact, Iwasaki (2002) treats *koto*, *no*, and *tokoro* as nominalizers, distinguishing them from the quotative marker *to*, and states that they function as nouns in form only without much semantic content: the semantic content is null in the case of *no* or extremely weak in the cases of *koto* (= abstract thing) and *tokoro* (= place). Also, according to Kuno (1973) and Akatsuka-McCawley (1978) among others, the choice of complementizer is determined by the degree of factivity of the information denoted in the embedded complement clause.

Syntactically, a complex sentence with a finite embedded clause with any kind of complementizer is undoubtedly bi-clausal. This is confirmed by the diagnostic we used

above: *zibun* 'self' binding. The fact that the sentence in (28) is ambiguous shows that there are two events with two subjects, hence two clauses.

(28) John_i -wa [_{CP} [Mary_j -ga zibun_{i/j} -no piza-o tabe-ta] to] omot-ta.
 John-TOP Mary-NOM self-GEN pizza-ACC eat-PAST COMP think-PAST
 'John thought that Mary ate self's pizza.'

(*zibun* 'self' = John, Mary)

2.3.2 Indirect Benefactive

In this section, we will survey a construction called the indirect benefactive with a benefactive affix *mora-w* 'receive' which suffixes to a verb stem. Japanese has constructions called benefactives which some literature assumes to be divided into two types: the direct benefactive and the indirect benefactive (Hoshi 1994, Terada 1990).¹⁷ Examples of each type are shown in (29) and (30).

(29) Direct benefactive

John_i -ga sensei-ni [e_i] homete-morat-ta.
 John-NOM teacher-DAT praise (gerund)-BEN-PAST
 'John received the favor of the teacher's praising him.'

(30) Indirect benefactive

John-ga sensei-ni ronbun-o yonde-morat-ta.
 John-NOM teacher-DAT paper-ACC read (gerund)-BEN-PAST.
 'John received the favor of the teacher's reading the paper.'

¹⁷ Both Hoshi (1994) and Terada (1990) pointed out the structural parallelism between passives and benefactives.

Note that both types of benefactive have *-morat*¹⁸ 'receive' which functions as a benefactive morpheme and suffixes to the verb stem. When a verb stem is suffixed by the benefactive affix *mora-w*, the form of the verb stem becomes gerundive (Hoshi 1994, Jacobsen 1982, among others). The benefactive morpheme *mora-w* preserves the original meaning 'receive' and the benefactive sentences denote a situation where an individual expressed by a subject NP with nominative case marker *-ga* receives the benefit of another individual's doing an action denoted by the verb phrase which the benefactive morpheme selects.

Hoshi (1994) and Terada (1990) argued separately that the benefactives can be divided into two types: one with a gap which is coindexed with the matrix subject and the other without a gap. In parallel with the analysis of Japanese passives, Hoshi (1994) calls the former the direct benefactive and the latter the indirect benefactive. Although discussions of syntactic operations or derivations that generate each of the benefactive constructions are interesting, our main focus in this thesis is to compare the causative to the benefactive. Therefore, we will only deal with the indirect benefactive which is not assumed to contain a gap, just like the productive causative.

In what follows, we will see how the indirect benefactive is similar to the productive causative and how they differ from each other. We then seek a plausible syntactic

¹⁸ The basic form of the affix is *mora-w*, but when followed by the past tense morpheme *-ta*, it becomes *morat-* as in (29) and (30). This affix, when it stands alone, functions as a simple verb meaning 'receive' as in:

John-ga	Mary-ni	hon-o	morat-ta.
John-NOM	Mary-DAT	book-ACC	receive-PAST
'John received a book from Mary.'			

In this thesis, I will use an abbreviation *-BEN* when it functions as the benefactive suffix.

analysis for the indirect benefactive. A typical indirect benefactive sentence is given in (31) below.

- (31) John-ga Mary-ni hon-o yonde-morat-ta.
John-NOM Mary-DAT book-ACC read (gerund)-BEN-PAST
'John received the favor of Mary's reading a book.'

First, the indirect benefactive sentences show properties associated with bi-clausality. Recall that we used two diagnostics to show that the productive causative has a bi-clausal structure: *zibun* 'self' binding and adverbial scope. First, the indirect benefactive with *zibun* 'self' is ambiguous, as shown in (32).

- (32) John_i-ga Mary_j-ni zibun_{i/j}-no hon-o yonde-morat-ta.
John-NOM Mary-DAT self-GEN book-ACC read (gerund)-BEN-PAST
'John received the favor of Mary's reading self's book.'
(*zibun* 'self' = John, Mary)

Both *John* and *Mary* are potential antecedents of *zibun* 'self,' suggesting that the sentence contains two subjects and hence two clauses. Second, the indirect benefactive with a subject-oriented adverbial phrase such as *isoide* 'quickly, in a hurry' as in (33) is also ambiguous as to whose action the adverbial modifies.

- (33) John-ga Mary-ni isoide hon-o yonde-morat-ta.
John-NOM Mary-DAT quickly book-ACC read (gerund)-BEN-PAST
'John received the favor of Mary's reading the book in a hurry.'
(John was in a hurry, Mary was in a hurry)

The whole verb phrase including the benefactive morpheme *mora-w* can be a target of the modification of the adverbial, and only the verb phrase *hon-o yonde* 'reading the book'

can also be the potential adverbial scope. This fact also shows that the indirect benefactive sentence has a bi-clausal structure; a property it shares with the productive causative.

Having confirmed that the indirect benefactive is bi-clausal just like the productive causative, the next question to be raised is what type of complement the benefactive morpheme *mora-w* selects. We have claimed that the productive causative morpheme –(s)*ase* has a vP as its complement. Does the indirect benefactive have a similar complement type? Or does it have a CP as its complement just like the complex sentence with finite embedded clause?¹⁹

Let us first examine examples of complex sentences with tensed clauses as their complements, which are undoubtedly CPs. Note that the example sentences in (34) below contain Negative Polarity Item *daremo* 'anyone' as the embedded subject and the negation morpheme *-nai*.²⁰

- (34) a. John-ga [CP [TP **daremo** hon-o yoma-**nakat-ta**] to] it-ta.
 John-NOM anyone book-ACC read-NEG-PAST COMP say-PAST
 'John said that no one read the book.'
- b. *John-ga [CP [TP **daremo** hon-o yon-da] to] iwa-**nakat-ta**.
 John-NOM anyone book-ACC read-PAST COMP say-NEG-PAST
 '(intended) John said that no one read the book.'

¹⁹ Hoshi (1994) assumes that a VP is embedded in the indirect benefactive, while Sawasaki and Nakayama (2001) propose that the construction has an IP as the embedded clause. Terada (1990) assigns a bi-clausal structure in which the benefactive morpheme selects a CP clause.

²⁰ Note that, as we have seen in section 2.2.1, when the past tense morpheme *-ta* follows the negation, *-nai* becomes *-nakat*.

The contrast between (34a) and (34b) shows us that the NPI *daremo* 'anyone' is licensed by the negation morpheme and the clause-mate condition has to be satisfied: they have to be in the same CP domain. Given this, let us look at indirect benefactive sentences. We are attempting to identify the question mark in the sentences below.

(35) Indirect benefactive

- a. John-ga [_{CP} **darenimo** hon-o yoma-**nai-de**] -morat-ta.
 John-NOM anyone book-ACC read-NEG-(gerund) BEN-PAST
 'John received the favor of nobody's reading the book.'
- b. John-ga [_{CP} **darenimo** hon-o yonde] morawa-**nakat-ta**.
 John-NOM anyone book-ACC read (gerund) BEN-NEG-PAST
 'John didn't receive the favor of anyone's reading the book.'

The indirect benefactives in both (35a) and (35b) are grammatical. In (35a) the NPI is within the embedded phrase, though we do not know what kind of phrase it is yet, and so is the negation morpheme *-nai*. In (35b), on the other hand, the negation *-nai* is outside of the phrase.²¹ If the phrase in question is CP like the complex sentence with finite embedded clause, this sentence would be ungrammatical, because the NPI and its licenser, negation *-nai*, would not be in the same clause, and hence would violate the clause-mate condition. However, this is not the case with the indirect benefactive, suggesting that the embedded phrase in the indirect benefactive is not CP.

We now compare the indirect benefactive with the productive causative in order to determine what kind of phrase is embedded in the benefactive. Recall that the productive causative morpheme *-(s)ase* takes a vP as its complement. Let us look at examples of the

²¹ As each translation in (35) shows, they are different in meanings. Namely, in (35a), the negation takes narrow scope with respect to the NPI, while the negation in (35b) takes wide scope.

indirect benefactive with negation in (36), comparing it to the productive causative with negation in (37).

(36) Indirect benefactive

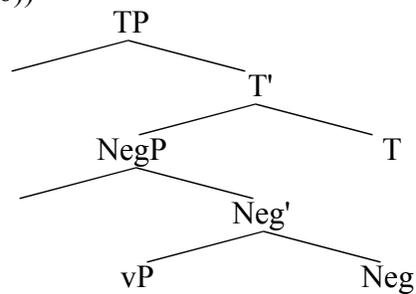
- a. John-ga [_{?P} Mary-ni hon-o yoma-**nai**-de] -morat-ta.
 John-NOM Mary-DAT book-ACC read-NEG-(gerund) -BEN-PAST
 'John received the favor of Mary's not reading the book.'
- b. John-ga [_{?P} Mary-ni hon-o yonde] -morawa-**nakat**-ta.
 John-NOM Mary-DAT book-ACC read (gerund) -BEN-NEG-PAST
 'John did not receive the favor of Mary's reading the book.'

(37) Productive causative

- a. *?John-ga [_{vP} Mary-ni hon-o yoma]-**naku**-sase-ta.
 John-NOM Mary-DAT book-ACC read-NEG-CAUS-PAST
 '(intended) John made Mary not read the book.'
- b. John-ga [_{vP} Mary-ni hon-o yom]-ase-**nakat**-ta.
 John-NOM Mary-DAT book-ACC read -CAUS-NEG-PAST
 'John did not make Mary read the book.'

Let us first examine the indirect benefactives. The negation morpheme *-nai* can affix to the verb stem as in (36a), and it can attach to the benefactive morpheme *-mora-w* as in (36b). On the other hand, the productive causative does not allow the negation morpheme to intervene between the verb stem and the causative morpheme, as indicated in (37a). What does this difference tell us about the structures of each construction? When we claimed that the productive causative has a vP as its embedded clause in section 2.2, we based our argument on the position of negation, by postulating the structure such as (38) (= (6)).

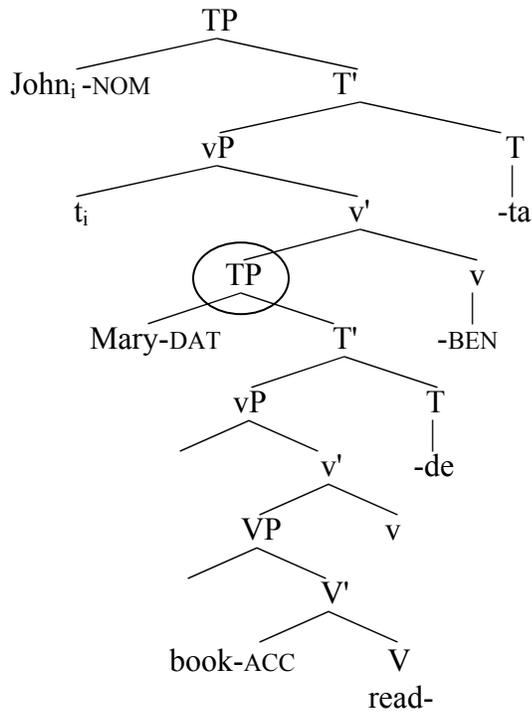
(38) (= (6))



The negation phrase (NegP) is generated between TP and vP in the tree. We saw in section 2.2 that the grammaticality of the productive causative with negation in (37) can naturally be accounted for. As the causative morpheme *-(s)ase*, which is generated under v, takes vP as complement, the only possible position for the negation morpheme to appear is right after the causative morpheme. Thus, the productive causative with the negation intervening between the verb stem and the causative morpheme, as in (37a), is ungrammatical. On the other hand, the observation that the indirect benefactive has two possible positions for the negation morpheme as in (36) can also be accounted for, if we assume that the complement of the benefactive morpheme *mora-w* is in fact TP, as in the structure given in (39b).

- (39) a. John-ga Mary-ni hon-o yonde-morat-ta.
John-NOM Mary-DAT book-ACC read (gerund)-BEN-PAST
'John received the favor of Mary's reading the book.'

b.



Having assumed that the benefactive morpheme takes TP as its complement, there are two TPs in the indirect benefactive sentence, allowing the negation to appear in different positions; one between the lower vP and the lower TP and the other between the higher vP and the higher TP. When the negation appears between the lower vP and TP, the sentence in (36a) is generated, whereas the negation appears between the higher vP and TP, we have the sentence in (36b).

There is another piece of evidence that leads us to claim that the complement types of the productive causative and the indirect benefactive are different. Japanese has subject honorification that is used as a diagnostic to identifying grammatical subjects (Kuno 1987, Matsumoto 2000, among others). The subject honorification is formed by wrapping the verb with the form of *o-V-ninaru*, and indicates the speaker's sense of respect for the

referent of the grammatical subject of the verb. An example of a verb with this honorification marking is given in (40), in which the verb *umare-* 'be born' receives this marking and the subject *prince* is respected by the speaker of the sentence.

- (40) Ooji-ga **o-umare-ninat-ta.**²²
 prince-NOM **o-be.born-ninat-PAST**
 'A prince was born.'

Let us now examine the productive causative and the indirect benefactive with this subject honorification form. Examples are given in (41) and (42) respectively,

(41) Productive causative

- a. Sensei-ga gakusei-ni hon-o **o-yom-ase-ninat-ta.**
 teacher-NOM student-DAT book-ACC **o-read-CAUS-ninat-PAST**
 'The teacher made the student read the book.'
- b. *Sensei-ga gakusei-ni hon-o yomi-**o-sase-ninat-ta.**
 teacher-NOM student-DAT book-ACC read-**o-CAUS-ninat-PAST**
 'The teacher made the student read the book.'

(42) Indirect benefactive

- a. *Sensei-ga gakusei-ni hon-o **o-yonde-morai-ninat-ta.**
 teacher-NOM student-DAT book-ACC **o-read-BEN-ninat-PAST**
 'The teacher received the favor of the student's reading the book.'
- b. Sensei-ga gakusei-ni hon-o yonde-**o-morai-ninat-ta.**
 teacher-NOM student-DAT book-ACC read-**o-BEN-ninat-PAST**
 'The teacher received the favor of the student's reading the book.'

In the productive causative in (41a), the honorification marking is placed on the complex of the verb stem and the causative morpheme. On the other hand in (41b), the marking is

²² A part of the honorification form *-ninaru* is a basic form and it becomes *-ninat* before the past tense form *-ta*.

placed only on the causative affix, rendering the sentence ungrammatical. The indirect benefactive in (42), on the other hand, shows the opposite behavior: the honorification marking cannot be placed on the verb stem and the benefactive morpheme together as shown in (42a), whereas it can be placed only on the benefactive affix as in (42b). Put together, the initial part of the honorification marker *o-* cannot be placed between the verb stem and the causative affix, whereas it can appear between the verb stem and the benefactive affix. Their different behavior with respect to the subject honorification form leads us to propose that the productive causative and the indirect benefactive have different structures.

In sum, in this section we examined the indirect benefactive and compared it to the productive causative. We proposed that the benefactive morpheme *mora-w* selects TP as its complement.

CHAPTER 3

ACQUISITION OF JAPANESE CAUSATIVES

3.1 Introduction

How do young children acquire the causative constructions? This chapter deals with both longitudinal and experimental studies of the Japanese causative constructions.

As we have seen in the previous chapter, Japanese causatives are typically divided into two types; the lexical causative and the productive causative. And there are some pairs of these two causatives which share the same verb stems. Japanese is one of the agglutinative languages and the productive causative behaves like a single word at the surface level (e.g. obeying the Double-*O* constraint), just like the lexical causative, but has properties indicating that the productive causative is syntactically derived out of two clauses. The presence of the competing lexical and productive causatives makes the acquisition of these constructions even harder. When do young children come to

understand the causative sentences to begin with? How can children come to recognize the syntactic and semantic differences between the two types of causatives in the absence of negative evidence and formal instruction? This chapter is the first step toward finding answers to these questions.

In the next section we begin by looking at a previous longitudinal study of naturalistic speech data by Murasugi et al. (2004). Although the main focus of the current thesis is to elucidate children's comprehension, rather than production, of causative constructions, it is worth observing how a child acquires the Japanese causative sentences and produces them in natural conversations.

Next we will briefly survey Otsu's (1997) study, which experimentally examined children's comprehension of the Japanese reflexive pronoun *zibun* 'self.' Although his attempt was to shed light on the acquisition of the subject-orientation property and long-distance binding property of *zibun* 'self,' he chose some lexical causative verbs to test the subject-orientation of *zibun* 'self,' which will also be adopted and discussed in detail in the experimental studies reported in sections 3.4 and 3.5. Otsu's (1997) study tells us in advance how children as young as 3 interpret the sentences with *zibun* 'self.'

Sections 3.4 and 3.5 deal with experimental studies whose aim was to examine how children come to understand both the semantic and the structural differences between the lexical and the productive causatives. The two experiments adopted different pairs of causative verbs and different methods, though a similar trend was found in both experiments.

Finally, section 3.6 summarizes this chapter.

3.2 Naturalistic Speech Data: Murasugi et al. (2004)

Murasugi et al. (2004) investigated the acquisition process of the Japanese constructions based on a longitudinal-observational study with a Japanese-speaking child over a period of five years. Their main claim is that the so-called "lexical *-(s)ase* causative" with a non-agentive dative NP is acquired earlier than the "regular" productive causative with an agentive dative-marked NP.

As we saw in section 2.2.4, there is some literature that argues for the existence of a subtype of causative constructions in Japanese (Matsumoto 2000, Kato and Koizumi 2006). Recall that it is argued that the causative construction with the productive causative morpheme *-(s)ase* is in fact structurally ambiguous, viz. that the constructions may have a bi-clausal structure with *-(s)ase* taking a vP complement, and may also have a mono-clausal structure with a non-agentive causee. To refresh our memory, we will briefly look at examples of this kind of causative below. Matsumoto (2000) and Kato and Koizumi (2006) argue that the sentence in (1) is ambiguous, as indicated in its translations.

- (1) John-ga Mary-ni miruku-o nom-ase-ta.
 John-NOM Mary-DAT milk-ACC drink-CAUS-PAST
 i) 'John gave an order to Mary and made her drink milk.'
 ii) 'John fed Mary milk.'

In the first reading, *Mary* is interpreted as an agent, while in the second reading, *Mary* does not seem to be an agent but instead a goal. However, the two interpretations are disambiguated in sentences such as (2).

- (2) Onnanoko-ga ningyoo-ni miruku-o nom-ase-ta.
 girl-NOM doll-DAT milk-ACC drink-CAUS-PAST
 'The girl fed a doll with milk.'

Since *ningyoo* 'doll' cannot be an agent, the sentence only has one interpretation; the one in which *the doll* is a goal. They also argue that the causative sentences such as (2) do not have a complex structure with an embedded clause, based on the fact that in an example such as (3), only *Mary* can be the antecedent of *zibun* 'self.'

- (3) Mary_i-ga akatyan_j-ni zibun_{i/*j}-no kususita-o hak-ase-ta.
 Mary-NOM baby-DAT self-GEN socks-ACC put.on-CAUS-PAST
 'Mary put self's socks on the baby.'
 (*zibun* 'self' = Mary, *baby)

Thus, they propose that when the dative marked NP is an agent, the causative morpheme takes a vP complement and yields a bi-clausal structure. And when a dative subject is not an agent, the sentence has a mono-clausal structure.

Keeping their analysis of the *-(s)ase* causatives in mind, we move on to their longitudinal study of a Japanese monolingual child. They found that the child started producing *V-(s)ase* forms sporadically around the age of 3;6. Examples they found in his speech are as follows.

(4) a. Akkun-ni tabe-sase-tee (3;6)
 Akkun-DAT eat-CAUS-request form
 'Please feed Akkun (me).'

b. Nomi-tatye²³-te (3;7)
 drink-CAUS-request form
 'Please give me (a drink).'

As for the examples above, they pointed out that (4a, b) do not express "indirect" causation. For example, the sentence in (4a) does not express the situation where 'You make me eat.' Instead, it just expresses 'You feed some food to me'. Thus in this developmental stage, the child only uses *-(s)ase* in sentences with non-agentive causee.

Murasugi et al. (2004) further observed that it was not until the age of 5 that he started using "regular" productive *-(s)ase* causatives. An example of such an utterance is given in (5).

(5) Biiru dake nom-ase-te kudasai. (5;3)
 beer only drink-CAUS-request form please
 'Please allow me to drink beer.'

It is obvious that the child did not ask someone to pour some beer into his mouth; rather he asked his mother to give him permission to drink beer. Thus, the causee, which is not overtly expressed, is an agent in (5).

In sum, Murasugi et al's (2004) main claim is that the lexical *-(s)ase* causative, which has a non-agent as a dative-marked NP, is acquired earlier than the "regular" productive causative with an agent as a dative-marked NP. More to the point, their data show that the

²³ The adult counterpart of *-tatye-* is *-sase-*. They transcribe his pronunciation of the causative morpheme in this way.

causative construction which they assume has a mono-clausal structure is acquired earlier than the one with a bi-clausal structure, and that the productive causative was not attested in the longitudinal speech data until around 5 years of age.

3.3 An Experimental Study on *Zibun* 'self': Otsu (1997)

In this section, we briefly look at a previous experimental study by Otsu (1997), in which he examined the acquisition of Japanese anaphora, including *zibun* 'self.' Because the main focus of Otsu's study is children's comprehension of Japanese anaphora, we do not find much detailed data on the acquisition of causatives in particular. However, Otsu used a lexical causative as a stimulus sentence to examine the acquisition of *zibun* 'self', which is adopted as one of the stimuli in experiments reported in later chapters. Thus, it is worth looking at these data at this point to see if the children tested by Otsu already had knowledge of *zibun* 'self' and how they treated *zibun* 'self' in causative sentences.

Otsu used the Truth Value Judgment Task (Crain and McKee 1986, Crain and Thornton 1998), and reported that a total of 41 subjects (12 three-year-olds, 14 four-year-olds, and 15 five-year-olds) understood the procedure and completed the whole task. The experiment tested the children's comprehension of a lexical causative, such as (6) in order to see whether the children knew the subject orientation property of *zibun* 'self.' As indicated in parentheses, only *Taroo* can be the antecedent of *zibun* 'self,' not the indirect object *Hanako*.

(6) Taroo-ga Hanako-ni zibun-no e-o mise-ta.
 Taro-NOM Hanako-DAT self-GEN picture-ACC show-PAST
 'Taro showed Hanako a picture of himself.'

(*zibun* 'self' = Taro, *Hanako)

This experiment revealed that all the subjects except one 3-year-old responded in an adult-like fashion: They allowed only *Taroo* to be the antecedent of *zibun* 'self.' Otsu concluded that even 3-year-old children had knowledge of the subject-oriented property of *zibun* 'self.'

So far, we saw two acquisition studies on the acquisition of Japanese causatives. In Murasugi et al.'s (2004) longitudinal study, they claimed that children do not produce the productive causative with an agentive embedded subject until around 5 years of age. However, they did not test experimentally if the child they observed understood the productive causative at all. They did not examine whether the child assigned a bi-clausal structure to the productive causative when he finally produced one either. We also reviewed Otsu's (1997) experimental study in section 3.3. However, his main goal was not to examine children's comprehension of causatives per se, but to test their knowledge of the reflexive pronoun *zibun* 'self' with respect to its subject-orientation and long-distance binding properties. Thus, his study does not tell anything about children's comprehension of the productive and the lexical causatives and their structural difference. Therefore, in order to elucidate how children come to understand the structural and semantic differences between the causatives, it was necessary to conduct a series of experiments on the children's comprehension of Japanese causatives. Let us now turn to my own experimental studies. In the next section, I report on the first experiment in

which the acquisition of the causatives with *kabuse-* 'put on' and *kabur-ase-* 'make someone put on' were examined.

3.4 Experiment I: Causatives with *kabuse-* 'put on' and *kabur-ase-* 'make someone put on'

Experiment I examined children's comprehension of the lexical causative and the productive causative in Japanese. The ultimate goal of this experiment was to see whether or not children, who were judged to have already acquired the productive causative affix *-(s)ase*, assigned a bi-clausal structure to the productive causative and a mono-clausal structure to the lexical causative. Specifically, we examined whether they could distinguish productive causatives from lexical ones with respect to the interpretation of the reflexive pronoun *zibun* 'self,' discussed in section 2.2.3.

There were four conditions in this experiment. The purpose of the first condition was to examine whether children knew the productive causative affix *-(s)ase* at all. The second condition examined whether those who had already acquired the causative affix *-(s)ase* knew the semantic difference between the productive and lexical causatives; direct causation vs. indirect causation. The third condition tested their knowledge of subject-oriented property of *zibun* 'self.' Their knowledge of the structural difference between the two types of causative we have been looking at was examined in the last condition. The procedures and the results of each condition will be reported in sections 3.4.1 through 3.4.4.

Subjects

A total of 20 children participated in this experiment. They were all mono-lingual Japanese children who attended a day-care center in the Tokyo area. The detailed information about the subjects is given in (7) below.

(7) N=20

4-year-olds: N=3 (age=4;6-4;11, mean=4;8)

5-year-olds: N=8 (age=5;2-5;7, mean=5;4)

6-year-olds: N=5 (age=6;0-6;11, mean=6;5)

7-year-olds: N=4 (age=7;0-7;10, mean=7;6)

Method

The methodology adopted throughout this experiment was the Truth Value Judgment Task (Crain and McKee 1986, Crain and Thornton 1998). Children were presented with short stories performed by an experimenter manipulating various stuffed animals and props. Each story was followed by a target stimulus sentence uttered by a puppet, *Kermit the Frog*, manipulated by another experimenter. The children were asked to say whether the puppet's utterance correctly depicted the situation provided by the short story. If they found that Kermit was correct, they gave him a toy pizza. If, on the other hand, they thought Kermit was wrong, they gave him a toy cucumber. The children were tested individually in a quiet room in their day-care center. All of their utterances were recorded for further analyses.

3.4.1 Condition 1: Acquisition of *-(s)ase*

The aim of the first condition was to examine children's comprehension of the productive causatives. In doing so, we compared their comprehension of productive causative sentences with that of ditransitive benefactive sentences. As shown in (8) and (9) below, the ditransitive benefactive sentences in (8) have similar case-marking patterns as the productive causative in (9), differing only in the specific suffixed morpheme, *-(s)ase* vs. *-age*.

(8) Ditransitive benefactive

John-wa	Mary-ni	ringo-o	totte-age-ta. ²⁴
John-TOP	Mary-DAT	apple-ACC	take-give-PAST
'John took the apple for Mary.'			

(9) Productive causative

John-wa	Mary-ni	ringo-o	tor-ase-ta.
John-TOP	Mary-DAT	apple-ACC	take-CAUS-PAST
'John made Mary take the apple.'			

As we can see, both the ditransitive benefactive and the productive causative take three arguments; one marked with *-wa* topic, dative *-ni*, and accusative *-o* respectively. However, they differ in one important respect: in the benefactive sentence in (8), the dative marked NP is a beneficiary and the agent of the verb stem *tor-* 'take' is *John*. On the other hand, in the productive causative sentence in (9), the dative marked NP is the causee who does an action denoted by the verb stem, hence an agent. Thus, although both sentences have the same number of arguments with the same pattern of case-marking,

²⁴ The ditransitive benefactive sentence has a verbal complex which consists of a verb stem and *age-ru* 'give'. The sentence can express the meaning that an individual (=subject) does something for the sake of someone (=dative object). As for the acquisition of this *age-ru* 'give' type benefactives, children even at the age of 4 correctly comprehend such sentences without any difficulties (Okabe 2005).

they denote completely different and opposite situations in terms of who is the agent of the main verb. Thus, if children understand the productive causative morpheme *-(s)ase*, they will systematically distinguish the interpretation of the causative sentence from the benefactive sentence.

Design

Keeping this in mind, we will present a sample scenario used in this experiment. A sample story is given in (10) and the sample stimulus sentences which were uttered by the puppet are given in (11) and (12). Note that each stimulus sentence followed each short story in the experiment. Hence, a total of four stories, two for the productive causative and two for the *age-ru* benefactive, were prepared with different animals and props.

(10) *There is a hungry pig wandering in the forest for some food. After a while, the pig found an apple. But, as the apple is on a very high tree, he can't reach it. When the pig was at a loss as to what to do, there came a bear. The pig asked the bear, "Can you pick that apple over there for me?" The bear said, "What? It's too high. I can't!" The pig kept asking the bear again and again, "You can climb up the tree, can't you?" "Umm...well, I can't..." said the bear. Finally the pig screamed, "I'm starving! Pick it for me!" The bear said, "Umm... all right. I'll bring you the apple." And the bear climbed the tree and brought the apple to the pig.*

After a story such as (10) was presented to a child, Kermit was asked a question by an experimenter, for example, "What happened to the pig?" Then Kermit said one of the test sentences in (11) or (12) below to the child. The sentences in (11) are benefactive sentences, one of which matches the scenario and the other does not match it because the

referent of the subject and that of the dative object are switched. The sentences in (12) are matching and mismatching productive causative sentences.

(11) Benefactive sentences

- | | | | | | |
|----|--|----------|-----------|------------------------|--------|
| a. | Kuma-wa | buta-ni | ringo-o | totte-age-ta. | |
| | bear-TOP | pig-DAT | apple-ACC | take(gerund)-give-PAST | |
| | 'The bear took the apple for the pig.' | | | | -TRUE |
| | | | | | |
| b. | Buta-wa | kuma-ni | ringo-o | totte-age-ta. | |
| | pig-TOP | bear-DAT | apple-ACC | take(gerund)-give-PAST | |
| | 'The pig took the apple for the bear.' | | | | -FALSE |

(12) Productive causative sentences

- | | | | | | |
|----|---|----------|-----------|----------------|--------|
| a. | Kuma-wa | buta-ni | ringo-o | tor-ase-ta. | |
| | bear-TOP | pig-DAT | apple-ACC | take-CAUS-PAST | |
| | 'The bear made the pig take the apple.' | | | | -FALSE |
| | | | | | |
| b. | Buta-wa | kuma-ni | ringo-o | tor-ase-ta. | |
| | pig-TOP | bear-DAT | apple-ACC | take-CAUS-PAST | |
| | 'The pig made the bear take the apple.' | | | | -TRUE |

In this particular sample scenario, (11a) is true and (11b) is false, while (12a) is false and (12b) is true. If a child has already acquired the productive causative affix, and the child has knowledge that a causer appears in the subject position and a causee appears in the object position with dative case, we would expect the child to correctly distinguish the productive causatives from the benefactive sentences.²⁵

²⁵ Uyeno et al. (1978) reported that even 3-year-olds could correctly interpret the benefactive sentences with *age-ru* 'give', as in (11) about 80% of the time. In Okabe (2005), it was also reported that children aged 4-6 could interpret similar benefactive sentences over 90% of the time.

Results

Let us turn to the results of the first condition of Experiment I. Percentages of the children's correct responses of both benefactives and productive causatives along with the number of correct responses are shown in Table 3.1.

Table 3.1. Correct responses for benefactives and productive causatives

	Benefactives	Causatives
4-yrs (N=3)	100% (6/6)	83% (5/6)
5-yrs (N=8)	100% (16/16)	100% (16/16)
6-yrs (N=5)	100% (10/10)	100% (10/10)
7-yrs (N=4)	100% (8/8)	100% (8/8)
Total (N=20)	100% (40/40)	98% (39/40)

As the table above shows, almost all children understood the productive causative sentences and distinguished them from the benefactive sentences. Even at the age of four, the children correctly accepted the productive causatives when they matched the scenarios and rejected them when the two arguments were reversed. Only one 4-year-old child gave a wrong answer to a causative sentence which should have been rejected according to the scenario. Overall, we can conclude from the results that the children had acquired the productive causative affix *-(s)ase* and had knowledge of the theta-roles of each argument in the sentences by the age of four.

3.4.2 Condition 2: Semantic Difference

We now need to confirm whether or not the children know the semantic difference between the lexical causative with *kabuse-ru* 'put on' and the productive causative *kabur-*

ase-ru 'make someone put on.' Recall that the lexical causative exclusively expresses direct causation, while the productive causative typically denotes indirect causation.

Design

A sample scenario depicting indirect causation was prepared, in which *a pig orders a bear to put a hat on, the bear refuses at first, and at last the bear puts the hat on by himself*. As we observed in section 2.2.2, the lexical causative cannot be used in this situation. Only the productive causative can be used in this case. The sample test sentences used in this condition are given in (13) and (14).

(13) Productive causative

Buta-wa kuma-ni bousi-o kabur-ase-ta.
pig-TOP bear-DAT hat-ACC put.on-CAUS-PAST
'The pig made the bear put the hat on.'

(14) Lexical causative

Buta-wa kuma-ni bousi-o kabuse-ta.
pig-TOP bear-DAT hat-ACC put.on-PAST
'The pig put the hat on the bear.'

We tested if the children knew that the productive causative in (13) is correct, whereas the lexical causative in (14) is wrong in this case.²⁶

Results

The results of this condition are shown in Table 3.2.

²⁶ I did not use a scenario depicting "direct causation" to test whether the children would be able to tell that the lexical causative is used for the "direct causation." Although it is true that the productive causatives are *typically* used in situations of the "indirect causation", they can be used in the "direct causation" as well: the productive causative in (13) is not unnatural in a situation where a pig directly puts a hat on a bear. Therefore, it should be noted that the lexical causative and the productive causative are not complementary in this sense.

Table 3.2. Correct responses for productive and lexical causatives for "indirect causation"

	Productive causative TRUE	Lexical causative FALSE
4-yrs (N=3)	100% (3/3)	33% (1/3)
5-yrs (N=8)	100% (8/8)	63% (5/8)
6-yrs (N=5)	100% (5/5)	100% (5/5)
7-yrs (N=4)	100% (4/4)	100% (4/4)
Total (N=20)	100% (20/20)	75% (15/20)

As Table 3.2 shows, two 4-year-olds and three 5-year-olds did not reject the lexical causative in (14). In other words, these five children wrongly accepted both of the sentences. The responses by these five children are therefore eliminated from the results of further sessions of the experiment.²⁷ The other 15 children correctly distinguished the productive causative *kabur-ase-* 'make someone put on' from the lexical causative *kabuse-* 'put on.' More specifically, they understood that the lexical causative in (14) cannot be used in the "indirect causation" case, while the productive causative in (13) is grammatical. Since the only difference between the sentences in (13) and (14) is the form of the verb, the results of this condition tell us that these 15 children already knew the semantic difference between the two causatives. We will examine the responses of these 15 children in the following conditions.

3.4.3 Condition 3: Lexical knowledge of *zibun* 'self'

In the third condition, we examined children's knowledge of the anaphor *zibun* 'self.' I was interested in particular in the children's knowledge of the subject-oriented property

²⁷ Note that one 4-year-old child who gave one wrong answer in the previous condition was included in these five children.

of *zibun* 'self.' Recall that *zibun* 'self' must always be bound by a subject. We saw in the previous section describing the study by Otsu (1997) that children even at the age of three knew that *zibun* 'self' cannot be bound by non-subject NPs and rejected the lexical causative sentence with *mise-ru* 'show' when the indirect object is the intended antecedent of *zibun* 'self.'

Keeping Otsu's (1997) finding in mind, we now move on to the design of our present condition. In this condition, we will examine the children's comprehension of *zibun* 'self' in both simple sentences and complex sentences.

3.4.3.1 *Zibun* 'self' in Simple Sentence

First, we need to investigate whether the children know that only subjects can be an antecedent of *zibun* 'self.' In so doing, we will look at their comprehension of simple sentence with *zibun* 'self' in an adverbial phrase.

Design

A sample scenario used in this part can be summarized as follows:

A pig finds a big fried chicken. An elephant comes to him and says it is his fried chicken. The pig asks for the elephant's chicken. They eventually decide to eat it together.

A target sentence which followed the story above is given in (15) below.

- (15) Buta_i -wa zou_j -to issyoni zibun_{i/*j} -no furaidotikin-o tabe-ta.
 pig-TOP elephant-together self-GEN fried chicken-ACC eat-PAST
 'The pig ate self's fried chicken with the elephant.'

(*zibun* 'self' = pig, *elephant)

According to this particular scenario, the sentence in (15) is false: the reflexive pronoun *zibun* 'self' can be bound only by a subject, which is *the pig* in this sentence. In the scenario, however, the fried chicken is the elephant's, not the pig's. Hence, the sentence in (15) is wrong for the situation. The sentence (15) can denote solely a situation where the pig and the elephant eat the pig's fried chicken, which contradicts the scenario.

Results

Now we examine the results, which are summarized in Table 3.3 below.

Table 3.3. Correct responses for *zibun* in simple sentence

	Simple sentence (15) FALSE
4-yrs (N=1)	100% (1/1)
5-yrs (N=5)	100% (5/5)
6-yrs (N=5)	100% (5/5)
7-yrs (N=4)	100% (4/4)
Total (N=15)	100% (15/15)

As we can see from Table 3.3, all of the 15 children correctly rejected the target sentence in (15), indicating that they know that *zibun* 'self' cannot be bound by NPs in adjuncts.

However, we are not quite sure based only on this result whether the children have knowledge that *zibun* 'self' cannot be bound by any type of non-subject NPs. In other words, we should make sure in further experiments that they know that any argument NPs other than subjects cannot be antecedents of *zibun* 'self,' for example, dative-marked indirect objects, as Otsu (1997) tested in his experimental study.

3.4.3.2 *Zibun* 'self' in Complex Sentence

Besides the confirmation of the children's knowledge that *zibun* 'self' cannot be bound by non-subject NPs, it was necessary to examine whether children would allow *zibun* 'self' to take any subject as antecedent, in particular both matrix and embedded subjects of a complex sentence with a finite embedded clause, which undoubtedly has a bi-clausal structure. For later comparison, five adults were also tested in this condition using the same experimental method.

Design

A target sentence is given in (16). It has a verb *it-ta* 'said' in the matrix clause, and it has another verb *tabechat-ta* 'ate up' in the embedded clause. There is no doubt that the sentence has a bi-clausal structure. *It-ta* 'said' takes a CP complement, headed by a complementizer *to* 'that.'

- (16) Buta_i -wa [usagi_j -ga zibun_{i/j} -no ringo-o tabechat-ta] to it-ta.
pig-TOP rabbit-NOM self-GEN apple-ACC eat up-PAST COMP say-PAST
'The pig said that the rabbit ate up self's apple.'
(*zibun* 'self' = pig, rabbit)

As such, the sentence (16) is ambiguous as to who is the possessor of the apple. Both the matrix subject, *the pig*, and the embedded subject, *the rabbit*, are possible antecedents of *zibun* 'self.' In order to examine whether the children allow two interpretations for the sentence in (16), two scenarios were prepared: scenario (A) in which a rabbit ate a *pig's* apple, and the other scenario (B) in which a rabbit ate a *rabbit's* apple. In both scenarios, the pig says to the rabbit at the end of each story, "You ate up the apple!" Since *the rabbit*

and *the pig* in (16) are both possible antecedents of *zibun* 'self,' the complex sentence in (16) can describe either scenario. If the children know that two subjects are involved in the sentence and that both of them can be antecedents of *zibun* 'self,' we would expect them to accept the target sentence in both cases.

Results

The results are shown in Table 3.4.

Table 3.4. Correct responses for *zibun* in complex sentence

	Matrix subj (A) TRUE	Embedded subj (B) TRUE
4-yrs (N=1)	100% (1/1)	100% (1/1)
5-yrs (N=5)	0% (0/5)	80% (4/5)
6-yrs (N=5)	40% (2/5)	40% (2/5)
7-yrs (N=4)	75% (3/4)	75% (3/4)
Total (N=15)	40% (6/15)	67% (10/15)
Adults (N=5)	80% (4/5)	80% (4/5)

Only 6 children out of 15 (40%) accepted the sentence in the case of long-distance binding in scenario (A). On the other hand, 67% of them accepted the same sentence for scenario (B). In order to see how many children accepted both matrix subject and embedded subject, only matrix subject, only embedded subject, and neither of them within each age group, let us look at Table 3.5 below.

Table 3.5. Breakdowns of responses to complex sentences

	Both	Only Matrix	Only Embedded	Neither
4-yrs (N=1)	1	0	0	0
5-yrs (N=5)	0	0	4	1
6-yrs (N=5)	2	0	0	3
7-yrs (N=4)	3	0	0	1
Total (N=15)	6	0	4	5
Adults (N=5)	4	0	0	1

The table shows that there were 6 children (out of 15), as well as 4 adults (out of 5), who correctly accepted both matrix and embedded subjects as antecedent to *zibun* 'self.' There were, however, no children who accepted only the matrix subject. There were also 4 children who allowed only the embedded subject. They were all 5-year-old children. It seems that for these children, only local binding was possible. In addition, there were 5 children who judged both cases as false, disallowing both the matrix and the embedded subjects as antecedent of *zibun* 'self' (but see below).

However, the results are not conclusive. First, there was only one 4-year-old tested in this session, who accepted the sentence in both cases. Second, there was a methodological problem: at least two children seemed to take the sentence as a "direct quotation," and rejected the sentence in both cases because they found that the sentence the puppet said ("the rabbit ate up self's apple!") was not *exactly* the same as what the pig said in the stories ("you ate up the apple!"). We should have used a true bridge verb such as "think" or "consider" in this condition to avoid this problem. It is therefore possible that the poor choice of verb was partially responsible for their low acceptance of the sentence. Comprehension of complex sentences with a finite embedded clause like those

used above was also examined in Experiment IV, but this time a different main verb was selected. We will examine the results of the experiment in section 4.4 of the next chapter.

3.4.4 Structural difference

Now we move on to the third and last session of the experiment. This part of the experiment tested whether the children knew the structural difference between the lexical and the productive causatives. In particular, we look at antecedent possibilities for *zibun* 'self' with two causatives.

Design

The target sentences of each type of causative used in this session are given in (17) and (18).

(17) Lexical causative

Buta _i -wa	kuma _j -ni	zibun _{i/*j} -no	bousi-o	kabuse-ta.
pig-TOP	bear-DAT	self-GEN	hat-ACC	put.on-PAST
'The pig put self's hat on the bear.'				(<i>zibun</i> 'self' = pig, *bear)

(18) Productive causative

Buta _i -wa	kuma _j -ni	zibun _{i/j} -no	bousi-o	kabur-ase-ta.
pig-TOP	bear-DAT	self-GEN	hat-ACC	put.on-CAUS-PAST
'The pig made the bear put self's hat on.'				(<i>zibun</i> 'self' = pig, bear)

Recall that the lexical causative in (17) is unambiguous, while the productive causative in (18) is ambiguous. In other words, *zibun* 'self' in (17) can be bound only by the subject, *the pig*, whereas that in (18) can be bound either the matrix subject, *the pig*, or the embedded subject, *the bear*.

We investigated whether the children allowed only one reading for the lexical causative in (17) and two readings for the productive causative in (18). If the children correctly assign a mono-clausal structure to the lexical causative, we would expect them to allow only one reading in which the subject, the pig, is the antecedent for *zibun* 'self.' If, on the other hand, they correctly assign a bi-clausal structure (i.e. two logical subjects in the sentence) to the productive causative, we predict that they would allow *zibun* 'self' to be bound by both the matrix and the embedded subjects. Also, if they treat the productive causative in exactly the same way as the complex sentence with a finite embedded clause, we would also expect them to have a preference for the local antecedent over the long-distance one.

A total of four scenarios were prepared. Two of them, (A) and (B), correspond to the lexical causative in (17), and the other two, (C) and (D) to the productive causative in (18). Each scenario has a similar beginning: a pig and a bear have their own hats. The pig wants the bear to put on a hat, but the bear won't do it. They differ in how the bear ends up having a hat on his head. A summary of each scenario is given in (19).

(19)

Lexical causative:

- | | |
|--|--------|
| Scenario A: <u>The pig</u> put the <u>pig's</u> hat on the bear. | -TRUE |
| Scenario B: The pig put the <u>bear's</u> hat on <u>the bear</u> . | -FALSE |

Productive causative:

- | | |
|--|-------|
| Scenario C: <u>The pig</u> made the bear put the <u>pig's</u> hat on. | -TRUE |
| Scenario D: The pig made <u>the bear</u> put the <u>bear's</u> hat on. | -TRUE |

In scenario A, the pig puts the pig's hat on the bear. The target lexical causative sentence in (17) correctly depicts the situation in this case. In scenario B, on the other hand, the pig

puts the bear's hat on the bear, rendering the same sentence wrong, because *zibun* 'self' cannot be bound by the indirect object NP. As for the scenarios corresponding to the productive causative, the sentence in (18) is true regardless of the possessor of the hat, because both the matrix subject, *the pig*, and the embedded subject, *the bear*, can potentially be an antecedent of *zibun* 'self.'

The followings are sample scenarios for each type.

Scenario A:

A pig was playing in the park, with his orange hat on his head. Here comes a bear. The bear has his hat in his hand. The pig asked the bear, "Why don't you put the hat on?" The bear said, "I don't want to." "But you had better put on a hat on such a sunny day", said the pig. The bear won't put his hat on. The pig now came up with a good idea, and he did like this (the pig puts his own orange hat on the bear.) The bear now has the pig's hat on his head and the bear's hat in his hand.

Scenario B:

A pig was playing in the park, with his orange hat on his head. Here comes a bear. The bear has his hat in his hand. The pig asked the bear, "Why don't you put the hat on?" The bear said, "I don't want to." "But you had better put on a hat on such a sunny day", said the pig. The bear won't put his hat on. The pig now came up with a good idea, and he did like this (The pig picks up the bear's hat and puts it on the bear's head.) And the bear now has the bear's hat on his head.

Scenario C:

A pig was playing in the park, with his orange hat on his head. Here comes a bear. The bear has his own hat in his hand. The pig asked the bear, "Why don't you put the hat on?" The bear said, "I don't want to." "But you had better put a hat on", said the pig. The bear won't do so. The pig tried to persuade him, but it was not easy. At last, the pig screamed, "Put this hat on!" And the pig picks up his own hat and gives it to the bear. The bear said, "Umm...I don't want to put on this hat, either." The pig said again, "Put the hat on!" The bear reluctantly put on the hat. The bear now has the pig's hat on his head and bear's hat in his hand.

Scenario D:

A pig was playing in the park, with his orange hat on his head. Here comes a bear. The bear has his own hat in his hand. The pig asked the bear, "Why don't you put the hat on?" The bear said, "I don't want to." "But you had better put a hat on", said the pig. The bear won't do so. The pig tried to persuade him, but it was not easy. At last, the pig screamed, "Put this hat on!" And the pig points at the bear's

hat. The bear said, "Umm...I don't want to put on this hat. I hate this hat." The pig said again, "Put the hat on!" The bear reluctantly put on the hat. The bear now has the bear's own hat on his head.

Results

Let us look at the results of this session. First, Table 3.6 shows the correct response rates for the lexical causative in (17).

Table 3.6. Correct responses for lexical causative

	Subject (A) TRUE	Indirect object (B) FALSE
4-yrs (N=1)	100% (1/1)	100% (1/1)
5-yrs (N=5)	80% (4/5)	100% (5/5)
6-yrs (N=5)	100% (5/5)	100% (5/5)
7-yrs (N=4)	100% (4/4)	100% (4/4)
Total (N=15)	93% (14/15)	100% (15/15)
Adults (N=5)	100% (5/5)	100% (5/5)

Most of the children correctly accepted the sentence when given a scenario in which *zibun* 'self' was bound by the subject. They also correctly rejected the sentence when *zibun* 'self' was bound by the dative case-marked NP in the scenario. This result replicates the results of session 2 in which the children knew that the reflexive pronoun *zibun* 'self' could not be bound by NPs other than a subject.

As for the productive causative, Table 3.7 on the next page shows the results.

Table 3.7. Correct responses for productive causative

	Matrix subj. (C) TRUE	Embedded subj. (D) TRUE
4-yrs (N=1)	100% (1/1)	0% (0/1)
5-yrs (N=5)	100% (5/5)	0% (0/5)
6-yrs (N=5)	100% (5/5)	20% (1/5)
7-yrs (N=4)	75% (3/4)	0% (0/4)
Total (N=15)	93% (14/15)	6.7% (1/15)
Adults (N=5)	100% (5/5)	80% (4/5)

As is shown in the left-hand column, all of the children except one 7-year-old child correctly accepted the productive causative sentence with *zibun* 'self' bound by the matrix subject. On the other hand, the percentages of the correct responses in the right-hand column show that they failed to accept the sentence in the local antecedent case, that is when the pig, the matrix subject, makes the bear, the embedded subject, put the bear's hat on. In this case they rejected the sentence over 90% of the time, though it is acceptable in adult grammar. In other words, the children generally did not allow *zibun* 'self' in the productive causative to be bound by the embedded subject, which contrasts with the results of complex sentences with finite embedded clause given in Table 4 in condition 3.

3.4.5 Discussion

Now I would like to discuss what the results of Experiment I tell us about children's acquisition of the causative constructions. I will also point out some shortcomings of the experiment and how the methodology was revised in the subsequent experiment.

Condition 1 revealed that children had already understood the productive causative affix *-(s)ase* by the age of 4. They correctly rejected false statements when the causer and

the causee were reversed and distinguished them from the ditransitive sentences. They knew that the nominative-marked subject is the causer and that the causee is marked with dative in the productive causative. Condition 2 showed that 15 children out of 20 also knew the semantic difference between the productive and the lexical causatives: they correctly judged that the lexical causative verb *kabuse-* 'put on' is unacceptable in the indirect causation situation. Murasugi et al. (2004) argued that children do not produce productive causatives with an agentive causee until around 5 (cf. section 3.2). Yet our finding in this experiment has provided empirical evidence that children as young as 4 correctly comprehended such productive causatives.

The children's knowledge of *zibun* 'self' was also examined in condition 3. The children who passed the previous two conditions also showed adult-like performance with respect to its subject-orientation. They rejected the sentence when a NP in an adjunct was the antecedent of *zibun* 'self.' However, this result is not sufficient to show that they know that only subjects can be an antecedent of *zibun* 'self,' for we did not examine whether the children would reject sentences when *zibun* 'self' is bound by other non-subject NPs. In the next experiment, we test whether children reject sentences when *zibun* 'self' is bound by object NPs or indirect object NPs.

We further tested the children's knowledge of long-distance binding of *zibun* 'self' in section 3.4.3.2, by testing their comprehension of complex sentences with a finite embedded clause which undoubtedly contain two clauses, hence two subjects. A total of 6 children out of 15 (40%) accepted the sentence when the long-distance matrix subject is the antecedent, and 10 children (67%) did so when the local embedded subject is the

antecedent. We have already pointed out several problems with this condition. Besides the limited number of subjects tested in this experiment, the pattern of responses for the complex sentence poses a major problem: overall correct responses were only 40% and 67% respectively, based on which we cannot clearly claim that the children had two distinct interpretations for the sentence. Although the result here is far from conclusive, we at least observe one trend: the children showed better performance on the local embedded subject than the long-distance matrix subject. To be confident of this result, we did a follow up experiment with children and also adults (see chapter 4, section 4.4).

Finally, let us consider what the results of the last condition tell us about children's knowledge of the two different types of causatives. As we observed in section 3.4.5, all 15 children correctly judged that the lexical causative sentence is unacceptable when *zibun* 'self' referred to the dative-marked indirect object NP. This result replicates Otsu's (1997) finding that young children know the subject orientation of *zibun* 'self.' As for the productive causative, we have seen the result that most of the children (14 out of 15) did not allow the embedded subject of the productive causative as antecedent to *zibun* 'self.' One interpretation of this result is that they are treating the productive causative just like the lexical causative, assigning a mono-clausal structure even to the productive causative. In this respect, our finding seems to be compatible with Murasugi et al.'s (2004) claim that children first acquire causatives with mono-clausal structure.

However, we cannot ignore the possibility that even a child who had a bi-clausal structure might nevertheless reject the productive causative sentence with *zibun* 'self' bound by the embedded subject. For example, suppose that the early grammar allows

zibun 'self' to be bound only by an NP with a *-ga* nominative case marker. Even if the child does assign a bi-clausal structure to the productive causative, this child would reject the sentence just because the embedded subject is not case-marked with *-ga* but the dative *-ni*. Thus, we cannot simply conclude that a child does not have a bi-clausal structure from mere observation that the child rejected the sentence. Therefore, we will reexamine whether children indeed do not assign bi-clausal structure to the productive causative, modifying problematic aspects of the methodology and using items in addition to *zibun* 'self' to probe the bi-clausal structure; subject-oriented adverbs.

As for the general shortcomings of the current experiment, we also need to test a larger number of children. For instance, we cannot reach a solid conclusion testing only a few children per each age group. A further issue is that only one pair of verbs (*kabuse-* 'put on' and *kabur-ase-* 'make someone put on') was used in this experiment. Additional verbs must be tested to ensure that the findings in this experiment were not influenced by verb choice.

Lastly, it seems necessary to modify or change the way of presenting scenarios. In this experiment, I adopted the Truth Value Judgment Task and manipulated stuffed animals and props to present scenarios. However, it turned out that manipulating stuffed animals with the experimenter's hands was not suitable for the actions we would like to illustrate. For example, when we intended to present a story in which a pig forced a bear to put a hat on (indirect causation), it was hard to make it clear that the pig was not involved in the action of putting the hat on and the bear put the hat on all by himself,

because it was in fact the experimenter's hand that brought about this action. Thus, in the further experiments, I adopted picture-story shows instead of manipulating toys.

3.5 Experiment II: Causatives with *mise-* 'show' and *mi-sase-* 'make someone look at'

In this section, I discuss a second experiment on children's comprehension of the lexical and the productive causatives. In particular, we will examine whether children have knowledge of both the semantic and the structural differences between the two types of causatives as in Experiment I. In this experiment, however, several changes were made to correct the shortcomings pointed out in the previous sections.

Subjects

30 mono-lingual Japanese children participated. They attended day-care centers in the Tokyo area.²⁸ The subject information is given in (20).

(20) Subjects (N=30)

4-year-olds: N=10 (age=4;0-4;10, mean=4;7)

5-year-olds: N=11 (age=5;2-5;11, mean=5;6)

6-year-olds: N=9 (age=6;0-6;11, mean=6;5)

Method

A slightly different and elaborated version of the Truth Value Judgment Task was adopted in order to make scenarios clearer. Children were presented a series of short picture-story shows. Each short story was followed by a test sentence audio-played on the

²⁸ Originally, a total of 35 children were tested. However, four of them either showed yes-bias or could not complete the task. Thus, the responses by those children will not be reported in this thesis.

computer uttered by a puppet, Kermit the Frog, shown on the computer screen.²⁹ The children were asked to judge whether the puppet's utterance was true or false according to the scenario they had just watched. The children were tested individually in a quiet room, and their responses were audio-recorded for further analyses.

Many experimental studies on children's language acquisition have adopted the Truth Value Judgment Task (Gordon 1996, Crain and Thornton 1998, among others). The task confers many advantages: we can probe complex grammatical phenomena in young children that cannot be found in their natural speech. We can test sentences that have multiple potential interpretations. We can control the discourse context in which a test sentence is judged. However, the task requires great care in its use and interpretation. Conroy et al. (2006) point out two specific assumptions that must be satisfied, arguing on a long-standing finding in the acquisition of anaphora that children behave poorly on Principle B (Chien and Wexler 1990, Reinhart 1983, among others). One such assumption is that both interpretations of a scenario must be equally salient: if a child has any reason independent of a target grammatical knowledge, such as a difference in saliency, that prevents him from assessing an interpretation, the logic of the Truth Value Judgment Task fails. The other assumption is the condition of "plausible denial": the scenario requires that a target interpretation be accessible, and should provide a clear motivation for its denial at some point in the scenario, if it turns out to be false.

²⁹ The reason for using the prerecorded stimulus sentences is that each child should hear the same sentence with same speed and same intonation. We could not guarantee that the stimuli are exactly the same for every child if an experimenter had uttered the stimuli while manipulating the puppet.

Although Conroy et al. (2006) discuss these issues in the context of acquisition of Principle B, similar lessons apply to any experimental study using the Truth Value Judgment Task. Thus, following their guidelines, scenarios for this experiment were carefully constructed to satisfy the two assumptions. First, every character that appears in scenarios and events that are brought about by the characters were made equal in saliency, so that we can prevent one interpretation from being easier to access than the other. As for the condition of plausible denial, we made one of the interpretations in question come up as a possibility at some point of the scenario even though it was not borne out ultimately, so that a child is able to judge that the sentence is false under that interpretation.

The experiment included four conditions, each of which will be reported in detail in the following sections. The first condition tested whether children had knowledge of the productive causative affix *-(s)ase* in their grammar. In the second condition, their knowledge of the semantic difference between the two causatives was examined. The third condition tested their knowledge of the subject-oriented property of *zibun* 'self' and PRO-control adverbials. In section 3.5.5, we will look at results of the last condition which directly tested their knowledge of the structural difference between the two.

3.5.1 Condition 1: Acquisition of *-(s)ase*

In Condition 1, we examined children's comprehension of the productive causative with the morpheme *-(s)ase*, by comparing it to that of benefactive sentences.

Design

A sample scenario used in this condition is summarized as follows:

A pig found an apple on a tree, and asked a bear to pick it up and bring it to him. The bear said, "All right...well, the tree is higher than I thought. I don't think I can do this." The bear would not do so. The bear even said to the pig, "You should climb up the tree for yourself!" The pig said, "I can't!" After a while, the pig finally screamed, "Take that apple for me!" The bear then reluctantly climbed the tree and brought the apple to the pig.³⁰

After the story was presented to a child, the puppet said one of the test sentences in (21) and (22) below to the child. The sentences in (21) are benefactives, one of which matches the scenario and the other does not, and those in (22) are matching and mismatching productive causatives. Note that the benefactives in (21) have a similar case-marking pattern and a similar structure to the productive causative in (22), which differs only in the specific suffixed morpheme; *-(s)ase* vs. *-age*.

(21) Benefactives

- | | | | | | |
|----|--|----------|-----------|---------------|--------|
| a. | Kuma-ga | buta-ni | ringo-o | totte-age-ta. | |
| | bear-NOM | pig-DAT | apple-ACC | take-BEN-PAST | |
| | 'The bear took the apple for the pig.' | | | | -TRUE |
| b. | Buta-ga | kuma-ni | ringo-o | totte-age-ta. | |
| | pig-NOM | bear-DAT | apple-ACC | take-BEN-PAST | |
| | 'The pig took the apple for the bear.' | | | | -FALSE |

(22) Productive causatives

- | | | | | | |
|----|---|---------|-----------|----------------|--------|
| a. | Kuma-ga | buta-ni | ringo-o | tor-ase-ta. | |
| | bear-NOM | pig-DAT | apple-ACC | take-CAUS-PAST | |
| | 'The bear made the pig take the apple.' | | | | -FALSE |

³⁰ In order to satisfy the plausible dissent requirement in the scenario, the bear first tried to pick up the apple but denied, saying that the pig should pick it up by himself. Yet, eventually the bear climbed up the tree to pick up the apple. Inserting this episode in the scenario makes it natural to reject sentences if the stimulus sentence does not match the scenario.

- b. Buta-ga kuma-ni ringo-o tor-ase-ta.
 pig-NOM bear-DAT apple-ACC take-CAUS-PAST
 'The pig made the bear take the apple.' -TRUE

In this particular scenario, (21a) is true and (21b) is false, while (22a) is false and (22b) is true.³¹ If the children have already acquired the causative morpheme, we would expect them to correctly distinguish the productive causatives from the benefactive sentences.

Results

Children's correct responses to both benefactives and productive causatives are shown in Table 3.8.

Table 3.8. Correct responses for benefactives and productive causatives

	Benefactives	Productive causatives
4-year-olds (N=10)	100% (20/20)	85% (17/20)
5-year-olds (N=11)	100% (22/22)	91% (19/21) ³²
6-year-olds (N=9)	100% (18/18)	100% (18/18)
Total (N=30)	100% (60/60)	92% (54/59)

Most of the children understood the causatives and distinguished them from the benefactives. There were three 4-year-olds and one 5-year-old who gave a wrong answer for the causatives which should have been rejected. Overall, however, even the 4-year-olds (7 children out of 10) correctly accepted the productive causative and correctly rejected it when the two arguments were reversed.

³¹ Combinations of animal characters used in these scenarios in the actual experiment were different from each other. Children never saw the same combination of animals in the scenarios.

³² I could not obtain a clear answer from one 5-year-old child. This is the reason why the number of total responses is 21 instead of 22.

3.5.2 Condition 2: Semantic Difference

Now let us look at Condition 2. Before examining whether the children assign a bi-clausal structure to the productive causative and a mono-clausal structure to the lexical causative, we need to confirm whether or not the children understand the semantic difference between the lexical and the productive causative verbs which we will use in test sentences in further conditions; *mise-ru* 'show' and *mi-sase-ru* 'make someone look at'.³³ Recall that the lexical causative expresses direct causation, whereas the productive causative generally denotes indirect causation. In Experiment I, we did not examine whether children accept the lexical causative in the case of direct causation. In this experiment, however, we tested whether they would accept the lexical causative sentence in a direct causation situation and reject it when a scenario depicted an indirect causation situation. The reason why we did not test their interpretation of the productive causative is that the productive causative verb *mi-sase-ru* 'make someone look at' could be used even in the direct causation case, though it typically denotes indirect causation. Thus, their interpretation of the productive causative would not give us any clear result.

Design

Two scenarios were prepared, each of which is given below.

³³ As I mentioned earlier, there is only a small group of verb stems that can appear both in the lexical and in the productive causative. Among such verbs, there are only a few pairs of lexical/productive causatives that share the same case-marking pattern. One such pair was that used in Experiment I: *kabuse-* 'put on' and *kabur-ase-* 'make someone put on.' The pair adopted in this experiment, *mise-ru* 'show' and *mi-sase-ru* 'make someone look at,' also belongs to this type. And importantly, the verbs should be familiar to young children. This is the reason why I chose this pair of causative verbs.

Scenario (A-direct causation): *A pig shows a bear the inside of a basket.*
 Scenario (B-indirect causation): *A pig makes a bear look at the inside of a basket.*

The lexical causative in (23) below can only be used for the 'direct causation' scenario (A) and not for the 'indirect causation' scenario (B).

(23) Buta-ga kuma-ni kago-no naka-o mise-ta.
 pig-NOM bear-DAT basket-GEN inside-ACC show-PAST
 'The pig showed the inside of the basket to the bear.'

Results

The results are shown in Table 3.9.

Table 3.9. Correct responses for 'direct causation' vs. 'indirect causation'

	Direct causation (A)-TRUE	Indirect causation (B)-FALSE
4-year-olds (N=10)	100% (10/10)	80% (8/10)
5-year-olds (N=11)	100% (11/11)	100% (11/11)
6-year-olds (N=9)	100% (9/9)	78% (7/9)
Total (N=30)	100% (30/30)	87% (26/30)

Most of the children, except two 4-year-olds and two 6-year-olds, correctly accepted the test sentence in (23) in 'direct causation' case and correctly rejected it in 'indirect causation' case. The other four children accepted the test sentence in both cases, suggesting that they did not know that the lexical causative cannot be used for the indirect causation situation.

3.5.3 Condition 3: Subject-Orientation of *Zibun* 'self' and Adverbial

Condition 3 examined the children's acquisition of the subject-oriented property of both the reflexive pronoun *zibun* 'self' and subject-oriented adverbial phrases which are

assumed to include PRO controlled by a subject. We first examine children's knowledge of *zibun* 'self' in section 3.5.3.1, which is followed by a section on the subject-orientation of PRO-control adverbial phrases.

3.5.3.1 Subject-Orientation of *Zibun* 'self'

Design

The scenarios used in this condition are as follows:

Scenario (A): *The pig had both the pig's and the bear's umbrella. The pig almost gave the bear's umbrella back to the bear when the bear asked the pig to give it back to him. But the pig gave the pig's umbrella to the bear instead.*

Scenario (B): *The pig had both the pig's and the bear's umbrella. The pig almost let the bear use the pig's umbrella, but the pig decided not to do so and gave the bear's umbrella back to the bear.*

The test sentence given in (24) below is a mono-clausal ditransitive sentence, and it cannot be used in the situation depicted by the scenario (B), because only the subject *the pig* can be an antecedent of *zibun* 'self.'

(24) Buta_i-ga kuma_j-ni zibun_{i/*j}-no kasa-o watasi-ta.
 pig-NOM bear-DAT self-GEN umbrella-ACC hand-PAST
 'The pig handed self's umbrella to the bear.' (zibun 'self' = pig, *bear)

We tested whether the children judged the test sentence in (24) as appropriate only for the scenario (A) and not for (B).

Results

Table 3.10 shows the results of this condition.

Table 3.10. Correct responses for ditransitive sentence with *zibun*

	Subject (A)-TRUE	Indirect obj (B)-FALSE
4-year-olds (N=10)	100% (10/10)	90% (9/10)
5-year-olds (N=11)	100% (11/11)	91% (10/11)
6-year-olds (N=9)	100% (9/9)	100% (9/9)
Total (N=30)	100% (30/30)	93% (28/30)

Almost all the children, except one 4-year-old and one 5-year-old, accepted the sentence in (24) when the antecedent of *zibun* 'self' was the subject *the pig*, and rejected it when the antecedent was dative-marked NP *the bear*. The results indicate that most children knew that *zibun* 'self' cannot be bound by a NP other than a subject, which is compatible with the result obtained in Otsu (1997): we have replicated the previous finding of children's early acquisition of subject-oriented property of Japanese reflexive pronoun *zibun* 'self' in Experiment I.

3.5.3.2 Subject-Orientation of Adverbial

Design

The target test sentence is again a ditransitive sentence with PRO-control adverbial phrase, which is given in (25).

- (25) Buta_i-ga kuma_j-ni [PRO_{i/*j} hasi-o watatte] ringo-o age-ta.
 pig-NOM bear-DAT bridge-ACC crossing apple-ACC give-PAST
 'The pig gave the apple to the bear by/after crossing the bridge.'
 (The pig crossed the bridge. *The bear crossed the bridge.)

As indicated by the indices, only the subject, *the pig*, can control the PRO of the adverbial. The reading in which the referent of the dative-marked indirect object, *the bear*,

crossed the bridge is not possible. We tested whether the children knew that this sentence is unambiguous.

In order to test this, two scenarios were prepared for this condition, which are summarized as follows:

Scenario (A): *The pig crossed the bridge and gave the apple to the bear.*

Scenario (B): *The pig tried to cross the bridge to give the apple to the bear, but as the bridge is very high, he couldn't do so. So, the bear came to the pig, crossing the bridge so that the pig could give the apple to him.*

Given that PRO can be controlled only by the subject, the truth condition of the test sentence in (25) is true for scenario (A), whereas it is false when given scenario (B).

Results

The results are shown in Table 3.11 below.

Table 3.11. Correct responses for ditransitive sentence with adverbial

	Subject (A)-TRUE	Indirect obj (B)-FALSE
4-year-olds (N=10)	100% (10/10)	80% (8/10)
5-year-olds (N=11)	100% (11/11)	91% (10/11)
6-year-olds (N=9)	100% (9/9)	100% (9/9)
Total (N=30)	100% (30/30)	90% (27/30)

As the table shows, all of the children accepted the sentence when the scenario (A) was presented. As for the scenario (B), on the other hand, there were two 4-year-olds and one 5-year-old who did not reject the test sentence. Although their performance was not perfectly adult-like, most of the children have acquired the subject-orientation of PRO-

control adverbial by age of 5 and this is parallel to the acquisition of *zibun* 'self' which was examined above.

3.5.4 Subject Selection

Knowledge of the properties examined in Conditions 1, 2, and 3 were prerequisite for being analyzed in the further condition, though they finished the whole experiment. Thus, children who gave more than one wrong answer in these conditions were eliminated from further analyses. One 4-year-old and one 5-year-old ended up being eliminated. The 4-year-old child (4;7) exhibited yes-bias once the reflexive pronoun *zibun* 'self' or the adverbials were added to the test sentences. The 5-year-old child (5;8) seemed to treat the productive causatives in Experiment I just as the *age-ru* 'give' benefactive sentences and did not accept the productive sentence for the matching scenario and did not reject one for the mismatching scenario. He did not seem to acquire the knowledge of subject-orientation of *zibun* 'self' either.

The information about the children who passed this criterion is given in (26).

(26) Subjects (N=28)

4-year-olds: N=9 (age=4;0-4;10, mean=4;6)

5-year-olds: N=10 (age=5;2-5;11, mean=5;6)

6-year-olds: N=9 (age=6;0-6;11, mean=6;5)

In the following condition, we will deal with experimental data of these twenty-eight children. We also collected data from five adults³⁴ and will use their responses as control data.

³⁴ They were all undergraduate students at the University of Tokyo and they were not linguistic majors.

3.5.5 Condition 4: Structural Difference

Now we move on to Condition 4, which directly tested whether the children know the structural difference between the lexical and the productive causatives. In Experiment I, we observed that the children even at the age of 6 had trouble allowing the embedded dative-marked subject to be an antecedent of *zibun* 'self,' although they seemed to be able to semantically distinguish the lexical causative from the productive one. In this current experiment, we now investigate whether a similar acquisition pattern is observed with a different pair of verbs. Also, we look at their interpretation of the two types of causatives not only with *zibun* 'self,' but also with subject-oriented adverbs. We will first consider the experimental results of the causatives with *zibun* 'self' (section 3.5.5.1), followed by examination of results of those with adverbs (section 3.5.5.2).

3.5.5.1 Causatives with *Zibun* 'self'

Examples of the lexical and the productive causatives with *zibun* 'self' are given in (27) and (28) respectively.

- (27) Buta_i -ga kuma_j -ni zibun_{i/*j} -no hon-o mise-ta.
pig-NOM bear-DAT self-GEN book-ACC show-PAST
'The pig showed self's book to the bear.'

(*zibun* 'self' = pig, *bear)

- (28) Buta_i -ga kuma_j -ni zibun_{i/j} -no hon-o mi-sase-ta.
pig-NOM bear-DAT self-GEN book-ACC look.at-CAUS-PAST
'The pig made the bear look at self's book.'

(*zibun* 'self' = pig, bear)

Recall that the lexical causative in (27) is unambiguous, while the productive causative in (28) is ambiguous: only *pig* can be an antecedent in the lexical causative, whereas both *pig* and *bear* are possible antecedents. We investigated whether the children allowed only one reading for the lexical causative in (27) and two readings for the productive causative in (28).

Design

A total of five scenarios were prepared. Simplified sample scenarios are given in (29).³⁵ In Experiment I, we did not include the final scenario (E) whose truth condition is false. However, it was necessary to test whether a child could reject the productive causative sentence when the referent existed outside of the sentence. Otherwise, there would be no scenario according to which the productive causative is judged to be a false statement.

In all scenarios, a pig has a book and a bear has one as well.

(29) Lexical causative with *zibun* in (27):

- (A) The pig shows the *pig's* book to the bear. -TRUE
- (B) The pig shows the *bear's* book to the bear. -FALSE

Productive causative with *zibun* in (28):

- (C) The pig makes the bear look at the *pig's* book. -TRUE
- (D) The pig makes the bear look at the *bear's* book. -TRUE
- (E) The pig makes the bear look at *someone else's* book. -FALSE

³⁵ The actual pictures used in this condition are given in Appendix 1 in section 3.7, along with the stories uttered by an experimenter.

In scenario (A), the pig shows the pig's book to the bear. The lexical causative in (27) correctly depicts the situation in this case. In scenario (B), on the other hand, the pig shows the bear's book to the bear, rendering the same sentence wrong, because *zibun* 'self' cannot be bound by the dative marked NP. The productive causative in (28) is true in both (C) and (D) cases, because both the matrix subject and the embedded subject can potentially be an antecedent of *zibun* 'self.' When the pig makes the bear look at someone else's book as in scenario (E), the sentence is false.

Results

Let us look at the results of this condition. First, Table 3.12 shows the children's responses for the lexical causative in (27). The left-hand column shows the number of children who accepted the sentence in the (A) case, while the right-hand column the number of children who rejected it for (B) scenario.

Table 3.12. Correct responses for lexical causative with *zibun*

	Subject (A)-TRUE	Indirect obj (B)-FALSE
4-yrs (N=9)	100% (9/9)	89% (8/9)
5-yrs (N=10)	100% (10/10)	90% (9/10)
6-yrs (N=9)	100% (9/9)	100% (9/9)
Total (N=28)	100% (28/28)	93% (26/28)
Adults (N=5)	100% (5/5)	100% (5/5)

All of the children correctly accepted the lexical causative in (27) when *zibun* 'self' referred to the subject, and most of them (except one 4-year-old) correctly rejected it when *zibun* 'self' referred to the dative marked NP. Again, this result replicates our

previous finding about children's early acquisition of subject-orientation of *zibun* 'self' (cf. section 3.4.3).

Table 3.13 shows the results of the productive causative in (28).

Table 3.13. Correct responses for productive causative with *zibun*

	Matrix subj (C)-TRUE	Embedded subj (D)-TRUE	Someone else (E)-FALSE
4-yrs (N=9)	100% (9/9)	22% (2/9)	100% (9/9)
5-yrs (N=10)	100% (10/10)	30% (3/10)	100% (10/10)
6-yrs (N=9)	100% (9/9)	33% (3/9)	100% (9/9)
Total (N=28)	100% (28/28)	29% (8/28)	100% (28/28)
Adults (N=5)	100% (5/5)	80% (4/5)	100% (5/5)

As we see in the left-hand column, all the children again correctly accepted the test sentence with *zibun* 'self' bound by the matrix subject. Also, they correctly rejected the sentence when the intended antecedent of *zibun* 'self' in the scenario was not an argument of the sentence. On the other hand, the low number of correct responses shown in the middle column shows us that the children again failed to accept the productive causative when *zibun* 'self' referred to the embedded subject. Only 8 children out of 28 (29%) accepted the productive causative. We should also note that one adult also rejected the sentence, implying that the children's poor performance on the productive causative with *zibun* 'self' bound by the embedded subject might be unrelated to their grammar itself. Some other factors might have been affecting their responses for the embedded subject.

Again, our finding in this part of the experiment replicates our previous finding that children as old as 6 have trouble accepting the embedded subject as an antecedent of *zibun* 'self,' even when we used different verbs. In sum, although we saw in the previous conditions that the children know that *zibun* 'self' is subject-oriented, the results in Table

13 suggest that they were not treating the embedded subject of the productive causative as a potential antecedent of *zibun* 'self.'

3.5.5.2 Causatives with Adverbial

We now turn to the test of children's interpretation of the two types of causatives with subject-oriented adverbials containing PRO.

Design

Examples of each sentence used in the current condition are given in (30) and (31).

(30) Lexical causative with adverbial

Buta_i -ga kuma_j -ni [PRO_{i/*j} futa-o akete] naka-o mise-ta.
 pig-NOM bear-DAT lid-ACC opening inside-ACC show-PAST
 'The pig showed the inside (of the basket) to the bear by removing its lid.'
 (^{OK}The pig removed the lid. *The bear removed the lid)

(31) Productive causative with adverbial

Buta_i -ga kuma_j -ni [PRO_{i/j} futa-o akete] naka-o mi-sase-ta.
 pig-NOM bear-DAT lid-ACC opening inside-ACC look.at-CAUS-PAST
 'The pig made the bear look at the inside (of the basket) by removing its lid.'
 (^{OK}The pig removed the lid. ^{OK}The bear removed the lid.
 *Someone else removed the lid.)

As shown in parentheses, the dative-marked indirect object cannot be a controller of PRO in the lexical causative in (30), because PRO can only be controlled by a subject. On the other hand, the productive causative in (31) is an ambiguous sentence: Both the matrix subject and the embedded subject are potentially able to control PRO in the adverbial.

A total of five scenarios were prepared; two for the lexical causative and three for the productive causative.³⁶

(32) Lexical causative with adverbial in (30):

- (A) The pig shows inside (of the box) to the bear by removing the lid. -TRUE
- (B) The pig shows inside to the bear after the bear removes the lid. -FALSE

Productive causative with adverbial in (31):

- (C) The pig makes the bear look at inside after removing the lid. -TRUE
- (D) The pig makes the bear remove the lid and look at inside. -TRUE
- (E) The pig makes the bear look at inside after a bird removes the lid. -FALSE

Results

The results of this condition are given below. We first look at results of the lexical causative which is summarized in Table 3.14.

Table 3.14. Correct responses for lexical causative with adverbial

	Subject (A)-TRUE	Indirect obj (B)-FALSE
4-yrs (N=9)	100% (9/9)	67% (6/9)
5-yrs (N=10)	100% (10/10)	90% (9/10)
6-yrs (N=9)	100% (9/9)	89% (8/9)
Total (N=28)	100% (28/28)	82% (23/28)
Adults (N=5)	100 % (5/5)	100% (5/5)

As Table 8 shows, three 4-year-olds, one 5-year-old, and one 6-year-old failed to reject the lexical causative sentence when the referent of the indirect object is one who performed the action denoted by the adverbial. The percentage of children who correctly judged it as false was slightly lower than that for the productive causative with *zibun* 'self.' It is possible that the pictures used for the scenarios (A) and (B) were not clear

³⁶ The narrated stories in the actual experiment are given in Appendix 2 in section 3.7.

enough to recognize who did the action of opening the box and who did the causing action because the two animals in the scenes were so close to each other in the pictures.

We now look at their responses for the productive causative with the adverbial.

Table 3.15. Correct responses for productive causative with adverbial

	Matrix subj (C)-TRUE	Embedded subj (D)-TRUE	Someone else (E)-FALSE
4-yrs (N=9)	100% (9/9)	13% (1/8)	100% (9/9)
5-yrs (N=10)	100% (10/10)	40% (4/10)	100% (10/10)
6-yrs (N=9)	100% (9/9)	56% (5/9)	89% (8/9)
Total (N=28)	100% (28/28)	36% (10/28)	96% (27/28)
Adults (N=5)	100% (5/5)	100% (5/5)	100% (5/5)

First, it is not surprising that all of the children correctly accepted the sentence with the matrix subject as a controller of PRO in adverbials. Also, all of them except one 6-year-old demonstrated adult-like performance when someone else besides the referents of the matrix and embedded subjects brought about the action denoted by the adverbial. As for the scenario (D) in which the referent of the embedded subject carried out the action of opening the box, we observe the same pattern with the productive causative with *zibun* 'self': many of the children (64%) rejected the sentence, although it is acceptable in adult grammar. The similar trend was found in the case of the productive causative with *zibun* 'self' in the previous section, though the percentage of children who accepted the sentences with adverbials (36%) was somewhat higher than that with *zibun* 'self' (29%).

3.5.6 Discussion

In this section, we discuss what we have found about the children's comprehension of Japanese causatives in Experiment II. We found that the same results that we observed in

Experiment I: children did not treat the embedded subject of the productive causative as adults do and did not accept it as antecedent of *zibun* 'self.' We also found that this pattern is applicable to the productive causative with a PRO-control adverbial as well.

We tested a larger number of children than in Experiment I. We modified the method of the experiment so that the scenarios presented to children were easier to comprehend. We picked another pair of lexical and productive verbs that share the verb stem; *mise-ru* 'show' and *mis-ase-ru* 'make someone look at.' Yet, we still obtained the similar results.

Our first finding was that children acquired the productive causative sentence with – (*s*)*ase* very early. Murasugi et al. (2004) observed that there is no apparent instance of the productive causative in production until around age 5 in their subjects' spontaneous speech. However, this does not mean that the children before 5 do not understand productive causative sentences. The children tested in Experiment II, as well as in Experiment I, were able to comprehend the productive causative sentences, distinguishing them from the ditransitive benefactive sentences which have the same case-marking pattern but each of whose arguments bear a completely different theta-role.

Furthermore, the children were able to distinguish the two types of causative verbs with respect to their semantics. They knew that the lexical causative only denotes direct causation in which an individual acts on the other directly, and that it cannot be used for an indirect causation situation.

Despite their ability to semantically distinguish the lexical causative from the productive causative and their knowledge that the productive causative expresses a situation involving two separate events, they failed to accept the embedded subject of the

productive causative as an antecedent of *zibun* 'self' and as a controller of PRO in adverbials. They did not seem to treat the embedded subject of the productive causative as a *subject*. In other words, Experiment II revealed that the embedded subject of the productive causative in child grammar cannot be an antecedent of *zibun* 'self' or a controller of PRO in adverbials and replicates the previous finding in Experiment I.

What does this result tell us about the causative constructions in child grammar? Does the productive causative in child grammar have the same mono-clausal structure as the lexical causative? If we take the position that young children cannot assign a bi-clausal structure to the productive causative, we would have to explain how children come to know the semantic difference between the two types of causatives. It is a general assumption that a certain meaning difference is a reflection of a structural difference. If both lexical and productive causatives in child grammar had the same structure, children would not be able to extract two different interpretations. Is the result that many children did not allow the embedded subject to behave like a subject an artifact of some other factors?

At this point, we do not have enough data to answer to these questions. However, there is one thing we are sure of: the children even at the age of 6 demonstrated non-adult-like performances on the productive causative. We will investigate this issue in detail in the next chapter and try to ascertain the reason why the children behave differently from adults with respect to the productive causative.

In addition to the overall results we have discussed above, we need to review some individual data. As already mentioned above, the percentage of correct responses by

children to the productive causative when the embedded subject was an intended antecedent of *zibun* 'self' was lower (cf. Table 13) than when the embedded subject was an intended controller of PRO in adverbials (cf. Table 15). The number of children who accepted the embedded subject as an antecedent of *zibun* 'self' was only 8, while those who accepted it as a controller of PRO was 10.

This difference looks small at first glance, but when we look at individual data, we notice some inconsistency with respect to their responses to the productive causative with *zibun* 'self' as in (33) (= (28)) and PRO-control adverbials as in (34) (= (31)).

(33) (= (28)) Productive causative with *zibun* 'self'

Buta_i -ga kuma_j -ni zibun_{i/j} -no hon-o mi-sase-ta.
 pig-NOM bear-DAT self-GEN book-ACC look.at-CAUS-PAST
 'The pig made the bear look at self's book.'

(34) (= (31)) Productive causative with adverbial

Buta_i -ga kuma_j -ni [PRO_{i/j} futa-o akete] naka-o mi-sase-ta.
 pig-NOM bear-DAT lid-ACC opening inside-ACC look.at-CAUS-PAST
 'The pig made the bear look at the inside (of the basket) by removing its lid.'

There were 4 children who gave correct answers to both the productive causative with *zibun* 'self' and with the adverbial when the embedded subject was the target. There were also 14 children who wrongly rejected both the productive causative with *zibun* 'self' and that with adverbial. In other words, these 18 children showed consistent behaviors. There were, however, 10 children who accepted either the productive causative with *zibun* 'self' or that with adverbials, but not both.

What was the factor that yielded their inconsistent responses? One obvious difference between the productive causative with *zibun* 'self' and that with an adverbial is the length

of the sentences. It is natural to think that the longer a sentence becomes, the harder it is to comprehend. As we mentioned above, however, there were 6 children who rejected the sentence with *zibun* 'self' but accepted that with an adverbial, which is the longer than the former and thus should have been harder. But the result was just the opposite. Hence, the idea that the lengths of each sentence in (33) and (34) were responsible for the children's inconsistent responses is not tenable.

Another possibility is that their inconsistent behavior is due to the different grammatical mechanisms involved in the sentences; binding vs. control. The reflexive pronoun *zibun* 'self' in (33) is interpreted by means of binding, while the adverbial in (34) is interpreted by control of PRO. Thus, it would not be farfetched to consider that these two different mechanisms have something to do with their inconsistent performance for the productive causative with *zibun* 'self' and PRO adverbial. We could claim that they are acquired in different developmental stages and some of the children acquire binding first and others acquire control first. However, this does not seem to be correct either. We have already confirmed earlier that the children tested in our experiment had shown knowledge of both binding of *zibun* 'self' and PRO control in condition 3. In particular, ditransitive sentences with *zibun* 'self' and PRO-control adverbials were examined, and the results showed that they correctly judged the sentences. Thus, their grammars had already been equipped with these mechanisms by the time they were tested with the productive causative with *zibun* 'self' or adverbials.

Yet another possible way to explain this inconsistent behavior is that the interpretation of the productive causative with adverbials as in (34), but not that with

zibun 'self' in (33), is subject to whether a prosodic pause exists or not, or it is subject to the position of the pause relative to the adverbial phrase. For the sake of explanation, the same productive causative with an adverbial is given again below.

(35) Buta_i-ga kuma_j-ni [PRO_{i/j} futa-o akete] naka-o mi-sase-ta.
pig-NOM bear-DAT lid-ACC opening inside-ACC look.at-CAUS-PAST
'The pig made the bear look at the inside (of the basket) by removing its lid.'

If we insert a small pause after the adverbial phrases, this pause makes the boundary between the adverbial phrase and the embedded verb phrase *naka-o mi-* 'look at the inside' clear and separate. And it makes the reading in which the matrix subject is a controller of the adverbial phrase easy to access. On the other hand, let us insert a pause right before the adverbial phrase. This renders the other reading easier to access. This time the boundary between the adverbial phrase and the embedded verbal phrase is very small, making the whole adverbial phrase and the embedded verb phrase sounds like one unit. Hence, the pause before the adverbial phrase renders the reading in which the embedded subject is the controller of PRO easier. Although I was careful to present to the children the test sentences as neutrally as possible throughout the test sessions, the possibility that the pauses affected the readings cannot be ruled out. In the next experiment which will be reported on in chapter 4, this factor was taken care of by playing the audio-recorded test sentences so that every child heard the same test sentences with the same pauses.

3.6 Summary

We began this chapter by looking at the longitudinal study by Murasugi et al. (2004), in which they observed the naturalistic speech of one child and found three developmental stages with respect to Japanese causative sentences. They also claimed that children acquiring Japanese do not produce productive causatives with agentive embedded subjects until around 5, but they did not examine his comprehension of the causatives by means of experimental methods.

We also looked at Otsu's (1997) experimental study on children's comprehension of *zibun* 'self.' He tested some lexical causatives in which *zibun* 'self' was used, though his main focus was on comprehension of *zibun* 'self' not causative. We found from his study that children even at the age of 3 correctly interpreted the lexical causative sentences with *zibun* 'self.'

In the last two sections, two experimental studies were reported. The results of both Experiments I and II tell us that, although the children know the productive causative morpheme *-(s)ase*, the semantic difference between the lexical and the productive causatives, and the subject-oriented properties of *zibun* 'self' and adverbial phrases, they treat the productive causative in a different way from the way that adult native speakers do. They do not allow the embedded subject of the productive causative to behave like a subject, i.e., to act as antecedent to *zibun* 'self' or a controller of PRO in adverbials. In the next chapter, we explore this issue in detail.

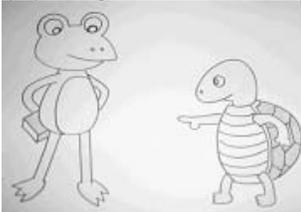
3.7 Appendices

Appendix 1 – Experiment II Condition 4:

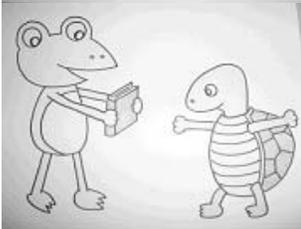
Structural Difference -- Causatives with *zibun* 'self'

Lexical causative with *zibun* 'self'

(A) Subject



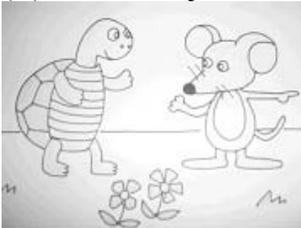
A frog met a turtle on the street. The frog was holding a book behind his back. The turtle said, "Wow, you've got a book! Well, it looks like mine..."



The frog said, "No! This is my book! I bought this yesterday." And the frog handed the book to the turtle so that the turtle could take a look at it.

Puppet: *The frog showed self's book to the turtle.* (TRUE)

(B) Indirect object



A turtle met a mouse on the street. Both of them grow flowers in the yard. The turtle asked the mouse how the mouse's flowers are. The mouse said to the turtle, "I'll take a look at them! Wait here!"



In the yard, the mouse saw his small dying flowers and the turtle's beautiful big flowers. The mouse said, "Why do only my flowers look like this? I don't want the turtle to look at my flowers...well, I'll bring the turtle's flowers instead."



When the mouse got back to the turtle and said "here they are!", the turtle noticed that the flowers are actually his flowers.

Puppet: *The mouse showed self's flowers to the turtle.* (FALSE)

Productive causative with *zibun* 'self'

(C) Matrix subject



A fox was reading his picture book and a raccoon was also reading his picture book. Since his picture book was very interesting, the fox wanted the raccoon to look at his book together. "Look at my picture book! Read this together!" said the fox. But the raccoon won't look at fox's book. The fox asked the raccoon to look at this picture book again and again. But the raccoon won't look at it. At last, the fox became upset and said, "Look at my picture book!"

The raccoon reluctantly came to the fox and they began to look at fox's picture book together.

Puppet: *The fox made the raccoon look at self's picture book.* (TRUE)

(D) Embedded subject

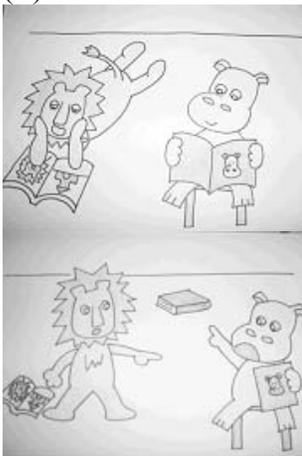


A lion and an elephant were looking at their own picture books. After a while, the elephant said, "My book is boring! Yours looks interesting! I want another one!!" But the lion said to the elephant, "You should read it through! There is no extra book here!" The elephant won't give up. At last, the lion got angry and said, "Read your own book!"

The elephant unwillingly began to look at his own book again.

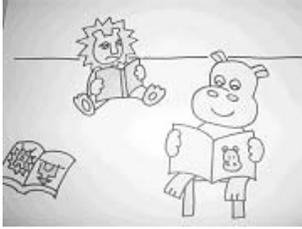
Puppet: *The lion made the elephant look at self's picture book.* (TRUE)

(E) Someone else



A hippo and a lion were reading their own picture books. After a while, the lion became bored with his book and said, "I want to look at another picture book!" The hippo said, "You are not finished yet!" But the lion said he wanted another one.

The hippo then said, "Then, you can read that picture book over there." "But I don't know whose book that is," said the lion. Since the lion wouldn't pick up that book, the hippo finally said, "You look at that picture book. You read that one, okay?"



The lion reluctantly agreed and began to read the book.

Puppet: *The hippo made the lion look at self's picture book.* (FALSE)

Appendix 2 – Experiment II Condition 4: Structural Difference -- Causatives with adverbial

Lexical causative with PRO-control adverbial

(A) Subject

A koala bear was holding a big box. There came a cat. The cat asked the koala bear to open the box and show what's inside of the box. The koala bear first hesitated, saying "Once it opens, it's hard to close it again..." But the cat kept asking, "Please show it to me!"

The koala bear finally agreed and open the lid of the box. The cat screamed, "Wow! What a big octopus!!"

Puppet: *The koala bear showed the inside to the cat by removing its lid.* (TRUE)

(B) Indirect object

A raccoon came across a duck holding a big bottle. The raccoon asked the duck what's inside of it. But the duck refused to answer. The raccoon asked again, "Open the top of the bottle and show what's in it!"

The duck reluctantly gave the bottle to the raccoon and said, "The top is tightly closed. If you can loosen it, I'll allow you to look inside." The raccoon tried to open the bottle as hard as possible. Finally, the top came off!

The duck then allowed the raccoon to look inside of the bottle. The raccoon saw many ugly worms in it.

Puppet: *The duck showed the inside to the raccoon by removing its lid.* (FALSE)

Productive causative with PRO-control adverbial

(C) Matrix subject

A cow and a dog were walking and found a big box with a lid. They wondered what is inside of it. Both are coward and hesitated to come close to the box. The dog asked the cow to open the box, but the cow refused. After a while, the cow came up a good idea! "I will open the box and you will look inside, all right?" The dog didn't want to, but eventually agreed.

"One, two, three!" The cow opened the box. "Look inside, now!" The dog followed the cow's order and looked inside of the box. The dog found a small sleeping cat inside.

Puppet: *The cow made the dog look at the inside by removing its lid.* (TRUE)

(D) Embedded subject

A frog and a chicken were taking a walk. They found a box far away. They wanted to know what's inside. But they both couldn't come near the box, because they are both coward. The chicken first asked the frog to go there and look what's inside. But the frog refused. Finally the frog ordered the chicken to go there. "Go there and open the box, now!" The chicken didn't like to fight, so decided to open the box. The chicken opened the lid and found a green turtle in it!

Puppet: *The frog made the chicken look at the inside by removing its lid.* (TRUE)

(E) Someone else

A panda and a tiger came up on a hill and found a huge pot on the grassy field. The pot had a thin lid on the top. They both wanted to know what's inside of the pod, but too scared to remove the lid. They started arguing on who's going to open it. While they were fighting, there came a big bird. The bird came close to the pod and removed the lid by its bill and took it away. The panda and the tiger noticed now the pod was open. The panda said to the tiger, "Go there and take a look inside, okay?" The tiger said, "Well, you will go there..." The panda refused and said again, "Go there, hurry!" The tiger reluctantly came close to the pod and found that tons of jam was inside of the pod.

Puppet: *The panda made the tiger look at the inside by removing its lid.* (FALSE)

CHAPTER 4

ACQUISITION OF CAUSATIVES AND BI-CLAUSAL STRUCTURE

4.1 Introduction

When children interpret a certain sentence differently from adults, there are several possible explanations for the difference. It may be a non-adult-like grammar that forces a child to interpret the sentence in non-adult-like fashion. Alternatively, it may reflect a non-adult-like parser: children may end up having a different interpretation from adults because of their immature processing mechanism, although they do have an adult-like grammar. Since Chomsky (1965) highlighted the importance of separating competence, the speaker-hearer's knowledge of his/her language, from performance, the actual use of language in concrete situations, linguists have been trying to elucidate what kind of linguistic knowledge or competence human beings have in their brains. And especially

researchers in language acquisition have debated whether or not children's competence is the same as adults' from the beginning of the language development.

In the previous chapter we found that young children's responses to the productive causative was different from adults': it seemed at first glance that they only allowed one interpretation for *zibun* 'self' and PRO controller in the productive causatives, as in (1), and rejected the productive causative sentences when the embedded subject with dative case was intended to be antecedent of *zibun* 'self' in (1a) or controller of PRO in subject-oriented adverbial phrases in (1b).

- (1) a. Buta_i -ga kuma_j -ni zibun_{i/j} -no hon-o mi-sase-ta.
 pig-NOM bear-DAT self-GEN book-ACC look.at-CAUS-PAST
 'The pig made the bear look at self's book.'
(*zibun* 'self' = pig, bear)
- b. Buta-ga kuma-ni [PRO futa-o akete] naka-o mi-sase-ta.
 pig-NOM bear-DAT lid-ACC opening inside-ACC look.at-CAUS-PAST
 'The pig made the bear look at the inside (of the basket) by removing its lid.'
 (The pig removed the lid, The bear removed the lid)

The natural question to be accounted for is whether the children's non-adult-like responses are attributed to non-adult-like competence or non-adult-like performance factors. In this chapter we will discuss possible explanations for the child-adult difference in the comprehension of causatives and try to narrow down the possibility of explanations as to why children performed as though they allowed only one reading for the productive causative.

Four possible hypotheses are first introduced, each of which will be described in detail in the next section. Our next step will be to verify the hypotheses by taking a close

look at results of experiments. Experiment III was conducted to test the first hypothesis, Experiment IV was carried out for the second hypothesis, and Experiment V was for the examination of the last two hypotheses. The results of the series of experiments will be reported in sections 4.3 through 4.5. We will conclude this chapter by summarizing the findings of the experiments in section 4.6.

4.2 Hypotheses and Predictions

In this section I propose four possible hypotheses that might be able to account for the children's response patterns in the previous experiments. As stated above and in the last chapter, the children did not accept the embedded subject of the productive causative as antecedent of *zibun* 'self' and controller of PRO in adverbial phrases. The four possible hypotheses are: 1) mono-clausal analysis, 2) root clause subject attraction, 3) nominative subject attraction, and 4) TP subject attraction, each of which will be described in the following sub-sections.

4.2.1 Hypothesis 1: Mono-clausal Analysis

The first possible hypothesis, the "mono-clausal analysis," states that the productive causative in early child grammar is mono-clausal. This possibility presupposes that as far as the causatives in Japanese are concerned, the child grammar is different from the adult grammar, and has a mono-clausal structure just like the lexical causative counterpart at early stages of their language development.

Once we hypothesize that children's grammar is different from adults', however, we need to make it clear exactly how the children unlearn their current grammar and move toward a target grammar. They have to modify their grammar on the basis of positive evidence because negative evidence is simply not available for children. With respect to the acquisition of the productive causative in Japanese, children might be able to fix their grammar based on positive evidence: we can imagine that when they encounter a productive causative sentence with *zibun* 'self' or a subject-oriented adverb and detect that the dative marked NP is the antecedent of *zibun* 'self' or the controller of the adverb in a given context, the children become aware that the dative marked NP that they have assumed to be a non-subject should be a subject and they became able to assign a bi-clausal structure to the productive causative just like adults do.

This hypothesis is not farfetched, when we consider the possibility that Japanese has a type of causative called the lexical *-(s)ase* causative, as Kato and Koizumi (2006) assume, which we observed in chapter 2 (section 2.2.4). Recall that they claim that the lexical *-(s)ase* causative is mono-clausal, though it has the same causative affix as the productive causative, i.e. *-(s)ase*. It is possible that children at their early developmental stage assume that all causatives with the causative affix *-(s)ase* are mono-clausal.

This assumption is also compatible with Murasugi et al.'s (2004) finding, as we already pointed out in the previous chapter. Their naturalistic speech data of a child imply that early child's utterances involving any sort of causatives are exclusively mono-clausal and typical productive causative sentences with an agentive embedded subject were not observed until age 5.

It also does not seem unnatural to assume that early child causative sentences have a mono-clausal structure, when we look at causative constructions in other agglutinative languages like Hindi/Urdu. Ramchand (2006) points out that Hindi/Urdu has productive causatives that are divided into two types; one with *-aa* suffix and the other with *-vaa* suffix. According to her study, the two types of causatives are equally productive, indicating that any verb can appear in either causative type. The difference between the two is that the former denotes 'direct' causation, while the latter expresses 'indirect' causation, leading her to claim that the former is mono-clausal and the latter is bi-clausal. In short, she points out the existence of productively used mono-clausal causative in Hindi/Urdu, which is absent in Japanese. Given that Universal Grammar enables children to acquire any language they are exposed to and that at least one language, i.e. Hindi/Urdu, has the productive mono-clausal causative, it is not totally impossible to suppose that even children acquiring Japanese first assume that there is such a kind of causative in their language.

This hypothesis, however, is problematic at least for one reason: in Chapter 3 we looked at the results of Experiments I and II, showing children's ability to distinguish the productive causative from the lexical causative in terms of their meanings. We confirmed that they knew that the productive causative denotes indirect causation and the lexical causative expresses direct causation. If we were to adopt this hypothesis and assume that children's productive causatives are mono-clausal, we would need to clarify how the semantic difference between the two types of causatives is realized. It is natural to assume that the semantic difference follows from the structural difference.

This hypothesis was tested in Experiment III, results of which will be reported in section 4.3.

4.2.2 Hypothesis 2: Root Clause Subject Attraction

The next three hypotheses presuppose that children's grammatical knowledge of the causatives is the same as adults'. As many previous child processing studies have revealed (Trueswell et al. 1999, Leddon and Lidz 2006, among others), children's abilities outside the grammar proper such as processing mechanisms and strong preferences may affect their comprehension of a certain sentence.

The second hypothesis is that when comprehending sentences with *zibun* 'self' or a subject-oriented adverbial, children pick up a root-clause (i.e. highest) subject in the sentence as the antecedent or the controller. The root clause subject attraction hypothesis states that although children have an adult-like grammar that allows the embedded subject of the productive causative to be an antecedent and a controller of *zibun* 'self' and adverbial, respectively, they have a processing bias or strategy of choosing the highest subject, which prevents them from noticing another possible interpretation.

This hypothesis was tested by Experiment IV. The detailed design and results of the experiment will be reported in section 4.4.

4.2.3 Hypothesis 3: Nominative Subject Attraction

Our next hypothesis is that children have a strong preference for a nominative (*-ga*) marked subject as antecedent of *zibun* 'self' and controller of PRO in adverbial phrases as

an ambiguity-resolution strategy, although they have an adult-like grammar that allows for dative (*-ni*) marked subjects. In Japanese the canonical case marking for subjects is nominative *-ga*. Only a few constructions have subjects with a non-canonical case, i.e. dative case *-ni*: benefactive constructions and indirect passives, as well as productive causatives, have an embedded subject marked with the dative case. Thus, subjects that children hear most in daily contexts are very likely to be marked with nominative case and it is not surprising that children utilize the strategy of picking an NP marked with nominative *-ga* as subjects in any type of sentence, given that very young children learning Japanese are sensitive to the case-marking (Otsu 1994).

The test sentences used in the previous experiments (Experiments I and II) include nominative case-marked matrix subjects, and children had no problem accepting them as antecedents of *zibun* 'self' or controller of adverbial phrases. However, we saw that children had difficulty treating the embedded subjects with the non-canonical dative case in the productive causatives as antecedents of *zibun* 'self' or controller of adverbials, when the scenarios contained two possible antecedents or controllers. If in fact children have a strong preference for the nominative case-marked subjects over the dative marked ones and adopt the strategy of picking up a nominative subject during their comprehension of the productive causative as this hypothesis proposes, we would be able to account for the children's response patterns observed so far.

4.2.4 Hypothesis 4: TP Subject Attraction

The last possible explanation is that children have a strong preference for a TP subject over a vP subject as antecedent of *zibun* 'self' and controller of PRO in adverbials, and thus they are trying to find a TP subject during their on-line processing, though their grammar is adult-like as far as the causative constructions are concerned and it allows them to treat vP subjects as antecedent or controller. As we saw in Chapter 2, we are assuming in this thesis that the productive causative has a vP as an embedded clause and the embedded subject is generated in Spec of this vP, whereas a matrix subject is moved to Spec of TP. It is possible that a child prefers a subject in Spec of TP to one in Spec of vP because subjects canonically appear in Spec of TP position. If this was indeed what children adopted as a strategy for ambiguity resolution in comprehending the productive causative sentences, we would be able to account for their performances we observed so far. Although they allowed the matrix subject of the productive causative to be antecedent of *zibun* 'self' and controller of PRO in adverbials, they did not seem to be treating the embedded subject of the productive causative as a subject even when the embedded subject was the intended antecedent and controller in given contexts, because they have a preferred subject, one in Spec of TP, in the sentence.

Keeping these hypotheses in mind, we move on to reports on three experiments: section 4.3 deals with Experiment III, testing the first hypothesis. In section 4.4, we discuss the results of Experiment IV, whose aim was to test the second hypothesis. Experiment V will be dealt with in section 4.5, where hypotheses 3 and 4 are carefully examined.

4.3 Experiment III: Mono-clausal or Bi-clausal?

The goal of Experiment III is to test the first hypothesis: the mono-clausal analysis. As we described above, this hypothesis states that early child grammar is different from adult grammar with respect to the structure of the productive causative: at an early developmental stage children analyze the Japanese productive causative as mono-clausal. To see if this hypothesis is on the right track, we will examine the results of Experiment III in which a small change was made in the scenarios used in the experiment.

4.3.1 Subjects and Method

The children who participated in this experiment are the same 28 children who were tested in Experiment II (cf. chapter 3, section 3.5) and passed conditions 1, 2, and 3. Thus, we can assume that these children had already acquired the productive causative morpheme *-(s)ase* (condition 1), knew the semantic difference between the lexical causative with *mise-* 'show' and the productive causative with *mi-sase-* 'make someone look at' (condition 2), and the subject-orientation of the reflexive pronoun *zibun* 'self' (condition 3). Their information is repeated in (2).

(2) Subjects: N=28

4-year-olds: N=9 (age=4;0-4;10, mean=4;6)

5-year-olds: N=10 (age=5;2-5;11, mean=5;6)

6-year-olds: N=9 (age=6;0-6;11, mean=6;5)

The experimental method adopted in this experiment is also the same as Experiment II: the Truth Value Judgment Task. Children were individually presented with a series of short picture-story shows. Each story contained 2 to 4 pictures. A stimulus sentence followed each story, which was played on a computer screen with a picture image of a puppet, Kermit the Frog. Children's task was to judge if the puppet's utterance describing the event in the story was right or wrong.

4.3.2 Design

The test sentences were the same pair of the lexical causative and the productive causative with the reflexive pronoun *zibun* 'self' as those used in condition 4 of Experiment II, provided below in (3) and (4) again.

(3) Lexical causative

Buta_i -ga kuma_j -ni zibun_{i/*j} -no hon-o mise-ta.
 pig-NOM bear-DAT self-GEN book-ACC show-PAST
 'The pig showed self's book to the bear.'

(*zibun* 'self' = pig, *bear)

(4) Productive causative

Buta_i -ga kuma_j -ni zibun_{i/j} -no hon-o mi-sase-ta.
 pig-NOM bear-DAT self-GEN book-ACC look.at-CAUS-PAST
 'The pig made the bear look at self's book.'

(*zibun* 'self' = pig, bear, *someone else)

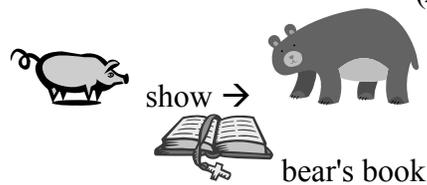
Recall that in sample scenarios for condition 4 of Experiment II, both the pig and the bear have their own books at the beginning of each scenario. In this case the children disallowed the embedded subject, *the bear*, as the antecedent of the reflexive pronoun. In this new condition, however, one aspect of the scenario was changed so that we

eliminated the possibility of the matrix subject of both the lexical and the productive causatives from being an antecedent of *zibun* 'self': the animal corresponding to the matrix subject does not have any book. Therefore, the reading in which the matrix subject is an antecedent of *zibun* 'self' is not possible because there is no such referent in the scenario.

Three scenarios were prepared for this experiment. Scenario (A) is for the lexical causative in (3) and scenarios (B) and (C) are for the productive causative in (4). In order to understand the plots of each scenario, let us look at the diagrams illustrated in (5) and (6).³⁷

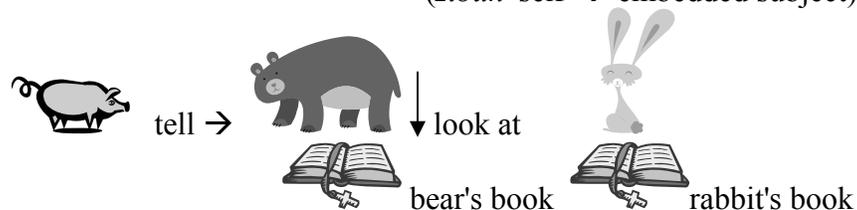
(5) Lexical causative

(A): A pig has a bear's book. The pig shows the bear's book to the bear.
(zibun 'self' → indirect object NP) -FALSE



(6) Productive causative

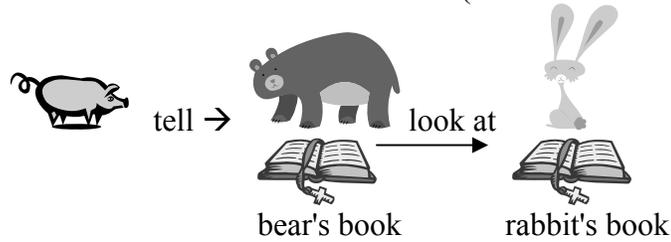
(B): There are a pig, a bear, and a rabbit. The pig does not have a book.
 The pig makes the bear look at the bear's book.
(zibun 'self' → embedded subject) -TRUE



³⁷ The pictures and scenarios actually used in this experiment are given in Appendix in section 4.7.

(C): There are a pig, a bear, and a rabbit. The pig does not have a book.
 The pig makes the bear look at the rabbit's book.

(*zibun* 'self' → someone else) -FALSE



Given scenario (A) in which the pig showed the bear's book to the bear, the lexical causative in (3) is false. The reflexive pronoun *zibun* 'self' must be bound by a subject of the sentence, i.e. *the pig*, but the pig does not have his book in the scenario. Condition 3 of Experiment II in chapter 3 revealed that the children knew that the indirect object NP cannot be antecedent of *zibun* 'self.' Thus, it is predicted that they will be able to reject the lexical causative sentence in this case too.

As for the productive causative, the sentence in (4) is true for scenario (B) and false for scenario (C). In scenario (B), the embedded subject, *the bear*, is the intended antecedent of *zibun* 'self.' Recall that in Experiment II, the children failed to accept the same productive causative sentence when *zibun* 'self' referred to the embedded subject animal. Now in this experiment, we changed the scenario and the matrix subject, *the pig*, does not have anything. If our hypothesis 1 is correct and children's grammar does not allow the embedded subject to be antecedent of *zibun* 'self,' we predict that they would reject the productive causative sentence. This is because in scenario (B), *zibun* 'self' refers to the embedded subject, *the bear*.

Scenario (C) depicts the situation in which the pig tells the bear to look at the rabbit's book, which renders the productive causative sentence false. We saw that *zibun* 'self' is an anaphor and cannot be bound by an extra-sentential argument. Given that we have already confirmed that the children have knowledge of this property of *zibun* 'self,' we predict that they will correctly judge that the test sentence is false.

4.3.3 Results and Discussion

Let us move on to the results and discussion of this experiment. The results are shown in Tables 4.1 and 4.2 below. The children's responses for the lexical causative (scenario A) are summarized in Table 4.1, and those for the productive causative (scenarios B and C) are given in Table 4.2.

Table 4.1. Correct responses for lexical causative

	Indirect obj (A)-FALSE
4-year-olds (N=9)	89% (8/9)
5-year-olds (N=10)	100% (10/10)
6-year-olds (N=9)	100% (9/9)
Total (N=28)	96% (27/28)

Table 4.2. Correct responses for productive causative

	Embedded subj (B)-TRUE	Someone else (C)-FALSE
4-year-olds (N=9)	78% (7/9)	100% (9/9)
5-year-olds (N=10)	100% (10/10)	100% (10/10)
6-year-olds (N=9)	100% (9/9)	100% (9/9)
Total (N=28)	93% (26/28)	100% (28/28)

Table 4.1 clearly shows that most of the children correctly rejected the lexical causative when *zibun* 'self' referred to the dative marked indirect object NP in the scenario (A), as

we expected. As Table 4.2 shows, 26 children out of 28 (93%) correctly accepted the productive causative in (4) with the embedded subject as antecedent of *zibun* 'self,' though the 4-year-olds performed more poorly than the 5- and 6-year-olds. They were the same children who rejected the same sentence in Condition 4 of Experiment II when the nominative *ga*-marked matrix subject was a possible antecedent (cf. Table 3.6 in chapter 3): in that experiment, only 8 children out of 28 (29%) correctly accepted the same productive causative. When we compare these results, the correct responses of the productive causative in this experiment are conspicuously higher.

One might think that the children had no choice but to allow the embedded subject of the productive causative as a last resort because the bear is the only sentence-internal referent in the scenario. However, this is not the case. As we saw above, the children correctly rejected the lexical causative sentence when the dative marked indirect object NP is the antecedent of *zibun* 'self' in the scenario, even though there is only one referent which has a book, *the bear* (cf. Table 4.1). If children indeed used a last resort strategy, they would have accepted this sentence as well because there is only one book-holding referent in the scenario. The result showed the contrary: As Table 4.1 shows, all the children, except one 4-year-old, correctly rejected the sentence. They distinguished the dative-marked embedded subject from the dative-marked indirect object NP, though they both appear with dative case. Thus, the results shown in Table 4.1, together with Table 4.2, clearly indicate that the children were able to accept the embedded subject as an antecedent of *zibun* 'self,' even when the subject had non-canonical dative case *-ni*.

Therefore, this experiment revealed that children even at the age of 4 have an adult-

like grammar as far as the structures of Japanese causatives are concerned. They correctly assign a bi-clausal structure to the productive causative, differentiating it from the mono-clausal structure of the lexical causative. Thus, the results of this experiment lead us to conclude that our first hypothesis, the mono-clausal analysis, should be rejected.

The natural question to be asked is how children even at the age of 4 can distinguish the lexical causative from the productive causative both semantically and structurally. We saw that the children under age 5 rarely produce a productive causative sentence in their natural conversation. Nevertheless, they correctly assign a mono-clausal structure to the lexical causative and a bi-clausal structure to the productive causative as adults do. What kind of linguistic ability enables them to do so? We will return to this problem and discuss some possible explanations in Chapter 5.

4.4 Experiment IV: Causatives and Complex Sentence with Finite Embedded Clause

In the previous section, we rejected the mono-clausal analysis hypothesis based on the finding that the children had the ability to assign a bi-clausal structure to the productive causative. We will now test the second hypothesis: the root clause subject attraction, which states that children look for the highest subject as antecedent of *zibun* 'self' during their on-line interpretation of a sentence. In order to test the hypothesis, Experiment IV examined the children's comprehension of complex sentence with a finite embedded clause. In chapter 2, we observed that a complex sentence with a finite embedded clause, such as (7) below, has two subjects and hence a bi-clausal structure.

(7) John-wa [Mary-ga zibun-no piza-o tabe-ta] no-o mi-ta.
John-TOP Mary-NOM self-GEN pizza-ACC eat-PAST COMP-ACC see-PAST
'John saw that Mary ate self's pizza.'

Note that the embedded subject of this sort of complex sentence is marked with nominative *-ga* case, while the productive causative sentence has a dative *-ni* marked embedded subject. The hypothesis we are dealing with in this experiment, however, does not concern the case-marking, but the position of the subject. Thus, the root clause subject attraction hypothesis predicts that children would accept the higher subject, *John* in (7), more readily than the lower subject, *Mary*.

In what follows, we will report on the details of the experiment.

4.4.1 Subjects and Method

The subjects tested in this experiment were the same 28 children who passed conditions 1, 2, and 3 of Experiment II, i.e. the same children who also participated in the previous experiment (Experiment III). The information on the subjects is repeated in (8).

(8) (= (2))
Subjects: N=28
4-year-olds: N=9 (age=4;0-4;10, mean=4;6)
5-year-olds: N=10 (age=5;2-5;11, mean=5;6)
6-year-olds: N=9 (age=6;0-6;11, mean=6;5)

As in Experiment III, they were assumed to know the subject-orientation property of *zibun* 'self' because they passed condition 3 of Experiment II. We can also assume that

they had the ability to assign a bi-clausal structure to the productive causative, given the results of Experiment III.

The experimental method adopted in this experiment was also the Truth Value Judgment Task and a series of picture-stories were presented to the children along with an experimenter's narration. The stimulus sentences were played on a computer along with a puppet on the PC monitor. The children's task was to say "yes" or "no" to the stimulus sentences the puppet uttered to them.

4.4.2 Design

The test sentence, the complex sentence with tensed embedded clause, is given in (9).

- (9) Buta_i-wa [kuma_j-ga zibun_{i/j}-no keeki-o tabe-ta] no-o mi-ta.
 pig-TOP bear-NOM self-GEN cake-ACC eat-PAST COMP-ACC see-PAST
 'The pig saw that the bear ate self's cake.'
 (*zibun* 'self' = pig, bear, *someone else)

The sentence in (9) is ambiguous: both the matrix subject, *the pig*, and the embedded subject, *the bear*, are possible antecedents of *zibun* 'self.'

Recall that we already tested in Experiment I (cf. chapter 3, section 3.4.3) children's interpretation of a complex sentence with *zibun* 'self' to examine if they allowed two readings for the complex sentences such as (10).

- (10) Buta-wa [usagi-ga zibun-no ringo-o tabechat-ta] to it-ta.
 pig-TOP rabbit-NOM self-GEN apple-ACC eat.up-PAST COMP say-PAST
 'The pig said that the rabbit ate up self's apple.'

However, in section 3.4.3 of chapter 3, we pointed out a methodological problem with this first test: there were some children who rejected the sentence in any scenario because they seemed to take the sentence in (10) as a direct quotation. This was due to the poor selection of the main verb. The next candidates for the main verb were true bridge verbs such as *think* or *believe*. These verbs, however, are not necessarily suitable for this type of experimental method: it is hard to depict events of thinking or believing clearly by a few pictures. Thus, the verb *mi-ru* 'to see,' which can take a tensed CP clause, was selected, though the complementizer in this case is not *to* but *no* with accusative case (cf. (9) above). This is the reason why the sentences such as (9) were chosen for the test sentences in this experiment.

Going back to the test sentence in (9), we already observed that the sentence has two interpretations. In order to examine whether the children allow the two readings for the sentence in (9), the following three scenarios were prepared.³⁸

(11)

(A) A pig saw a bear eating the pig's cake. (*zibun* 'self' → matrix subj: TRUE)

A pig and a bear bought cakes, one for each. This big one is for the pig, and this small one is for the bear. There came the bear. He was so hungry that he wanted to eat the pig's big cake rather than his small cake. "Well...I know this big one is for Pig. But he is not here now. What do I do?" He thought about this a while, but he can't help but eat the pig's big cake. But while the bear was eating the pig's big cake, the pig was standing right behind the door and watching what the bear was doing.

³⁸ The combination of animal characters appearing in the actual scenarios was different from those in the sample scenarios in (11).

(B) A pig saw a bear eating the bear's cake. (*zibun* 'self' → embedded subj: TRUE)

A pig and a bear bought cakes, one for each. They decided to eat them together later. The pig said, "Don't eat the cakes, okay? Let's eat them together later!" and left the room. But, when the bear was left in the room alone, he became so hungry and could not wait for the pig. "Umm...we promised to eat them together...I can't eat this now. But I want to..." The bear tried not to eat the cake. But...as the cakes look so yummy, he said, "Umm... this one is mine. So I can eat this" and ate his cake. But while the bear was eating his cake, the pig was standing outside of the room and looked what the bear did through the window.

(C) A pig saw a bear eating someone else's cake. (*zibun* 'self' → someone else: FALSE)

There are three cakes on the table. A pig decided to eat this cake with a strawberry, a bear decided to eat this chocolate cake, and they decided to give the last one to someone else. As the bear likes cakes very much, he wanted to eat the last one too. He said to himself, "Well, I know this one is for someone else. But I want to eat this...What do I do?" The bear finally ate the last cake that they decided to keep for someone else! The pig saw what the bear did and became very angry.

According to the sample scenarios above, the complex sentence in (9) is true for (A), true for (B), but false for (C). The results will be reported in the next section.

4.4.3 Results and Discussion

The results are given in Table 4.3. The responses by five adult speakers of Japanese who also participated in Experiment II are also included in the results.

Table 4.3. Correct responses for the complex sentence with *zibun*

	Matrix subj (A)-TRUE	Embedded subj (B)-TRUE	Someone else (C)-FALSE
4-yrs (N=9)	78% (7/9)	89% (8/9)	89% (8/9)
5-yrs (N=10)	70% (7/10)	90% (9/10)	100% (10/10)
6-yrs (N=9)	67% (6/9)	100% (9/9)	100% (9/9)
Total (N=28)	71% (20/28)	93% (26/28)	96% (27/28)
Adults (N=5)	80% (4/5)	100% (5/5)	100% (5/5)

Although there is a preference for the local antecedent and some of the children rejected the sentence for scenario (A), the results show that overall they accepted two readings for the test sentence in (9). Importantly, most of the children (93%), except one 4-year-old and one 5-year-old, allowed the embedded subject to be an antecedent of *zibun* 'self.'

Taking a close look at individual data, we found that there were 8 children who rejected the sentence in the case of scenario (A) but accepted the same sentence for the scenario (B). There were two children who showed the reverse pattern: they accepted the sentence for the scenario (A) but rejected it for (B). However, there was no child who rejected the test sentence in both cases, suggesting that every child accepted the sentence for either scenario (A) or (B) and there was no child who rejected the sentence because he took the sentence as a direct quotation.

As we saw above, although there were some children, as well as one adult, who failed to accept the complex sentence when the matrix subject was the intended antecedent of *zibun* 'self,' it is certain that most of them accepted the sentence when the embedded subject was the intended antecedent in the scenario. Therefore, the children were not looking for a root clause subject for an antecedent of *zibun* 'self,' which is what our second hypothesis, the root clause subject attraction, predicts. Rather they liked the local antecedent more than the long-distance one in fact. Based on the results of this experiment, we must also reject the second hypothesis.

4.5 Experiment V: Causatives and Benefactives

In the previous sections, we concluded that neither of the first two hypotheses, the mono-clausal analysis or the root clause subject attraction, account for the children's non-adult-like response pattern for the productive causative. There remain two hypotheses: the nominative subject attraction (hypothesis 3) and the TP subject attraction (hypothesis 4). The aim of the last experiment, Experiment V, was to elucidate which factor, case-marking or structural position, is at work when children comprehend the productive causative sentences. This section reports on the results of the experiment and discusses what the findings tell us about the children's acquisition of bi-clausal structures.

Section 4.5.1 describes the subject information, experimental method, and predictions of each hypothesis. In sections 4.5.2 through 4.5.4, we examine the results of the pre-tests which were conducted to confirm that each child knew the subject-orientation property of *zibun* 'self' and adverbials, the semantic difference between the lexical and the productive causatives, and the structural difference between the two causatives. The main session of the experiment, i.e. the comparison of comprehension of the productive causative and the indirect benefactive, will be reported in detail in section 4.5.6. We then discuss the results of the experiment and implications of the findings in section 4.5.7.

4.5.1 Subjects, Method, and Predictions

The detailed information of the 29 children who participated in this experiment is given in (12) below.

(12) Subjects: N=29³⁹

4-year-olds: N=11 (age=4;0-4;11, mean=4;6)

5-year-olds: N=11 (age=5;0-5;10, mean=5;5)

6-year-olds: N= 7 (age=6;0-6;6, mean=6;3)

Note that the children tested in this experiment were newly recruited for this experiment only, so they did not participate in the previous experiments we conducted and reported on, i.e. Experiments I, II and III. They were all mono-lingual Japanese children who attended one of two day-care centers in the Tokyo area.

The methodology adopted in this experiment was also the Truth Value Judgment Task with a slight modification in the manner in which scenarios and stimuli were presented. The scenarios were presented in the form of picture-story shows along with narration by an experimenter. Each short story was followed by a stimulus sentence which was recorded on the computer and played with a picture of the puppet, *Kermit the Frog*, on the computer screen. The picture-story shows were chosen instead of manipulating some stuffed animals and props because events of showing and making someone look at something are depicted more easily by drawing pictures than moving stuffed animals. The reason why the stimuli were recorded and played on the computer instead of being uttered by an experimenter is that it made the stimuli constant across the children. As we observed that a slight change in intonations could easily affect the interpretations of the potentially ambiguous sentences, I wanted to make sure that each child hears the same stimulus sentences with the same intonation patterns. Each child was

³⁹ Originally, I tested 32 children including the 29 children in (12). However, there was one 4-year-old who could not finish the whole task and two other 4-year-olds who clearly showed a yes-bias. Thus, responses by those children were eliminated from the results of the experiment from the beginning.

tested individually in a quiet room in his/her day-care center, and the whole session of the experiment was audio-recorded for further analysis.

In order to test hypotheses 3 and 4, children's comprehension of the productive causative and the indirect benefactive were compared. Recall that the productive causative and the indirect benefactive have similar case-marking pattern but they differ in that the former has a vP as its embedded clause while the latter has a TP complement. As we will see below, the two remaining hypotheses make different predictions for the comprehension of these constructions.

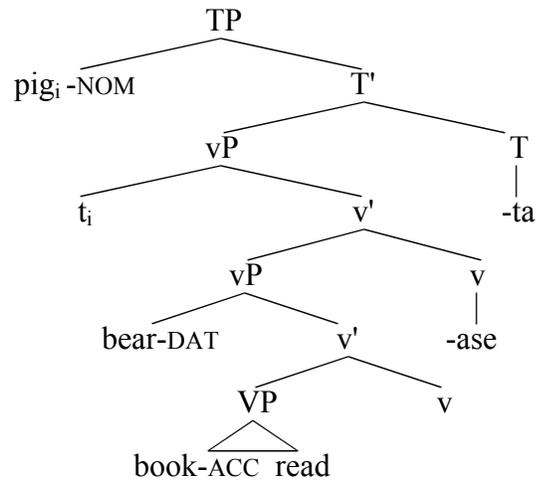
In what follows, we will summarize what each hypothesis predicts regarding the children's performance on the two constructions. Before doing so, let us represent the relevant details of the syntactic analyses of each construction that are important to the experiment.

The target sentences and their structures we deal with in this experiment are given in (13) and (14).

(13) Productive causative

- a. Buta-ga [_{VP} kuma-ni hon-o yom]-ase-ta.
pig-NOM bear-DAT book-ACC read-CAUS-PAST
'The pig made the bear read the book.'

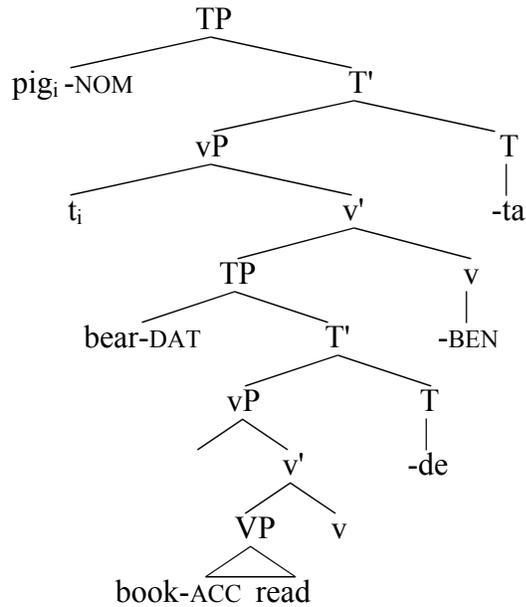
b.



(14) Indirect benefactive

- a. Buta-ga [TP kuma-ni hon-o yonde]-morat-ta.
 pig-NOM bear-DAT book-ACC read (gerund)-BEN-PAST
 'The pig received the favor of the bear's reading the book.'

b.



As we briefly mentioned above, both the productive causative and the indirect benefactive have the same case-marking for each argument: nominative case for the

matrix subject, dative case for the embedded subject, and accusative case for the direct object in the embedded clause. Structurally, they are both bi-clausal with non-finite embedded clause. However, apart from the different morphology, i.e. the causative morpheme *-(s)ase* and the benefactive morpheme *-moraw*, they also differ in that the productive causative has a vP complement, whereas the indirect benefactive selects a TP complement. The table in (15) shows the comparison.

(15)

	Productive causative	Indirect benefactive
case-marking	Nominative matrix subj. Dative embedded subj.	Nominative matrix subj. Dative embedded subj.
complement type	vP complement	TP complement

Keeping the similarities and the differences of the two constructions in mind, we move on to the predictions of each hypothesis. Hypothesis 3, the nominative subject attraction, states that children try to find a nominative (*-ga*) subject for the antecedent of *zibun* 'self' and controller of PRO in subject-oriented adverbials. If a child utilizes this strategy during his on-line interpretation of a certain sentence, it is predicted that the child will perform badly on the productive causative and badly on the indirect benefactive as well, for both constructions have a nominative matrix subject and a dative embedded subject. The hypothesis predicts that children will not allow the embedded subject to behave as a subject regardless of the type of construction as long as the embedded subject is marked with dative case. In other words, if Hypothesis 3 were on the

right track, children who show non-adult-like performance with the productive causative will also treat the indirect benefactive in the same non-adult-like fashion.

Hypothesis 4, on the other hand, assumes that the structural position of subjects plays an important role in the interpretation of *zibun* 'self' and adverbials when children comprehend sentences with a bi-clausal structure. The hypothesis states that when children encounter *zibun* 'self' or adverbials with PRO, they look for a TP subject of the sentence as antecedent or controller no matter whether the subject is marked with nominative or dative. We observed that the productive causative has a vP complement, whereas the indirect benefactive has a TP complement. Hence, the embedded subject of the productive causative is in the Spec of vP, while that of the indirect benefactive is in the Spec of TP. According to this hypothesis, children will have difficulty treating the former, i.e. the subject in vP Spec, as antecedent of *zibun* 'self' or controller of PRO, but no trouble with the latter, i.e. the subject in TP Spec. Therefore, if this hypothesis is true, it predicts that children will perform well on the indirect benefactive even though they have trouble with the productive causative when the embedded subject of each construction is the intended antecedent or controller in a given scenario.

In this way, the two hypotheses predict different behaviors with respect to the children's comprehension of the indirect benefactive. Both hypotheses, however, equally predict that there will be no child who performs well on the productive causative but badly on the indirect benefactive.

To summarize, let us look at the 2×2 table below. The vertical column shows whether a child performs well or poorly on the productive causative, and the horizontal row indicates his results on the indirect benefactive.

Table 4.4. Predictions

Benefactive Causative	√	*
√	Group A	Group B
*	Group C	Group D

If a child shows adult-like performance on both constructions, he is classified into Group A in the table. Hypothesis 3, the nominative subject attraction, predicts that children who have difficulty with the productive causative also have trouble with the indirect benefactive. Thus, if children's non-adult-like performance with the productive causative would be accounted for only by this hypothesis, we expect that children who have difficulty with the productive causative all belong to Group D, but not Group C. On the other hand, if Hypothesis 4, the TP subject attraction, is on the right track, and this is the only strategy the children are adopting, we expect that there would be some children who are grouped into Group C: they show non-adult-like behavior with the productive causative but no problem with the indirect benefactive. Furthermore, both Hypotheses 3 and 4 predict that there will be no children in Group B. Neither hypothesis predicts children who will perform better on the productive causative than the indirect benefactive.

We now move on to the details of the experiment. As mentioned above, we first look at results of three pre-tests. The main session of the experiment will be reported on in section 4.5.6.

4.5.2 Pre-test 1: Subject-orientation

Design

Before examining the children's comprehension of the productive causative and the indirect benefactive, we had to confirm whether the children had knowledge of the subject-orientation properties of *zibun* 'self' and adverbials with PRO, each of which will be used in each construction to examine if they can assign two readings to the sentences.

The target sentences are given in (16) and (17). They are exactly the same as those used in Condition 3 of Experiment II (cf. section 3.5.3 of Chapter 3). The sentence in (16) is a ditransitive sentence with *zibun* 'self' used in the direct object NP. The sentence in (17) is another ditransitive sentence with an adverbial with PRO.

- (16) Buta_i-ga kuma_j-ni zibun_{i/*j}-no kasa-o watasi-ta.
pig-NOM bear-DAT self-GEN umbrella-ACC hand-PAST
'The pig handed self's umbrella to the bear.'
(*zibun* 'self' = pig, *bear)

- (17) Buta_i-ga kuma_j-ni [PRO hasi-o watatte] ringo-o age-ta.
pig-NOM bear-DAT bridge-ACC crossing apple-ACC give-PAST
'The pig gave the apple to the bear by crossing the bridge.'
(PRO = pig, *bear)

As indicated in parentheses, both sentences are mono-clausal and hence unambiguous, allowing only the subjects to be antecedent of *zibun* 'self' and controller of PRO in the adverbial phrase.

Two scenarios for each sentence were prepared, which are also exactly the same as those used in Experiment II. Below are the summaries of the sample scenarios.⁴⁰

(18) Scenarios for the ditransitive with *zibun* 'self' in (16)

(A): *The pig gave the pig's umbrella to the bear.*

(B): *The pig gave the bear's umbrella to the bear.*

(19) Scenarios for the ditransitive with adverbial in (17)

(A): *The pig crossed the bridge and gave the apple to the bear.*

(B): *The pig gave the apple to the bear after the bear crossed the bridge.*

The test sentence with *zibun* 'self' in (16) is correct for the scenario (A) of (18), while it is a false statement for the scenario (B). Likewise, the sentence with an adverbial in (17) correctly depicts the situation of (A) of (19), whereas it is a false statement given the scenario (B) of (19).

Results

The results of the children's responses for the ditransitive with *zibun* 'self' in (16) are given in Table 4.5 below.

Table 4.5. Correct responses for ditransitive sentence with *zibun*

	Subject TRUE	Indirect obj FALSE
4-year-olds (N=11)	91% (10/11)	100% (11/11)
5-year-olds (N=11)	100% (11/11)	82% (9/11)
6-year-olds (N=7)	86% (6/7)	86% (6/7)
Total (N=29)	93% (27/29)	90% (26/29)

⁴⁰ The details of each scenario can be referred to in section 3.5.3 of Chapter 3.

Most of the children, except one 4-year-old and one 6-year-old, gave correct answers when they were given the matching scenario (A). Also, 26 children out of 29 correctly rejected the ditransitive sentence when the intended antecedent of *zibun* 'self' was the indirect object NP in the scenario. There were two 5-year-olds and one 6-year-old who failed to reject it. Note that the 6-year-old who wrongly rejected the sentence given the matching scenario (A) was the one who wrongly accepted the test sentence given the mismatching scenario (B).

We now look at the results of their responses for the ditransitive sentence with adverbial in (17) shown in Table 4.6.

Table 4.6. Correct responses for ditransitive sentence with adverbial

	Subject TRUE	Indirect obj FALSE
4-year-olds (N=11)	100% (11/11)	82% (9/11)
5-year-olds (N=11)	100% (11/11)	100% (11/11)
6-year-olds (N=7)	100% (7/7)	100% (7/7)
Total (N=29)	100% (29/29)	93% (27/29)

All of the children correctly gave a "yes" response to the sentence when they were given the matching scenario (A). There were two 4-year-old children who failed to reject the sentence for scenario (B): they wrongly accepted it even when the indirect object animal was the one who did the action denoted in the adverbial.

4.5.3 Pre-test 2: Semantic Difference

Design

In pre-test 2, we examined the children's knowledge of the semantic difference between the productive causative and the lexical causative. We used two pairs of the productive and the lexical causative verbs in stimulus sentences throughout this experiment. Note that we adopted a pair of *kabuse-* 'put on' and *kabur-ase-* 'make someone put on' in Experiment I, and another pair, *mise-* 'show' and *mi-sase-* 'make someone look at,' in Experiment II. In other words, we only used one pair of the verbs for each experiment, and never tested two or more pairs of verbs for the same children in the same experiment. In order to see if there would be any difference in children's responses depending on the verb choice, in this experiment we tested two pairs of the lexical and the productive causative verbs with the same children. Thus in this pre-test, we needed to examine whether the children knew the semantic difference between *mise-* 'show' and *mi-sase-* 'make someone look at' and between *kabuse-* 'put on' and *kabur-ase-* 'make someone put on.' In particular, we tested whether they knew that the lexical causative verbs of each pair, *mise-* 'show' and *kabuse-* 'put on,' can only be used in the direct causation situation.

The test sentences with the two lexical causative verbs are given in (20) and (21).

(20) Lexical causative with *mise-* 'show'

Buta-ga kuma-ni kago-no naka-o mise-ta.
pig-NOM bear-DAT basket-GEN inside-ACC show-PAST
'The pig showed the inside of the basket to the bear.'

(21) Lexical causative with *kabuse-* 'put on'
Buta-ga kuma-ni bousi-o kabuse-ta.
pig-NOM bear-DAT hat-ACC put.on-PAST
'The pig put the hat on the bear.'

As we already saw in the previous chapter, lexical causative sentences such as (20) and (21) exclusively denote the situation called direct causation, in which the subject, *the pig*, is an agent who directly acts on the object and the indirect object NP, *the bear*, is just a goal.

In order to test if the children have this knowledge, two scenarios were prepared for each test sentence.⁴¹ One depicts the situation of direct causation, which is a matching scenario and the other expresses the indirect causation situation, which is a mismatching one. Scenarios for the lexical causative with *mise-* 'show' are given in (22) and those for the one with *kabuse-* 'put on' are given in (23).

(22) Scenarios for lexical causative with *mise-* 'show'

Scenario A (direct causation): *A pig shows a bear the inside of a basket.*

Scenario B (indirect causation): *A pig makes a bear look at the inside of a basket.*

(23) Scenarios for lexical causative with *kabuse-* 'put on'

Scenario A (direct causation): *A pig puts a hat on a bear's head.*

Scenario B (indirect causation): *A pig makes a bear put on a hat.*

If a child knows the semantic difference between the lexical and the productive causatives, he is expected to reject the lexical causatives in (20) and (21) under scenario (B).

⁴¹ The scenarios used in this pre-test are exactly the same as those used in Experiment II. The details of each scenario can be found in section 3.5.2 of Chapter 3.

Results

The results are given in Tables 4.7 and 4.8 below. Table 4.7 shows the children's correct responses for the lexical causative with *mise-* 'show' in (20) and Table 4.8 shows those for the lexical causative with *kabuse-* 'put on' in (21).

Table 4.7. Correct responses for lexical causative with *mise-* 'show'

	Direct causation TRUE	Indirect causation FALSE
4-year-olds (N=11)	100% (11/11)	91% (10/11)
5-year-olds (N=11)	100% (11/11)	100% (11/11)
6-year-olds (N=7)	100% (7/7)	100% (7/7)
Total (N=29)	100% (29/29)	97% (28/29)

Table 4.8. Correct responses for lexical causative with *kabuse-* 'put on'

	Direct causation TRUE	Indirect causation FALSE
4-year-olds (N=11)	100% (11/11)	100% (11/11)
5-year-olds (N=11)	100% (11/11)	91% (10/11)
6-year-olds (N=7)	100% (7/7)	100% (7/7)
Total (N=29)	100% (29/29)	97% (28/29)

All of the children accepted the sentences for the (A) scenarios. More importantly, we can see that most of the children correctly rejected the sentences when the (B) scenarios which depict the indirect causation situation were presented to them. One 4-year-old failed to reject the sentence with *mise-* 'show' and one 5-year-old did not reject the one with *kabuse-* 'put on.' These results look similar to those obtained in Condition 2 of Experiment II (cf. section 3.5.2 of Chapter 3), leading us to conclude again that the semantic difference between the lexical and the productive causatives is acquired quite early.

4.5.4 Pre-test 3: Structural Difference

Design

The aim of the last pre-test was to make certain that the children who participated in this experiment actually could assign a bi-clausal structure to the productive causative. Recall that in Experiment III, we confirmed that children can distinguish the productive causative from the lexical counterpart with respect to their structures from the very early on, when we set up the easier context for the children to show their ability to treat the embedded subject as antecedent of *zibun* 'self.' With the goal of the current experiment being to elucidate why children show non-adult-like performance with the productive causative despite the fact that they are in fact able to assign a correct structure to the construction, it was necessary to confirm that the children who will be tested in the following test condition have the ability to assign a bi-clausal structure to the productive causative in the first place.

In order to examine their ability to assign a bi-clausal structure to the productive causative, we adopted the same experimental design used in Experiment III (cf. section 4.3 of this chapter). The target sentences are the lexical causative with *mise-* 'show' and the productive causative with *mi-sase-* 'make someone look at' with *zibun* 'self,' repeated in (24) and (25).

(24) (= (3)) Lexical causative

Buta_i -ga kuma_j -ni zibun_{i/*j} -no hon-o mise-ta.
pig-NOM bear-DAT self-GEN book-ACC show-PAST
'The pig showed self's book to the bear.'

(*zibun* 'self' = pig, *bear)

(25) (= (4)) Productive causative

Buta_i-ga kuma_j-ni zibun_{i/j}-no hon-o mi-sase-ta.
pig-NOM bear-DAT self-GEN book-ACC look.at-CAUS-PAST

'The pig made the bear look at self's book.'

(*zibun* 'self' = pig, bear, *someone else)

As we observed in section 4.3, the important aspect of this test was to prepare the scenarios in which the referent of the matrix subject of both the lexical and the productive causatives cannot be antecedent of *zibun* 'self': the pig in above cases does not possess anything. The sample scenarios used in this pre-test are given again in (26) and (27), which are exactly the same as those used in Experiment III.

(26) Scenario for lexical causative in (24)

Scenario (A): *A pig has a bear's book.*

The pig shows the bear's book to the bear.

(*zibun* 'self' → indirect object NP) -FALSE

(27) Scenarios for productive causative in (25)

Scenario (B): *There are a pig, a bear, and rabbit. The he pig does not have a book.*

The pig makes the bear look at the bear's book.

(*zibun* 'self' → embedded subject) -TRUE

Scenario (C): *There are a pig, a bear, and rabbit. The he pig does not have a book.*

The pig makes the bear look at the rabbit's book.

(*zibun* 'self' → someone else) -FALSE

As we saw in section 4.3 in which Experiment III was reported on, the lexical causative sentence in (24) is false for scenario (A), for the indirect object NP cannot be an antecedent of *zibun* 'self.' As for the productive causative sentence in (25), the test sentence is true for scenario (B), but false for scenario (C), for the reflexive pronoun *zibun* 'self' must be bound by a subject and this condition is met only in the case of (B).

Results

We now turn to the results of this pre-test. The results of the children's responses are given below. We first look at their responses for the lexical causative shown in Table 4.9.

Table 4.9. Correct responses for lexical causative

	Indirect object (A) - FALSE
4-year-olds (N=11)	100% (11/11)
5-year-olds (N=11)	82% (9/11)
6-year-olds (N=7)	86% (6/7)
Total (N=29)	90% (26/29)

26 children out of 29 (90%) gave correct answers to the lexical causative when the intended antecedent of *zibun* 'self' was the indirect object NP in the given scenario.⁴² This high correct response rate was already observed in Experiment III, and it reinforces our finding that the subject-orientation of the reflexive pronoun in Japanese is acquired early.

Table 4.10 shows the children's responses for the productive causative.

Table 4.10. Correct responses for productive causative

	Embedded subj (B) - TRUE	Someone else (C) - FALSE
4-year-olds (N=11)	73% (8/11)	100% (11/11)
5-year-olds (N=11)	91% (10/11)	100% (11/11)
6-year-olds (N=7)	86% (6/7)	100% (7/7)
Total (N=29)	83% (24/29)	100% (29/29)

⁴² It appears that the percentage of the children who gave the correct answer to the lexical causative in this condition (90%) is slightly lower than that found in Experiment III (96%). I speculate that the children who participated in Experiment III were those who passed the criteria set up in Experiment II, which guarantees that they knew the subject-orientation of *zibun* 'self.' In this pre-test, however, the result was obtained from all of the children who participated in the experiment and were not yet selected by a certain criteria.

The left column shows whether the children gave a correct "yes" answer to the productive causative when the embedded subject was the intended antecedent of *zibun* 'self.' Twenty-four children (83%) judged the sentence true. Three 4-year-olds, one 5-year-old, and one 6-year-old wrongly rejected the sentence. It is possible that either those children were treating the productive causative just like the lexical counterpart or they rejected the productive causative despite their knowledge that the productive causative is bi-clausal. We cannot sort this out at this point, but at least we can state that 24 out of 29 children accepted the productive causative in this condition, indicating that those children treated the embedded subject of the productive causative as a "subject," though the subject is marked with non-canonical case.

4.5.5 Subject Selection

As mentioned above, we take the knowledge tested in the previous three pre-tests as prerequisite for the test session of the experiment. Thus, the children who gave more than one wrong answer during these pre-tests are eliminated from the following test session. There were two such children: one 5-year-old and one 6-year-old. The 5-year-old child (5;0) gave two wrong answers, one in pre-test 1 and the other in pre-test 2. The 6-year-old child (6;0) gave a total of four wrong answers, two in pre-test 1 and two in pre-test 3.

The subjects who passed these pre-tests are given in (28).

(28) Subjects: N=27

4-year-olds =11 (age=4;0-4;11, mean=4;6)

5-year-olds =10 (age=5;1-5;10, mean=5;6)

6-year-olds =6 (age=6;0-6;6, mean=6;3)

In what follows, we examine the experimental results obtained from these 27 children. We also collected data from five adult native speakers of Japanese⁴³ as well, which will be compared to that of the children.

4.5.6 Main Session: Productive Causative and Indirect Benefactive

In this section, we report the main session of Experiment V and discuss why children show non-adult-like performance with the productive causative, as observed in Experiments I and II which revealed that children did not accept the embedded subjects of the productive causative as antecedent of *zibun* 'self' and PRO controller. In so doing, we compare the children's comprehension of the productive causative with that of the indirect benefactive, which have some properties in common but differ from each other in some respects. Recall that the constructions share their case-marking pattern: nominative case for the matrix subject, dative case for the embedded subject, and accusative case for the direct object of the embedded clause. They are both bi-clausal, but they differ apart from the specific morphology, in that the productive causative has a vP complement, while the indirect benefactive has a TP complement.

In what follows, the experimental design and the results of the main session are described. In section 4.5.6.1, we look at the design and the results of the first condition of the main session which tested the children's comprehension of the productive causative. In section 4.5.6.2, we report on the design and the results of the second condition of the

⁴³ They are all undergraduate students whose majors are not linguistics.

main session which dealt with their comprehension of the indirect benefactive, which will be compared with those of the productive causative.

4.5.6.1 Test Condition 1: Productive Causative

Design

The target sentences of this condition are shown in (29) and (30) below.⁴⁴

(29) Productive causative with *zibun* 'self'

- a. Buta-ga kuma-ni zibun-no hon-o mi-sase-ta.
 pig-NOM bear-DAT self-GEN book-ACC look.at-CAUS-PAST
 'The pig made the bear look at self's book.
 (*zibun* 'self' = pig, bear, *someone else)

- b. Buta-ga kuma-ni zibun-no bousi-o kabur-ase-ta.
 pig-NOM bear-DAT self-GEN hat-ACC put.on-CAUS-PAST
 'The pig made the bear put on self's hat.'
 (*zibun* 'self' = pig, bear, *someone else)

(30) Productive causative with adverbial

- a. Buta-ga kuma-ni [PRO futa-o akete] naka-o mi-sase-ta.
 pig-NOM bear-DAT lid-ACC opening inside-ACC look.at-CAUS-PAST
 'The pig made the bear look at the inside (of the basket) by removing its lid.'
 (The pig removed the lid, The bear removed the lid,
 *Someone else removed the lid)

- b. Buta-ga kuma-ni [PRO me-o tubutte] bousi-o kabur-ase-ta.
 pig-NOM bear-DAT eye-ACC closing hat-ACC put.on-CAUS-PAST
 'The pig made the bear put on the hat while closing eyes.'
 (The pig closed eyes, The bear closed eyes,
 *Someone else closed eyes)

⁴⁴ As the sample test sentence in other experiments, animals and stuffs selected in the actual experiment are different from those used in the sample test sentences.

The sentences in (29) are productive causatives with *zibun* 'self' with two different main verbs; *mi-ru* 'look at' and *kabur-u* 'put on.' Those in (30) are productive causatives with adverbial phrases with PRO with the same two main verbs as in (29). As shown in parentheses of each sentence, all four sentences above are two-way ambiguous: both the matrix subject and the embedded subject are potential antecedents of *zibun* 'self' and controllers of PRO in adverbial phrases.

The children were tested on whether they would allow two interpretations for each test sentence. Three scenarios were prepared for each sentence above. Thus we have a total of 12 scenarios for this condition.⁴⁵

Scenario (A): the matrix subject is an intended antecedent or controller.

Scenario (B): the embedded subject is an intended antecedent/controller.

Scenario (C): an extra-sentential animal is referred to by *zibun* 'self' and one who does the action denoted by the adverbial phrase.

For each sentence in (29) and (30), scenarios (A) are matching ones, scenarios (B) are also matching stories, but scenarios (C) are mismatching ones.

Based on the results of the previous experiments reported in Chapter 3 (Experiments I and II), we can predict that they will not allow the embedded subject to behave as a "subject."

⁴⁵ A part of the actual scenarios used in this condition along with the pictures are the same as those used in Condition 4 of Experiment II (cf. section 3.5.5 of Chapter 3). The narrated stories for the productive causative with a verb *mi-ru* 'look at' can be referred to in Appendices 1 and 2 in section 3.7 in Chapter 3. The scenarios for those with the other verb *kabur-u* 'put on' actually used in this experiment are given in Appendix 4 in section 4.7 of this chapter.

Results

Let us look at the results of this condition. Table 4.11 shows the children's responses for the productive causative with *zibun* 'self,' and Table 4.12 summarizes their responses for those with adverbials. As we used two verbs for each sentence type and put them into one category in the tables, the total number of responses for each age group are sixty-six, hence twenty-two for each scenario type.

Table 4.11. Correct responses for causatives 'look at' and 'put on' with *zibun*

	Matrix subj (A) TRUE	Embedded subj (B) TRUE	Someone else (C) FALSE
4-yrs (N=11)	100% (22/22)	23% (5/22)	95% (21/22)
5-yrs (N=10)	100% (20/20)	20% (4/20)	100% (20/20)
6-yrs (N=6)	100% (12/12)	50% (6/12)	100% (12/12)
Total (N=27)	100% (54/54)	28% (15/54)	98% (53/54)
Adults (N=5)	100% (10/10)	80% (8/10)	100% (10/10)

Table 4.12. Correct responses for causatives 'look at' and 'put on' with adverbial

	Matrix subj (A) TRUE	Embedded subj (B) TRUE	Someone else (C) FALSE
4-yrs (N=11)	100% (22/22)	41% (9/22)	95% (21/22)
5-yrs (N=10)	95% (19/20)	35% (7/20)	90% (18/20)
6-yrs (N=6)	100% (12/12)	67% (8/12)	100% (12/12)
Total (N=27)	98% (53/54)	44% (24/54)	94% (51/54)
Adults (N=5)	90% (9/10)	100% (10/10)	100% (10/10)

First, Table 4.11 shows that almost all of the children correctly accepted the productive causative with *zibun* 'self' when given scenario (A), i.e. matrix subject antecedent, and correctly rejected it for scenario (C). There was only one 4-year-old (4;9) who failed to reject the productive causative with the verb *mi-* 'look at' for the (C)-type scenario. As for the scenario (B) where the embedded subject is the intended antecedent of *zibun* 'self,' they had trouble accepting the sentence: we observed only 15 correct

responses (15/54=28%) and there were only five children (two 4-year-olds, one 5-year-old, and two 6-year-olds) who consistently accepted the productive causative with both verbs, *mi-* 'look at' and *kabur-* 'put on,' for this scenario. This low response rate is not a surprising result and is expected based on the findings of the previous experiments. Also, there was one adult who rejected the sentence with both verbs.

Secondly, we see a more or less similar response pattern in Table 4.12. Subjects had no trouble accepting the productive causative with an adverbial with scenario (A) in which the matrix subject was a controller of PRO in the adverbial phrases and rejecting it for scenario (C). However, also expected from the previous experiments, they failed to accept the similar sentence when scenario (B) was presented. They gave a total of 24 out of 54 "yes" responses (44%) in this case, and again there were only five children (one 4-year-old, two 5-year-olds, and two 6-year-olds) who gave correct answers to the sentences with two different verbs (*mi-sase-* 'make someone look at' and *kabur-ase-* 'make someone put on'). In addition, among these 5 children, there was only one 6-year-old child who also gave correct responses to the productive causatives with both verbs, suggesting that there was only one child who correctly allowed the embedded subjects of all four sentences (*zibun* 'self' and adverbial \times *look at* and *put on*).

Note that the acceptance rate was below chance, but it is slightly, but statistically significantly higher than that of the productive causative with *zibun* 'self' (paired *t* test: $t = 2.08$, $p = 0.047$). This slightly higher correct response rate for the productive causative with adverbial compared to that with *zibun* 'self' could be accounted for by the prosodic factor discussed in section 3.5.6 of Chapter 3.

In sum, across every age group the children performed in a non-target-like manner with respect to the productive causative when the embedded subject was an intended antecedent of *zibun* 'self' and controller of PRO in adverbial phrases. This replicates the findings of both Experiments I and II.

Keeping our findings in mind, we now examine the same children's comprehension of the indirect benefactive with both *zibun* 'self' and adverbial phrases in the next subsection.

4.5.6.2 Test Condition 2: Indirect Benefactive

Design

The test sentences of this condition are given in (31) and (32). The sentences in (31) are the indirect benefactives with *zibun* 'self' with two different verbs, i.e. *mi*- 'look at' and *kabur*- 'put on,' as in the case of the productive causative. Those in (32) are the indirect benefactives with adverbial phrases.

(31) Indirect benefactive with *zibun* 'self'

- a. Buta-ga kuma-ni zibun-no hana-o mite-morat-ta.
 pig-NOM bear-DAT self-GEN flower-ACC look.at(gerund)-BEN-PAST
 'The pig received the favor of the bear's looking at self's flower.'
 (*zibun* 'self' = pig, bear, *someone else)
- b. Buta-ga kuma-ni zibun-no bousi-o kabutte-morat-ta.
 pig-NOM bear-DAT self-GEN hat-ACC put.on(gerund)-BEN-PAST
 'The pig received the favor of the bear's putting on self's hat.'
 (*zibun* 'self' = pig, bear, *someone else)

(32) Indirect benefactive with adverbial

- a. Buta-ga kuma-ni [PRO doa-o akete] naka-o mite-morat-ta.
pig-NOM bear-DAT door-ACC opening inside-ACC look.at (gerund)-BEN-PAST
'The pig received the favor of the bear's looking at the inside by opening the door.'

(The pig opened the door, The bear opened the door, *Someone else opened the door)

- b. Buta-ga kuma-ni [PRO te-o agete] bousi-o kabutte-morat-ta.
pig-NOM bear-DAT hand-ACC raising hat-ACC put.on (gerund)-BEN-PAST
'The pig received the favor of the bear's putting on the hat while raising his hand.'

(The pig raised his hand, The bear raised his hand, *Someone else raised his hand)

Note again that each of the indirect benefactive sentences above is ambiguous, as shown in the parentheses. The aim of this condition was to examine if the children allow the two interpretations for each test sentence.

Just as in the previous condition, three scenarios were prepared for each sentence type.

And two different verbs were tested for each sentence type, thus we have a total of 12 different scenarios prepared in this condition.⁴⁶

Scenario (A): the matrix subject is an intended antecedent or controller.

Scenario (B): the embedded subject is an intended antecedent/controller.

Scenario (C): an extra-sentential animal is referred to by *zibun* 'self' and one who does the action denoted by the adverbial phrase.

All of the test sentences in (31) and (32) are true statements under scenario type (A) and they are also true statements under scenario type (B). Under scenario type (C), the test sentences are false statements. The children's responses for each of the test sentences were examined.

⁴⁶ Just like the scenarios for the productive causative in the previous condition, a sample set of narrated scenarios are given in Appendix 5 in section 4.7 of this chapter.

Results

The results of the children's responses for the indirect benefactive sentences with *zibun* 'self' in (31) are summarized in Table 4.13.

Table 4.13. Correct responses for benefactives 'look at' and 'put on' with *zibun*

	Matrix subj (A) TRUE	Embedded subj (B) TRUE	Someone else (C) FALSE
4-yrs (N=11)	82% (18/22)	55% (12/22)	100% (22/22)
5-yrs (N=10)	100% (20/20)	40% (8/20)	95% (19/20)
6-yrs (N=6)	100% (12/12)	67% (8/12)	100% (12/12)
Total (N=27)	93% (50/54)	52% (28/54)	96% (26/27)
Adults (N=5)	100% (10/10)	90% (9/10)	100% (10/10)

We see that most of the children performed in a target-like fashion for scenario type (A): they gave 50 correct responses out of 54 (93%). A total of four wrong responses (three for the sentences with 'look at' and one for those with 'put on') were observed in three children. They were all 4-year-old children. The results of the right-hand column tell us that they performed almost perfectly, rejecting the indirect benefactive with *zibun* 'self' when *zibun* 'self' referred to an extra-sentential animal in the scenario. The children showed almost perfect performance for scenarios (A) and (C).

However, they did not accept the test sentences given scenario (B), as they did with the productive causative sentences in the previous section. They gave only a total of 28 "yes" answers out of 54 (52%) to the sentences, and there were 10 children who gave consistent correct answers to the sentence with both main verbs.⁴⁷ The percentages of

⁴⁷ This means that there were 8 children who gave a correct answer to one of the test sentences with *zibun* 'self'; the sentence with *mi-ru* 'look at' or one with *kabur-u* 'put on.' But we cannot see any trend among the children showing which sentence was easier to accept than the other.

their correct response rates for scenario type (B) in this condition, however, are higher than those observed in the previous productive causative condition: we have 52 % correct responses in this indirect benefactive condition (cf. Table 13), while 28% in the previous condition (cf. Table 11). In other words, the children gave more correct answers to the indirect benefactive with *zibun* 'self' than to the productive causative (paired *t* test: $t = 3.12, p = 0.004$) with *zibun* 'self.'

Turning to the indirect benefactives with adverbial phrases in (32), the children's responses are shown in Table 4.14 below.

Table 4.14. Correct responses for benefactives 'look at' and 'put on' with adverbial

	Matrix subj (A) TRUE	Embedded subj (B) TRUE	Someone else (C) FALSE
4-yrs (N=11)	95% (21/22)	64% (14/22)	77% (17/22)
5-yrs (N=10)	100% (20/20)	50% (10/20)	100% (20/20)
6-yrs (N=6)	100% (12/12)	75% (9/12)	100% (12/12)
Total (N=27)	98% (53/54)	61% (33/54)	91% (49/54)
Adults (N=5)	100% (10/10)	90% (9/10)	100% (10/10)

Like the results of the sentences with *zibun* 'self' just observed above, they showed almost perfect responses for scenario type (A). They also performed very well on the sentences for scenarios (C), though five 4-year-old children each gave one wrong "yes" answer.

Although they performed well on the test sentences under scenario types (A) and (C), the children had problems with scenario (B): they rejected the sentences even when the test sentences were true statements for the scenarios. They gave a total of 33 correct "yes" responses out of 54 trails (61%), and there were 14 children (six 4-year-olds, four 4-year-olds, and four 6-year-olds) who judged the test sentences as correct for both verbs (*look at* and *put on*). The rate was only a little above chance. However, the percentage (61%) is

higher than that of the productive causative with adverbials (44%) observed in the previous condition (cf. Table 9), and the difference is statistically significant (paired t test: $t = 2.21, p < 0.036$). Again we observe that the children give more correct answers to the indirect benefactive with adverbials than to the productive causative with adverbials.

More detailed discussion of the results, including individual response analyses, will be dealt with in the next section.

4.5.7 Discussion

In this section, we first summarize what we have found in the current experiment as well as the results of the children's comprehension of the productive causative and the indirect benefactive and what those findings tell us about the last two hypotheses we proposed in section 4.2.

In this experiment, we first examined whether the children had knowledge of the subject-orientation properties of *zibun* 'self' and PRO-control adverbials and both the semantic and the structural difference between the lexical and the productive causatives through three pre-tests. Those who passed the pre-tests were then examined as to whether they could apply the knowledge of the subject-orientation properties to the productive causative and the indirect benefactive. Although they had no trouble accepting both constructions when the matrix subjects were intended antecedents of *zibun* 'self' or controllers of PRO in adverbials in given scenarios and rejecting the sentences when extra-sentential animals were referred to by the reflexive pronoun or as a controller, they showed non-adult-like performance with respect to the embedded subject of both

constructions. The finding that children even at the age of 6 showed non-target-like responses for the productive causative, disallowing the embedded subject to be an antecedent of *zibun* 'self' or a controller of PRO in adverbials, is not at all an unexpected result for us, for we observed the same behavior in Experiments I and II. We found in this experiment, however, that the children disallowed the embedded subject of the indirect benefactive as well as those of the productive causative.

Although they showed non-target-like performance with both the productive causative and the indirect benefactive, they performed differently across the constructions. The results given in the previous section seem to show that the children were overall less likely to allow the embedded subject of the productive causative to be an antecedent of *zibun* 'self' or a controller of PRO in adverbials than that of the indirect benefactive (paired *t* test: $t = 3.81, p < 0.01$).

However, this generalization is not applicable to every child when we take a close look at individual data. Let us check how many children performed well on both constructions, better on one construction than the other, or poorly on both. Recall that we had four different sentence types for each construction, i.e. one with *zibun* 'self' with a verb 'look at', one with *zibun* 'self' with a verb 'put on', one with an adverbial with 'look at', and one with an adverbial with 'put on.' Each child receives a score from 0 to 4 for each construction. Two constructions, the productive causative and the indirect benefactive, were tested and two different main verbs were used for each construction in stimuli in this experiment. For example, if a child correctly responded to every sentence type, he will receive a score of 4. If a child correctly responded to the productive causative with a

verb *look at* but not with *put on* and gave correct responses to the indirect benefactive with both main verbs, his score is 3, and so on. We then set up a pass/non-pass criterion for allowing the embedded subject of each construction to be an antecedent of *zibun* 'self' and a PRO controller as in (33):

- (33) \checkmark (pass) = 3/4 or 4/4
 * (non-pass) = 0/4, 1/4, or 2/4

When a child received a score of 3, he is regarded as one who passed the test. When a child received a score of 1, he belongs to "non-pass." Based on the criteria, they are classified into four groups outlined in section 4.5.1, shown in Table 4.15.

Table 4.15. Productive causative × Indirect benefactive

Benefactive Causative	\checkmark	*
\checkmark	Group A: 7	Group B: 0
*	Group C: 6	Group D: 14

Group A is the group of children who performed in an adult-like manner. Group B is the group of children who performed well on the productive causative but not on the indirect benefactive. Children in Group C are those who did not pass the causative test but passed the indirect benefactive one. Lastly, Group D children are those who performed badly on both constructions. There were 7 children in Group A, who showed adult-like performance on both constructions. There were 14 children in Group D, who disallowed the embedded subject of both constructions to be antecedent of *zibun* 'self' and controller

of PRO in adverbials. In Group C, there were 6 children, who performed well on the indirect benefactive but poorly on the productive causative. However, there was no child who belongs to Group B. This result clearly shows that the children who passed the productive causative test always passed the indirect benefactive test ($\chi^2 = 10.18$, $df = 1$, $p < 0.005$). In other words, by the time children become able to allow the embedded subject of the productive causative as antecedent of *zibun* 'self' or controller of PRO adverbials, they can already do so with the indirect benefactive.

Let us now examine the breakdowns of each group in Table 4.15, which are summarized in Table 4.16 below.

Table 4.16. Breakdowns of each group

	Group A (N=7)	Group B (N=0)	Group C (N=6)	Group D (N=14)
4-year-olds (N=11)	2	0	4	5
5-year-olds (N=10)	2	0	1	7
6-year-olds (N=6)	3	0	1	2

In Group A, there were two 4-year-olds, two 5-year-olds, and three 6-year-olds. It is clear that half of the 6-year-old children fell into Group A. The two children in each age group, 4-year-olds and 5-year-olds, performed well on both constructions, but the numbers are very small, considering the total numbers of children in each group.

The children grouped under Group D found the embedded subjects of both constructions equally (or almost equally) hard to accept to be antecedent of *zibun* 'self' or controller of PRO. Among those children, 5-year-olds occupied half of the group. On the other hand, among the children in Group C, four children out of six were 4-year-olds, and

there were only two other children (one 5-year-old and one 6-year-old). Based on these observations, it seems that younger children tend to be classified into Group C and older children have tendency to be grouped under Group D. This implies that younger children adopt the TP subject attraction (hypothesis 4) and older children use the nominative subject attraction (hypothesis 3). In other words, younger children pay more attention to the structural cue than the case-marking of arguments, and older children are sensitive to the case-marking. We will come back to the issue of this developmental course that children follow later in the next chapter.

Returning to the hypotheses we proposed in section 4.2, this last experiment attempted to sort out which hypothesis could best account for the children's non-target-like performance with the productive causative. It turns out that the problem is not straightforwardly resolved by either hypothesis. Rather, we need both hypotheses to explain why children failed to treat the embedded subject as "subject." We found in this experiment that the children who performed poorly on the productive causative could be divided into two groups, i.e. Group C and Group D. Those who passed the indirect benefactive test (Group C) seemed to follow the strategy that Hypothesis 4 proposes: they are following a strategy of picking a TP subject as antecedent of *zibun* 'self' and controller of PRO. On the other hand, Hypothesis 3 (nominative subject attraction) can account for the behavior of the children who performed poorly on the indirect benefactive as well as the productive causative (Group D). The children in this group found the embedded subject of both the productive causative and the indirect benefactive equally difficult to

accept as antecedent of *zibun* 'self' and PRO controller because the embedded subjects both constructions are case-marked with a dative *-ni* not a nominative *-ga*.

The results of this experiment lead us to claim that children have two kinds of strategies in dealing with potentially ambiguous sentences with bi-clausal structure containing *zibun* 'self' or subject-oriented adverbials. The question as to how exactly children interpret both the productive causative and the indirect benefactive sentences during their on-line parsing will be discussed in detail in the next chapter.

4.6 Summary

Let us conclude this chapter by summarizing the findings we obtained in a series of experimental studies. In the previous chapter, we observed that children even at the age of around 6 performed differently from adults with respect to the productive causative when the embedded subject of the sentences was targeted as an antecedent or a controller. Do the children have a different grammar from adults'? If not, then what made them perform differently from adults? These are questions this chapter has been trying to elucidate.

We first laid out four possible hypotheses regarding reasons why young children do not allow two interpretations for the productive causative with *zibun* 'self' or subject-oriented adverbs. The first hypothesis, the mono-clausal analysis, was rejected based on the finding that in modifying the scenarios the children accepted the productive causative sentences a lot easier: we found that young children's grammars allow the embedded subject as antecedent of *zibun* 'self' and controller of PRO in adverbials. The children

have the ability to assign a correct bi-clausal structure to the productive causative and differentiate it from the lexical counterpart at an early developmental stage. In other words, the children's ability to build a correct structure for the productive causative is not different from adults'.

In order to test the second hypothesis, the root clause subject attraction hypothesis, we compared the children's comprehension of the productive causative with that of the complex sentence taking a finite complement. The hypothesis states that children try to pick a subject in the root clause, i.e. the highest subject, when there are two options, even though they have grammar that allows those two readings. According to this hypothesis, the same children who had trouble accepting the embedded subject of the productive causative should allow the matrix subject of the complex sentence more easily than the embedded subject. However, it turned out this was not the case. Most of the children accepted the embedded subject of the complex sentence with finite embedded clause as the intended antecedent of *zibun* 'self,' showing that they were not just looking for a subject in a root clause. Based on the result of this experiment, we rejected the second hypothesis.

One more experiment was conducted to clarify the children's non-target-like performance on the productive causative. In so doing, we compared the comprehension of the productive causative with that of the indirect benefactive. Three groups of children emerged with respect the comprehension patterns of each construction. Children in the first group (Group A) showed adult-like performances for both constructions. Children in the second group (Group C) allowed the embedded subject in Spec TP (indirect

benefactive) but not that in Spec vP (productive causative), which is compatible with the hypothesis 4, TP subject attraction. The last group of children (Group D) disallowed the embedded subject with dative *-ni* case regardless of its position, which is compatible with hypothesis 3, nominative subject attraction. Furthermore, we found that there was no child who allowed the embedded subject of the productive causative but not that of the indirect benefactive. These findings lead us to conclude that some (and relatively younger) children adopted the TP subject attraction as a strategy for ambiguity resolution, and other (relatively older) children followed the nominative subject attraction.

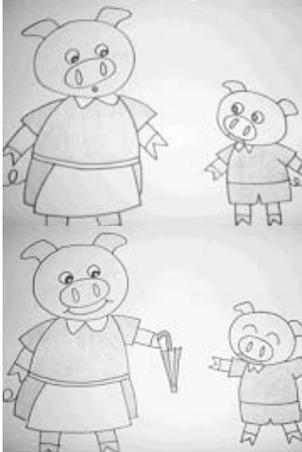
In order to explain the behavior of the different groups, in the next chapter, we will discuss how exactly the children parse the potentially ambiguous constructions with bi-clausal structures. A second issue is how it is possible for such young children to assign a bi-clausal structure to the productive causative, distinguishing it structurally as well as semantically from the lexical causative counterpart. What kind of linguistic ability is required to guarantee that such young children acquire the correct structure for the productive causative will be addressed in the next chapter.

4.7 Appendices

Appendix 3 – Experiment III: What If There Is Only One Referent?

Lexical causative

(A) Indirect object



Once upon a time, there were a mother pig and a boy pig. The boy asked his mother if she bought an umbrella for him. The mother said, "Yes, I did." The boy said, "I wanna see it, I wanna see it!" "All right, I'll bring it to you now."

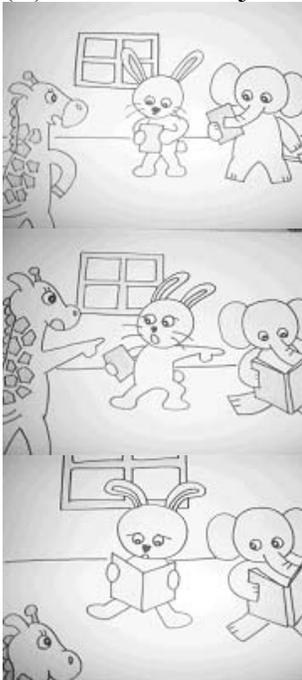
And she came back with a new umbrella. The boy was glad and said, "Thanks! Well...where is your umbrella?" She said, "There is no new umbrella for me."

Puppet: *The mother showed self's umbrella to the child.*

(FALSE)

Productive causative

(B) Embedded subject



A giraffe teacher asked to a rabbit and an elephant, "Did you bring your picture books with you?" "Yes!" they said together. The elephant has his red book, and the rabbit has her green book. "Let's read your picture books!" said the teacher.

The rabbit suddenly said to the teacher that she wanted to read the elephant's red book. The teacher said, "You should look at your own picture book." The rabbit didn't listen to the teacher. "I don't wanna read this!" But the teacher strongly said again, "You should look at your own picture book!"

After all, she gave up and began to read her own green book.

Puppet: *The teacher made the rabbit look at self's*

picture book. (TRUE)

(B) Someone else



A cat teacher said to everybody, "We will read a blue book today. Did you all bring your blue book with you?" A pig found that he had a different book. The teacher said to the pig, "Well, you have a different book...why don't you read the panda's blue book with him?" The pig said, "I wanna read my book!" The teacher said, "But yours is not a blue book, right? Read that book with the panda!"

The pig had no choice but to look at the panda's blue book with him.

Puppet: *The teacher made the pig look at self's picture book.* (FALSE)

**Appendix 4 – Experiment V Main Session:
Productive Causative with *kabur-u* 'put on'**

Productive causative with *zibun* 'self'

(A) Matrix subject

A cat with a red hat came across a pig. The pig was holding his hat which is very dirty and has many holes. The cat said, "Why don't you put on your hat? It's very hot today." The pig answered, "I don't want to because my hat is very dirty." "But you should put on the hat!" said the cat. But the pig didn't do so. The cat told the pig, "You have to put on a hat! If you don't like your hat, I'll give you my hat. Put this hat on!" The pig still didn't want to put on any hat. "I don't like to put hats on..." The cat at last ordered the pig, saying "You MUST put my hat on!!" The pig reluctantly put on cat's hat.

Puppet: *The cat made the pig put on self's hat.* (TRUE)

(B) Embedded subject

A mouse with a big red hat came across a turtle. The turtle was just holding his small hat. The mouse said, "Why don't you put on your hat? It's very hot today." The turtle said, "My hat is too small for me. I don't want to put this on." "But you should put on the hat!" said the mouse. The turtle said, "Well, I like your hat. If you give your hat to me, I'll put it on." The mouse refused, "No! This is mine and I need this too! You have to put yours on, not mine!" As the mouse kept ordering the turtle to put on his hat, the turtle at last put his small hat on.

Puppet: *The mouse made the turtle put on self's hat.* (TRUE)

(C) Someone else

There are an elephant, a cat, a rabbit, and a cow. They decided to go picnic. The elephant asked everybody, "Do you all have hats with you? Well, Cow is not wearing a hat. Where is yours?" The cow answered, "I don't like mine and I don't want to put it on. So I left it at home." "You have to put something on while walking on such a hot day." said the elephant. The cow didn't do so. The elephant found a big purple hat on the ground. "Why don't you put that hat on?" The cow said, "That's not mine. It's too big!" At last the elephant screamed, "You put on that hat!!" The cow finally put the big purple hat on.

Puppet: *The elephant made the cow put on self's hat.* (FALSE)

Productive causative with PRO-control adverbial

(A) Matrix subject

A sheep brought a huge box to a cat and said, "This is a present for you. Open this! I bet you like this!" "What's in it?" "This is a strange hat. I want you to put this on." But the cat said, "I don't want to put this on now while you are staring at me." As the cat kept refusing to put the hat on, the sheep finally ordered the cat, "Put this on! I'm going to close my eyes then. Put this on!" The cat at last reluctantly took the hat out of the box and put it on.

Puppet: *The sheep made the cat put on the hat while closing eyes.* (TRUE)

(B) Embedded subject

A mouse who is a hat maker came to a raccoon with a huge box. The mouse said, "Here you are. This is for you." The raccoon replied, "Thank you! Can I put this on now?" The mouse said, "Well...I don't want you to look at the hat until you put it on." The raccoon said, "That's impossible!" The raccoon refused to do so. But the mouse kept asking. Finally, the mouse got angry and ordered the raccoon, "Close your eyes and put the hat on!" The raccoon at last closed his eyes and put the hat on.

Puppet: *The mouse made the raccoon put on the hat while closing eyes.* (TRUE)

(C) Someone else

A mouse who is a hat maker came to a dog's place to give him a cool hat. There are other animals in the room. They said, "Show us the hat! Put that hat on now!" But the dog is very shy and he didn't want everybody to look at him while he is wearing the hat. The mouse then told the other animals to close their eyes. The other animals first refused and said, "Mouse, you should close your eyes." But the mouse kept saying to them, "Everybody! Close your eyes now!!" Animals finally agreed and closed their eyes. The mouse then said to the dog, "Put the hat on now!!" "All right, all right" said the dog and he put on the cool hat.

Puppet: *The mouse made the dog put on the hat while closing eyes.* (FALSE)

Appendix 5 – Experiment V Main Session: Indirect Benefactive

Indirect benefactive with *zibun* 'self'

(A) Matrix subject

A frog and a mouse both grow flowers. The frog came across the mouse. The frog said to the mouse, "My flowers are still very small and look they are dying." The mouse said, "Why don't you bring yours? I'll take a look at them for you."

The frog brought his flowers. After examining the flowers, the mouse said, "Umm...I think they will be all right. Just don't forget to water them." "Thank you!" said the frog.

Puppet: *The frog received the favor of the mouse's looking at self's flower.* (TRUE)

(B) Embedded subject

Animals are growing magic flowers. They are flowers that grow bigger and bigger when one continues gazing at them. One day, a rabbit was in charge of looking at everybody's flowers.

The rabbit watched her own flower first. It suddenly grew huge. Then the rabbit said, "Well, which flower am I gonna watch now? There are still lots of flowers." There came a cat. The cat said, "I can help you. Whose flowers do you want me to take care of? Do you want me to look at your flower?" The rabbit told the cat, "I've already taken care of it. So can you take a close look at yours?"

The cat agreed and gazed at the cat's flower. The cat's flower now became huge!

Puppet: *The rabbit received the favor of the cat's looking at self's flower.* (TRUE)

(C) Someone else

Today, a monkey was in charge of watching everybody's magic flowers. The monkey said, "Umm...there are so many flowers. I can't take care of everything..." Here came a frog. The monkey said, "Do you have time? I wanna ask you to help me look at these flowers." The frog said, "All right. Do you want me to look at mine?" The monkey said, "No no no. Can you gaze at that bear's flower?"

The frog then gazed at the bear's flower and it became very tall.

Puppet: *The monkey received the favor of the frog's looking at self's flower.* (FALSE)

Indirect benefactive with PRO-control adverbial

(A) Matrix subject

A pig was standing in front of the door. Here came a lion. The lion asked the pig what's wrong. The pig said, "I can hear something weird inside of the house. Can you go inside and take a look?" The lion first refused. But the pig asked the lion to look at inside again and again. The lion finally agreed and said, "Well, if you open the door, I'll come inside for you."

The pig then opened the door. The lion then found that a TV is on.

Puppet: *The pig received the favor of the lion's looking at the inside
by opening the door.* (TRUE)

(B) Embedded subject

A fox was standing in front of his house. Here came a pig. The pig asked the fox, "What's wrong?" The fox said, "I think I saw something inside of my house. But I'm too scared to look what it is. Can you go inside and take a look for me?" The pig first refused.

As the fox kept asking again and again, the pig at last came close to the door and opened it. The fox was standing at the corner of the house, just looking. The pig found a rat running around the house.

Puppet: *The fox received the favor of the pig's looking at the inside
by opening the door.* (TRUE)

(C) Someone else

A cow was standing in front of an old, miserable house with cleaning stuff with his both hands. The cow was going to clean the house. As he was holding the cleaning stuff, he was unable to open the door. Here came a bear. The cow asked the bear, "Can you open the door and see how dirty the room is?" The bear said, "Well...I want to but look! I injured both arms and I can't open the door." They are both at a loss what to do.

Suddenly, a strong wind blew!! And then the door opened because of the wind.

The cow screamed, "Look! The door is now open! Can you take a look inside for me?" The bear didn't want to look inside because he didn't like dirty things. But the cow kept asking. And at last the bear agreed and came closer to the door. Then he saw how dirty and disorganized the room was.

Puppet: *The cow received the favor of the bear's looking at the inside
by opening the door.* (FALSE)

CHAPTER 5

GENERAL DISCUSSION

5.1 Introduction

In the previous two chapters, we looked at results of a series of experiments and observed how the children aged 4 to 6 (4 to 7 for Experiment I) interpret the causative constructions and the indirect benefactive in Japanese. We found that the children had knowledge that the lexical and the productive causatives are semantically distinct from a very early developmental stage. However, Experiments I and II revealed that children behaved as if they were not regarding the embedded subject of the productive causative as a subject, rejecting the productive causative sentence when the embedded subject was the intended antecedent of the reflexive pronoun or controller of PRO in adverbials. A similar behavioral pattern was also observed in the last experiment (Experiment V).

In order to elucidate the source of their non-adult-like performance, further experiments were conducted and the results were reported in Chapter 4. The first hypothesis, which states that the children's early structure for the productive causative is a mono-clause, was rejected based on the results of Experiment III. The children in fact had the ability to assign a correct bi-clausal structure to the productive causative. This was confirmed by the fact that they allowed the embedded subject of the productive causative to be an antecedent of *zibun* 'self' once the scenario was slightly altered to make that interpretation easily accessible.

Despite the fact that the children had the ability to distinguish the productive causative from the lexical causative both structurally and semantically, they gave non-target-like responses for the productive causative: more than half of the children did not allow the embedded subject to behave as a subject, when both matrix and embedded subjects are possible antecedents in the scenarios adopted in Experiments I and II. Given that these same children were able to accept the local subject as antecedent, when given the modified scenario in Experiment III, we should attribute their non-adult-like behavior to some kind of immature performance mechanism.

We further observed in Experiment V that the children who had trouble accepting the embedded subject as antecedent to *zibun* 'self' or controller of PRO in adverbial were divided into two groups. One group performed (Group C) well on the indirect benefactive and badly on the productive causative. The other group of children (Group D) performed badly on both constructions. The results of this experiment lead us to argue that two

ambiguity resolution strategies might have been at work; nominative subject attraction and TP subject attraction.

In the series of experiments, we found that young children have ability to assign a bi-clausal structure to the productive causative, and that they have trouble dealing with the embedded subject of the productive causative and indirect benefactive. Yet, questions remain as to how the early acquisition of bi-clausal structures for the productive causative comes about and also as to why they cannot accept the embedded subject of the constructions. The aim of this chapter is to try to answer to these questions.

In the next section, we first discuss the children's processing mechanism that could affect their comprehension of constructions with bi-clausal structure. In particular, we will discuss how the mechanisms by which the children comprehend the productive causative and the indirect benefactive on-line. Section 5.3 deals with the learnability problem regarding the Japanese causative constructions and the children's early acquisition of bi-clausal structure. We will discuss what kind of language acquisition mechanism could account for the fact that the children acquire both the structural and semantic difference between the Japanese causatives. And more generally, we will consider what kind of linguistic ability human mind is equipped with.

5.2 Comprehension of Bi-clausal Structure

In this section, we discuss how children learning Japanese give interpretation(s) to the causatives and the indirect benefactive, and we will try to elucidate why they performed differently from adults with respect to these constructions. In order to examine how the

children process and give interpretations to these constructions, we first need to understand what kind of processing mechanism children as well as adults adopt during their on-line interpretation. We also need to know in what way children are different from adults with respect to their on-line processing.

Before we talk about their comprehension of the causative and the indirect benefactive sentences, in section 5.2.1 we will survey the previous psycholinguistic studies concerning a particular approach to the human processing mechanism, namely, incrementality, which will be presupposed in the further discussion. We also deal with a phenomenon called "reanalysis difficulty," which could be regarded as a factor yielding the child-adult performance differences in processing the bi-clausal structures observed in the previous chapters. In section 5.2.2, we discuss the processing of the productive causative in Experiments I and II (and a part of V), by which we might be able to throw light on their non-adult-like performance on the productive causative. Section 5.2.3 further discusses the comprehension of the indirect benefactive and we will consider a possible reason for the different behaviors with the productive causative and the indirect benefactive that some younger children showed in Experiment V.

5.2.1 Incrementality and Reanalysis Difficulty

Incrementality

Over a few decades of sentence processing research, there have been a number of studies showing that sentences are processed and interpretations are obtained incrementally, i.e., incoming constituents are construed on a word-by-word basis without

waiting for a crucial cue that disambiguates the possible interpretations (Aoshima et al. 2004, Frazier 1987, Inoue 1991, Marslen-Wilson 1973, Miyamoto 2002, Yoshida 2006, among others). If a parser waited to integrate incoming constituents until it detected the only possible structure for a given sentence, in head-final languages, the processor would delay structure building until the final word of each sentence.

However, there are many studies that provided evidence against this view (Aoshima et al. 2004, Inoue 1991, Miyamoto 2002, Yoshida 2006). For example, Inoue (1991) noted the following Japanese sentence with a relative clause to demonstrate that Japanese native speakers do not delay their interpretation of the sentence until they encounter the verb.

(1) Brown-ga White-ni ringo-o tabe-ta inu-o age-ta.
B-NOM W-DAT apple-ACC eat-PAST dog-ACC give-PAST
'Brown gave White the dog that ate the apple.'

Inoue (1991) argues that native Japanese speakers have difficulty interpreting this sentence when they hit the first verb *tabe-ta* 'ate,' indicating the existence of a garden-path effect. If the parser did not start interpreting the sentence until the verb is available, any garden-path effect would not be expected. Rather the parser treats the three NPs that it encounters in a row, i.e. Brown-NOM White-DAT apple-ACC, as coarguments of a certain verb which it has not yet encountered. Thus, when the parser has reached the first verb *tabe-ta* 'ate,' it experiences the surprise effect, realizing that all of the three arguments cannot be coarguments of this verb.

Although Inoue's (1991) claim is based on native speaker's intuitive judgments, Miyamoto (2002) gives supporting evidence for the same idea experimentally (self-paced reading task), demonstrating that a sequence of NPs with case-markers in Japanese is integrated into a partial interpretation of the sentence even before a relevant verb is available. As evidence for the early integration of NPs, Miyamoto (2002) found that a slowdown was observed when a NP cannot be a coargument of a preceding NP, i.e., when two NPs should be associated with two different verbs and a clause boundary should be posited between the two NPs. To illustrate the idea, let us look at the schematic representation of a sequence of NPs in a sentence, in which NP₁ and NP₂ are associated with the main verb V₂, while NP₃ is associated with the embedded verb V₁.

(2) [NP₁-ga NP₂-o [NP₃-o ... V₁] ... V₂]
 -NOM -ACC -ACC

The design of his experiment was based on a phenomenon called the *Double -o Constraint* (see Chapter 2, Harada 1973) which states that a clause may not contain more than one accusative *o*-marked NP in Japanese. The case marking information allows the parser to posit a clause boundary between NP₂ and NP₃ as soon as NP₃ is processed and a slowdown in reading is observed. If we assume that a parser does not initiate the processing until a relevant predicate is introduced, the slowdown would not be observed in his experiment. Thus, his self-paced reading experiments revealed that the parser does not wait for a relevant verb and each of the NPs are processed incrementally even before the verb is processed, making argument information available.

Moreover, Aoshima et al. (2004) demonstrated by examining *wh*-questions with embedded complement clauses that Japanese readers associate a fronted *wh*-phrase with a gap in the embedded clause in attempt to satisfy thematic requirements. Their results also show that filler-gap dependencies are built before the embedded clause verb is reached, again supporting the incremental properties of human processing mechanism.

Based on both on-line and off-line experimental studies, Aoshima et al. (in press) further tested the formation of coreference relations between a pronoun and an antecedent NP. They argue that Japanese speakers are able to build grammatically accurate syntactic structures before they encounter a verb. Their results are strong supporting evidence for incrementality and suggest that not only information about argument structure, but also hierarchical structural relations such as c-command, are established before the verb is encountered.

Results of these processing studies and many others suggest that sentence processing is carried out incrementally, i.e., incoming words are integrated into a current syntactic structure without any delay.

Let us look at one more processing study by Yamashita (1997), which does not necessarily provide supporting evidence⁴⁸ but is worth mentioning in regard to the comprehension of the bi-clausal structures we discuss later in this chapter. The experimental study by Yamashita (1997) revealed that Japanese speakers interpret a

⁴⁸ Even the head-driven model, which states that the structure is built when the information of licensing heads, i.e. typically verbs, become available, could also account for the slowdown upon the verb observed in Yamashita's studies, as Miyamoto (2002) pointed out. The delay parser does not integrate each NP into the structure until a verb is introduced. At the verb, the parser starts building a representation associating NPs with the verb. According to this model, the recognition of *dasi-ta* 'served' is faster than *non-da* 'drank' in processing sentences in (3) because *dasi-ta* 'served' allows all of the NPs to be its arguments.

sequence of NPs as coarguments in the same clause, whenever possible. She adopted a sentence beginning with three NPs such as in (3a) as a test sentence. She found that the speakers were faster to process the verb *dasi-ta* 'served' in (3b) than the verb *non-da* 'drank' in (3c) as a valid following word.

- (3) a. Seito-ga sensee-ni kootya-o...
 student-NOM teacher-DAT tea-ACC
- b. ... *dasi-ta*
 serve-PAST
- c. ... *non-da*
 drink-PAST

The reason for the preference of (3b) over (3c) is that the verb *serve* allows the three NPs to be coarguments in the same clause, where as the verb *drink* does not and forces the speakers to build a more complex structure with two clauses.⁴⁹ Thus, the result suggests that speakers process a sequence of NPs as coarguments in the same clause unless they have a cue telling them otherwise.

Reanalysis Difficulty

We now survey some previous experimental studies that focus on how young children process and comprehend sentences and how their performance is different from that of adults.

⁴⁹ We may complete the sentence with *drink* as in
 Seito-ga sensee-ni kootya-o non-da otoko-o syokaisi-ta.
 student-NOM teacher-DAT tea-ACC drink-PAST man-ACC introduce-PAST
 "The student introduced to the teacher the man who drank the tea."

Leddon and Lidz (2006) experimentally examined young children's comprehension of sentences involving "reconstruction," by which a syntactically moved constituent is interpreted in its original position. The target sentences used in their experimental study are as follows.

(4) Mary_i knew [how proud of herself_{*i/j}] Janie_j was *t*.

Given that the binding principle A (Chomsky 1981, 1986) requires an anaphor to be locally bound, the predicate phrase *how proud of herself* as a whole should be interpreted in its original position which is indicated by *t* in (4). They found that even at the age of 4 children already have reconstruction mechanism as part of their grammar. However, they also found that the same children's interpretations of moved arguments, as opposed to predicates, which are not required to reconstruct, seem to differ from adults'. The target sentence is given in (5) below.

(5) Mary_i knew [which painting of herself_{i/j}] Janie_j put up *t*.

The sentence in (5) is ambiguous as to whose painting that is. The argument of the verb *put up*, *which painting of herself*, can be construed either in its surface position or in its pre-moved position. Their experiments revealed that children consistently rejected the reconstructed interpretation and had a clear preference for the surface structure interpretation when licensed by their grammar, even though they had a reconstruction mechanism as part of their grammar.

Based on the results obtained in Leddon and Lidz (2006), Omaki et al. (2007) further tested similar sentences with reconstruction with adult subjects, adopting the on-line self-paced reading task. They confirmed that the adults first considered the surface antecedent (*Mary* in this case) as the correct one for sentences such as (5) in the course of comprehensions. This interpretation was the children's only interpretation in the study by Leddon and Lidz (2006). Thus, we have a parallel between the adults' *initial* interpretation and the children's *only* interpretation. They attribute this adult-child difference to children's inability to reanalyze, which blocks the reconstruction interpretation in argument-fronting cases. Thus, the study claims that children do have a reconstruction mechanism in their grammar but have difficulty going back and assigning a new structure or a new antecedent once they have made a commitment. In other words, children do not have trouble with reconstruction if that is the only way to interpret the sentence, but they stick to the initial interpretation even when there is another reconstructed interpretation.

Furthermore, their claim is compatible with Trueswell et al. (1999) and Hurewitz et al. (2000), provide evidence for children's difficulty with reanalysis. Their on-line studies using a head-mounted eye-tracker revealed that 5-year-olds showed little or no ability to revise their initial parsing commitments. The children were asked to listen to the test sentence involving temporary syntactic ambiguities such as "Put the frog on the napkin in the box" and manipulate toys in front of them. Although both children and adults showed signs of rapid incremental interpretation, i.e., they initially treat the phrase *on the napkin* as a PP expressing a goal, only adults could later reanalyze it as a PP modifying *the frog*.

In sum, these previous psycholinguistic studies show that children have difficulty revising their initial parse of a sentence. We see then that it is possible that what initially appears to be a grammatical difference between children and adults can be actually better accounted for by performance factors. Keeping this possibility in mind, we will now reexamine our data and discuss how the children's non-adult-like performance can be accounted for by the processing factors we have just discussed in this section.

5.2.2 Comprehension of Productive Causative and Indirect Benefactive

Let us summarize the findings of the experiments reported in Chapters 3 and 4 again at this point to refresh our memory. First, children failed to accept the embedded dative-marked subject of the productive causative in (6) as antecedent of *zibun* 'self' and PRO controller when two possible referents were present in scenarios (Experiments I and II), even though they knew the semantic difference between the productive causative and the lexical counterpart.

(6) Productive causative with *zibun* 'self'

Buta-ga kuma-ni zibun-no hon-o mi-sase-ta.
 pig-NOM bear-DAT self-GEN book-ACC look.at-CAUS-PAST
 'The pig made the bear look at self's book.'

(*zibun* 'self' = pig, bear)

Secondly, the same children succeeded in accepting the embedded subject as antecedent of *zibun* 'self' given the modified scenarios in which only one referent exists, suggesting that they had the ability to build a bi-clausal structure for the productive causative (Experiment III).

Thirdly, among the 20 children who had trouble accepting the embedded subject of the productive causative as antecedent of *zibun* 'self' as well as controller of PRO in adverbials, 14 of them also had difficulty accepting that of the indirect benefactive as in (7) (Experiment V).

(7) Indirect benefactive with *zibun* 'self'

Buta-ga kuma-ni zibun-no hana-o mite-morat-ta.
pig-NOM bear-DAT self-GEN flower-ACC look.at (gerund)-BEN-PAST
'The pig received the favor of the bear's looking at self's flower.'

(*zibun* 'self' = pig, bear)

Lastly, we found that there were 6 children who performed well on the indirect benefactive, though they had difficulty with the productive causative.

In what follows, we will examine how these four findings can be accounted for by referring to the processing mechanisms such as incrementality and reanalysis difficulty in turn. In particular, we will see that children's incremental processing and reanalysis difficulty seem to be able to explain the first three findings just summarized above, each of which will be examined in sections 5.2.2.1, 5.2.2.2, and 5.2.2.3 respectively). As for the last finding that there were some children who performed well on the indirect benefactive but badly on the productive causative, we will point out the possibility of some other factors affecting the children's response pattern (section 5.2.2.4).

5.2.2.1 Productive Causative: Two Referents

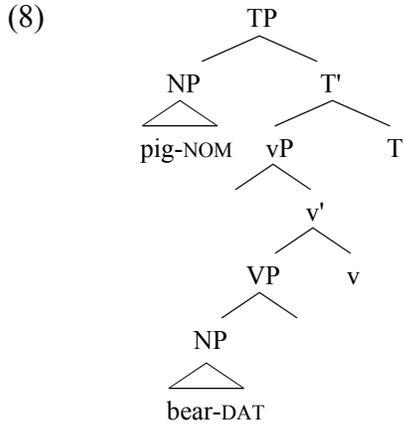
Let us first examine what was happening when the children were in the process of responding to the stimulus sentences such as (6) in Experiments I and II, in which the

scenario begins with a situation where both animals have their own books. The example of the productive causative sentences is repeated below.

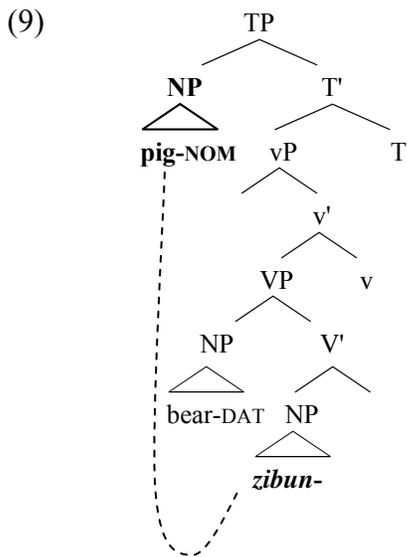
- (6) Buta-ga [kuma-ni zibun-no hon-o mi] -sase-ta.
pig-NOM bear-DAT self-GEN book-ACC look.at-CAUS-PAST
'The pig made the bear look at self's book.'

Recall that both the matrix subject *the pig* and the embedded subject *the bear* in (6) are potential antecedents of the reflexive anaphor *zibun* 'self.' Nevertheless, in Experiments I and II, children aged 4 to 6 demonstrated a constant rejection of the embedded subject as antecedent of *zibun* 'self.'

Suppose a child was given a scenario in which the pig told the bear to look at the bear's book. When the child starts hearing the sentence as a stimulus, the child starts interpreting the sentence incrementally, in the sense that the incoming word is interpreted from left-to-right without a delay, as the previous processing studies propose (Aoshima et al. 2004, Inoue 1991, Miyamoto 2002, among others). The child initiates the interpretation of the sentence, assuming that the sentence is mono-clausal, as Yamashita (1997) claims. Hence, the child regards the first two NPs as coarguments of the same clause. Therefore, the structure of the sentence the child is assuming at this point should roughly look like one in (8).



Thus, at the very moment the child hears the dative-marked NP *kuma-ni* 'bear-DAT,' the NP cannot be a subject. Until the child encounters the causative morpheme, it is natural that the dative-marked NP in a matrix clause bears a goal role. Then, when the child hears *zibun* 'self' which needs to be bound by a subject, the nominative-marked subject (in this case *the pig*) is the only possible candidate for the antecedent, and then the child associates the reflexive pronoun with the nominative subject NP, as shown in (9).⁵⁰



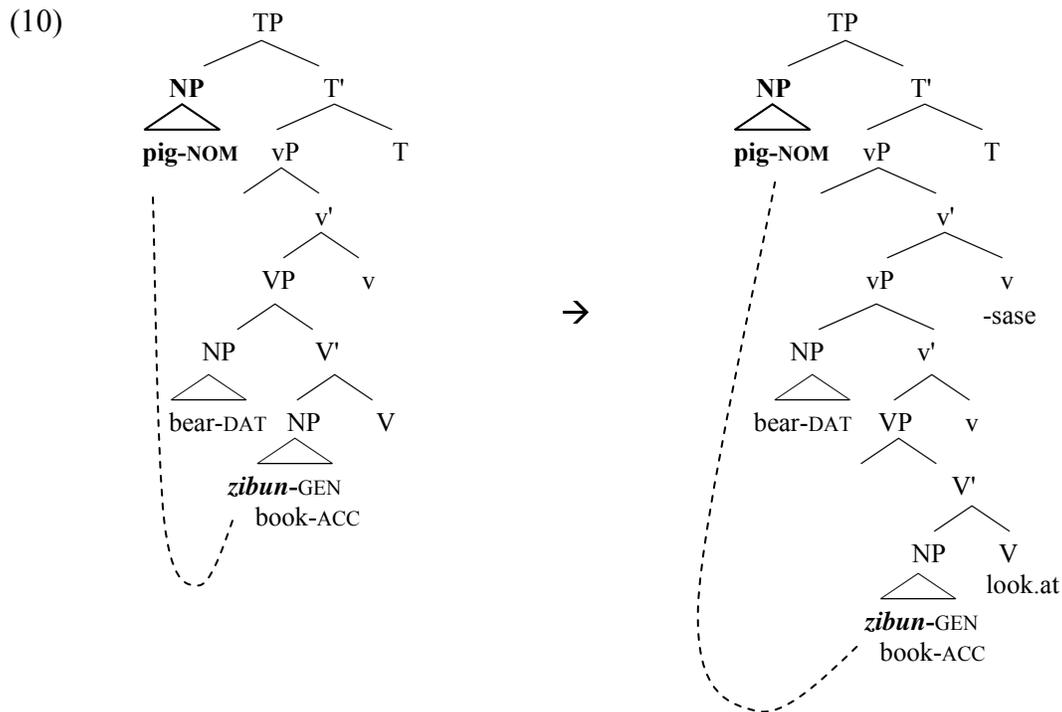
⁵⁰ In the tree structure, the NP that the child is assuming to be the antecedent of *zibun* 'self' is indicated as bold and the link is shown by a dotted line.

The child continues processing the sentence assuming that *zibun* 'self' refers to the subject NP *the pig*, until he encounters the causative affix *-(s)ase*.⁵¹ At that moment, a structural reanalysis is necessary. An adult would reanalyze and cancel the association between the nominative-marked subject and *zibun* 'self' and assign a new interpretation by linking *zibun* 'self' with the embedded subject, allowing them to judge the sentence as true statement.

How about children? If young children had difficulty with structural reanalysis as Trueswell et al. (1999) proposed, the child would not be able to change the current mono-clausal structure to a bi-clausal structure and fail to accept the embedded subject as antecedent of *zibun* 'self.' However, we already confirmed that children had the ability to assign a bi-clausal structure to the productive causative in certain conditions in Experiment III.⁵² In that condition, children showed the ability to reanalyze the present structure and assign a bi-clausal structure to the productive causative. Hence, it is natural to assume that this child can reanalyze the structure for the sentence and assigns a bi-clausal structure in the current case too. The child now changes the structure from the mono-clausal to the bi-clausal, as shown in (10), keeping the association between *zibun* 'self' and the nominative-marked NP.

⁵¹ Hyams (p.c.) pointed out that children might not be able to reassign a new bi-clausal structure at the moment they hear the causative morpheme, because the causative morpheme *-(s)ase* can potentially be either the one for the productive causative or the one for the lexical *-(s)ase* causative. However, the combination of the verb stem *mi-* 'look at' and the causative morpheme cannot be used for the lexical *-(s)ase* causative, i.e., it is used only for the indirect causation. Thus, the causative morpheme along with the verb stem can be a cue for the bi-clausality.

⁵² The children's processing of the productive causative in this condition will be discussed in detail shortly in the next section.



At this point, the child might be able to realize that there are two subjects in the sentence; both the matrix and the embedded subjects. Suppose children have no problem with the structural reanalysis, but rather they have trouble with canceling the initial commitment. As illustrated in (10), the child had already linked *zibun* 'self' to the matrix subject when he reassigned a new structure to the productive causative. The child cannot give up the first interpretation and link *zibun* 'self' to the embedded subject, making him ends up rejecting the sentence for the given scenario. In this way, children's non-adult-like responses to the productive causative with *zibun* 'self' could be accounted for by assuming that children have difficulty with the referential reanalysis, i.e. canceling the initial commitment and obtaining another referential interpretation, rather than the

structural reanalysis. We can assume the similar process of interpretation of the productive causative with subject-oriented adverbials, which is given in (11).

- (11) Buta-ga kuma-ni [PRO futa-o akete] naka-o mi-sase-ta.
pig-NOM bear-DAT lid-ACC opening inside-ACC look.at-CAUS-PAST
'The pig made the bear look at the inside (of the basket) by removing its lid.'

A child starts interpreting the sentence, assuming that it is mono-clausal. The child treats the first three NPs as coarguments of the same clause. Once he encounters the verb *akete* 'opening,' the child realizes he is dealing with an adverbial phrase probably because the verb is not a three-place predicate. As the dative-marked NP is not regarded as a subject at this point, the child assumes that the controller of PRO, i.e. the one who opens the lid, is the matrix subject, which he thinks is the only subject in the sentence at the time. When he reaches to the causative affix, he reanalyzes the sentence and assigns a bi-clausal structure. For the same reason as that for the productive causative with *zibun* 'self,' i.e., children have difficulty with referential reanalysis, he cannot help but stick to his initial interpretation and wrongly reject the sentence. Thus, our explanation here is a direct supportive evidence for Leddon and Lidz (2006): children do not have trouble with reanalysis but they have difficulty discarding the initial commitment.

5.2.2.2 Productive Causative: One Referent

We have just examined how the children who failed to accept the embedded subject in Experiments I and II might have processed the productive causative in real-time. Let us now discuss how they reacted to the same productive causative in Experiment III,

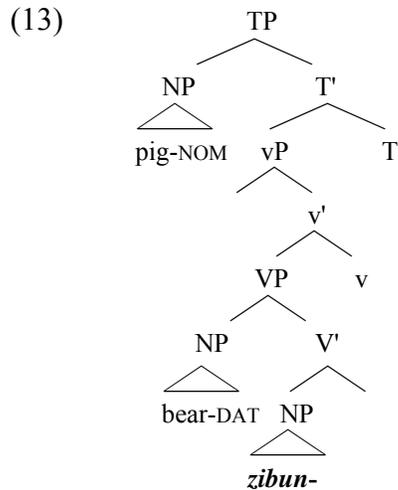
when given a scenario in which the only possible antecedent of *zibun* 'self' was the embedded subject. As we already observed, the children allowed the embedded subject of the productive causative to be an antecedent of *zibun* 'self' in Experiment III (cf. section 4.3 in Chapter 4). Why were they able to do so in Experiment III, though they failed to do so in Experiments I and II?

The test sentence that the children heard was the same productive causative with *zibun* 'self' which is repeated in (12) below. The sentence is ambiguous as to who is the possessor of the book, either the pig or the bear.

- (12) Buta-ga [kuma-ni zibun-no hon-o mi] -sase-ta.
pig-NOM bear-DAT self-GEN book-ACC look.at-CAUS-PAST
'The pig made the bear look at self's book.'

Recall that in Experiment III, the children were presented with a scenario in which only the bear has a book and the pig told the bear to look at the bear's book. The sentence in (12) is compatible with this scenario. Suppose that a child watched a picture-story show in which the pig orders the bear to look at the bear's book. Right after the scenario, the test sentence in (12) is played for the child. The child interprets the sentence from left to right in an incremental fashion, assuming that the first two NPs are coarguments of the same clause. The dative NP, *kuma-ni* 'bear-DAT,' cannot be a subject until the causative morpheme *-(s)ase* is processed, as the sentence is being regarded as mono-clausal. In Experiments I and II, children associated *zibun* 'self' with the nominative-marked subject NP at this point. In the current case, however, as the pig, i.e. the nominative subject NP,

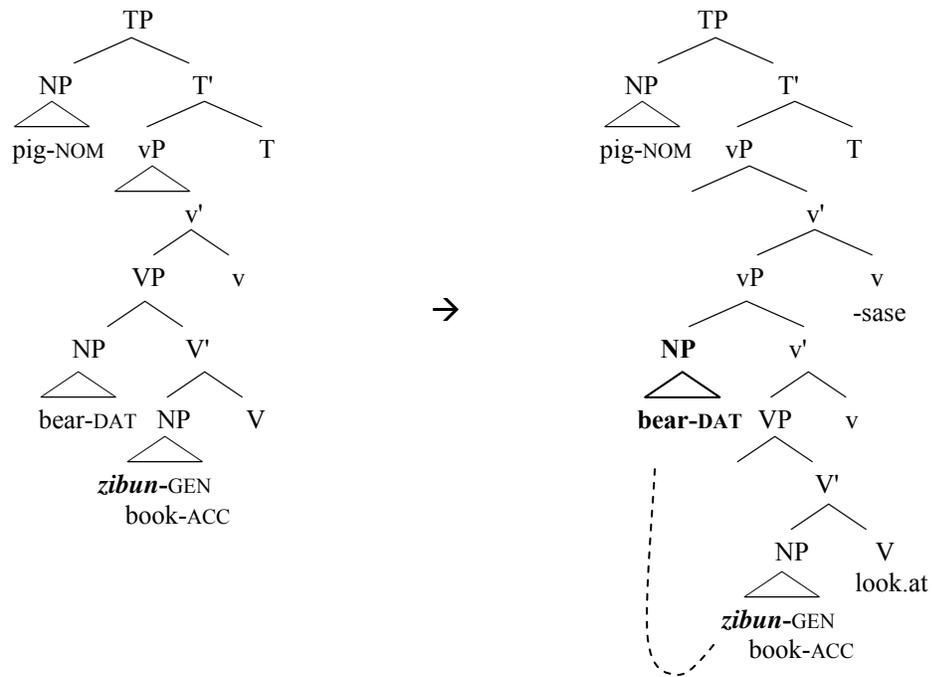
does not have a book in the given scenario, the child does not connect *zibun* 'self' with anything at this point of comprehension process, which is illustrated in (13).⁵³



It is assumed that the child continues processing the sentence, without assigning an antecedent to *zibun* 'self' or with anxiety after assigning it. Reanalysis is prompted when he encounters the causative affix. The child then assigns a bi-clausal structure to the sentence and realizes that there are two subjects in the sentence, which is shown in (14).

⁵³ It is also possible to assume that children tentatively associate *zibun* 'self' to the nominative-marked NP while being concerned about the presupposition failure.

(14)



Note that at this point, the reflexive pronoun has not yet been associated with anything, i.e., no NPs in (14) are shown in bold. Thus, the child does not need to be in trouble with referential reanalysis. Among the two subjects, the child chooses a subject without presupposition failure, i.e. the embedded subject, because the child has known that the pig does not have a book in the given scenario. In this way, we can account for the reason why children succeed in accepting the local antecedent in Experiment III, though not in the previous cases.

This account presupposes that children can rely on contexts they are provided with while they are interpreting the sentences. In the above case we have just described, the child utilizes the context information that the pig does not have a book when he should associate *zibun* 'self' to the subject or not during the processing of the sentence. It should be noted that this assumption contradicts Trueswell et al.'s (1999) and Hurewitz et al.'s

(2000) claim that children are insensitive to contexts and cannot use them when dealing with temporarily ambiguous sentences such as "Put the frog on the napkin in the box."

5.2.2.3 Indirect Benefactive

We have observed that in Experiment V reported in the last chapter (section 4.5), children who failed to allow the embedded subject as antecedent to *zibun* 'self' and controller of PRO in adverbials were divided into two groups: those who correctly allowed the embedded subject of the indirect benefactive (Group C) and those who had trouble with the embedded subject of the indirect benefactive as well as that of the productive causative (Group D). In this section, we first discuss how the children in Group D processed the indirect benefactive sentence in (15) below.

(15) Indirect benefactive

Buta-ga kuma-ni zibun-no hana-o mite-morat-ta.
pig-NOM bear-DAT self-GEN flower-ACC look.at (gerund)-BEN-PAST
'The pig received the favor of the bear's looking at self's flower.'
(*zibun* 'self' = pig, bear)

Recall that the children in Group D are those who performed badly on both the productive causative and the indirect benefactive. It can be assumed that the children processed the indirect benefactive in exactly the same way as the productive causative. They process the indirect benefactive sentence incrementally, assuming that it is monoclausal. Thus, they interpret the first two NPs as coarguments in the same clause. When they hear the anaphor *zibun* 'self,' they try to associate it to a subject. As the first

nominative-marked NP is the only subject at this point, they pick it up as antecedent to *zibun* 'self.'

(16) [_{TP} **Buta-ga** kuma-ni **zibun-no** ...
pig-NOM bear-DAT **self-GEN**

They realize that the sentence is bi-clausal and the dative-marked NP is also a subject when the benefactive morpheme is encountered. They then reassign a bi-clausal structure to the indirect benefactive sentence, by building a TP embedded clause as complement in this case. Note that at this point, the association between *zibun* 'self' and the matrix subject has already been established and children maintain the interpretation.

(17) [_{TP} **Buta-ga** [_{TP} kuma-ni **zibun-no** hana-o mite-] morat-
pig-NOM bear-DAT **self-GEN** flower-ACC look.at- BEN-

Just like the cases of processing of the productive causative, we assume that children have difficulty with referential reanalysis. Children cannot give up the already established association between *zibun* 'self' and the matrix subject, making them wrongly reject the test sentence because the pig asked the bear to look at the bear's flowers rather than his own in the scenario provided to them. In this way, children's non-adult-like behavior with respect to the indirect benefactive can also be accounted for by assuming that children as well as adults process sentences incrementally and children, unlike adults, have trouble with the referential reanalysis.

5.2.2.4 TP Subject vs. vP Subject

What about the children in Group C? Why did they correctly judge the indirect benefactive sentence as true when the embedded subject was intended antecedent of *zibun* 'self' and controller of PRO but not for the productive causative? Let us now consider what kind of processing factor might have caused the different behaviors in the two constructions.

Children in this group are also assumed to initiate his interpretation of the sentence in (15), repeated in (18) below, by regarding that the sentence is mono-clausal, hence with only one subject.

(18) Indirect benefactive

Buta-ga kuma-ni zibun-no hana-o mite-morat-ta.
pig-NOM bear-DAT self-GEN flower-ACC look.at (gerund)-BEN-PAST
'The pig received the favor of the bear's looking at self's flower.'

As the dative-marked NP *the bear* is not yet a candidate for antecedent of *zibun* 'self,' the children associate *zibun* 'self' with the nominative-marked subject *the pig*, which is illustrated in (19).

(19) [_{TP} **Buta-ga** kuma-ni **zibun-no** ...
pig-NOM bear-DAT **self-GEN**

Upon encountering the benefactive morpheme, the children reanalyze the sentence assigning a bi-clausal structure, given that they have no problem with the structural reanalysis. In this case too, children maintain their initial association of *zibun* 'self' and its antecedent.

(20) [_{TP} **Buta-ga** [_{TP} kuma-ni **zibun-no** hana-o mite-] morat-
pig-NOM bear-DAT **self-GEN** flower-ACC look.at- BEN-

The children build a TP complement, allowing them to realize not only that there are two subjects but that they are TP subjects. It might be possible to speculate that the children in this group are able to cancel their initial commitment and newly associate *zibun* 'self' with the embedded TP subject, allowing them to correctly accept the sentence.

Why these children in this group could cancel their first interpretation and reinterpret so quickly only for the indirect benefactive remains unanswered at this moment. The children might prefer the closest TP subject (in this case the embedded subject), once they realize that there is a second TP in the same sentence. This hypothesis does not seem so farfetched when we consider experimental studies by C. Chomsky (1969). She examined children's comprehension of control sentences such as in (21).

- (21) a. Bozo tells Donald [PRO to hop up and down].
 b. Bozo promises Donald [PRO to hop up and down].

Her experiments revealed that many children interpret the matrix clause object as the controller regardless of the matrix verb. She suggested that children tend to interpret the NP that occurs in minimal distance to the nonfinite verb as the controller.

Support for the hypothesis of this "minimal distance" principle also comes from the results of our own experimental study. Recall that in Experiment IV, we examined the comprehension of complex sentences with a finite embedded clause and observed that the children accepted the embedded subject (which in this case is marked with nominative)

more easily than the matrix subject. The explanation that children prefer the closest TP subject is compatible with this result as well, in the sense that if there are two TP subjects in the same sentence, the children prefer the local (closer) antecedent for *zibun* 'self.' We might be able to think that this preference is so strong that even if the children have already associated *zibun* 'self' with the matrix subject, they can cancel the initial commitment and switch to the correct local binding.⁵⁴

This cannot go beyond the speculation at this point. What we can claim is that the children do not just stick to their first interpretation but evaluate two possible readings when the two readings are equally accessible, i.e., they are both in Spec TP positions in this case, in contrast to the claim by Omaki et al. (2007) that children always have difficulty with reanalysis once they establish one interpretation.

5.2.3 Summary

We have discussed children's comprehension of the constructions with a bi-clausal structure. By assuming that even young children comprehend sentences incrementally and that they have difficulty with referential reanalysis (but not structural reanalysis), we can account for the children's comprehension patterns on both the productive causative and the indirect benefactive observed in the series of experiments to a large extent.

⁵⁴ Note, however, that reanalysis and cancelling the first interpretation do not involve in the comprehension of complex sentences with finite complements, whereas we need to reanalyze the benefactive sentences and cancel the initial interpretation. Thus, in the case of the complex sentences with finite complements, we already have two possible antecedents when *zibun* 'self' is processed. And on encountering *zibun* 'self,' children choose the local antecedent more readily than the long-distant one. In the case of benefactive sentences, on the other hand, evaluating two possible TP subjects occurs after having associated *zibun* 'self' with the matrix subject. Therefore, in the strict sense, we cannot assume the exact same processing mechanisms in these two cases.

As our discussions here are based on results of experiments which were conducted using off-line comprehension techniques, we cannot directly answer to the question as to how children process the constructions with bi-clausal structure on-line. To confirm our processing hypotheses, there needs to be some experimental studies adopting on-line processing methodologies. Additionally, we might also test if adults' first reading in on-line processing corresponds to children's first and only interpretation. We could do this with reading-time experiments when adults are given the productive causative and the indirect benefactive.

We have not directly tested if the children were able to build a TP complement for the indirect benefactive, either. However, the finding in Experiment V that the children in Group C treated the indirect benefactive differently from the productive causative with respect to the status of embedded subjects of each construction leads us to claim that they are at least able to assign different types of complements to these constructions.

There is another open question concerning the comprehension of the productive causative and the indirect benefactive sentences. When we looked at individual data of Experiment V, we found that the children were divided into three groups based on their responses to the two constructions: Group A consists of children who did well on both constructions. Children who did badly on both constructions belonged to Group D. And lastly, there were six children in Group C who performed well on the indirect benefactive, but badly on the productive causative. We pointed out in the previous chapter that Group C consisted of four 4-year-olds, one 5-year-old, and one 6-year-old. We have not yet discussed why most of the children in this group were 4-year-olds. We do not have any

data at this point telling us whether this tendency was accidental or not. We cannot tell if these children will belong to Group D at their later developmental stage as many 5-year-olds did in the experiment, or they will be able to treat both constructions equally well without passing through the Group D stage. It will be necessary to examine longitudinal data of children who are assumed to belong to this group in order to answer this question.

5.3 Early Acquisition of Bi-clausal Structure

In this section, we address another important issue as to how children as young as 4 are able to build a bi-clausal structure for the productive causative, and possibly for the indirect benefactive, differentiating it from the mono-clausal structure for the lexical causative counterpart, and how they distinguish the two types of causative with respect to their meanings; indirect causation vs. direct causation.

Here we address the question of how such young children are able to semantically distinguish the productive causative from its lexical counterpart, and to build a correct bi-clausal structure for the productive causative so early. The fact that the productive causative is formed through suffixation, and not having two separate verbs like in English and many other languages, makes it very similar to its mono-clausal lexical causative counterpart, and thereby compounds the learning task. What kind of linguistic ability do children have that allows them to detect that the productive causative involves two clauses?

In the next section, I will lay out the learnability problem involved in the acquisition of causatives in Japanese, and explain why it is worth discussing this issue, pointing out

how difficult it looks to acquire the Japanese causatives in a few years of exposure to the language, though every child achieves to do so in normal circumstances. In section 5.3.2, we survey possible approaches to the acquisition of the Japanese causative constructions and more generally, to acquisition of verb meanings; semantic bootstrapping and syntactic/morphological bootstrapping. In 5.3.3, we discuss how these different bootstrapping mechanisms can or cannot account for the early acquisition of bi-clausality of the productive causative in Japanese.

5.3.1 The Learnability Problem

We confirmed in the series of experiments reported in the previous chapters that children learning Japanese have knowledge of the semantic difference between the productive and the lexical causative (i.e. indirect vs. direct causation) and have the ability to construct correct structures for each of the causatives. Children accomplish this task in a few years of exposure to the language, despite the fact that they seldom hear the productive causative sentences as parental input and even if they hear the productive causative verb, it does not contain any explicit information about bi-clausality.

Let us first consider the quantity and quality of input from caregivers. In order to grasp the idea how often children hear sentences with *-(s)ase* morpheme in their early stages, I examined the CHILDES (MacWhinney 1999) corpus data of two children learning Japanese, Aki and Tai, whose utterances were recorded by Miyata (1995). Tai's conversation with his mother was recorded while he was 1;5-3;1 and a total length of the recording is 50 hours. During this period, his mother uttered a total of 19 sentences with –

(s)ase (19 tokens and 8 types). A total of 39 hours of Aki's conversation with his mother was recorded when he was 1;5-3;0. During the recording, he heard only two sentences with *-(s)ase* morpheme (1 type).

In addition, we did not find any full causative sentences with both matrix and embedded subject, since Japanese allows *pro* as long as it is recoverable from context. Also, most of the sentences with the causative affix that were found express permission rather than coercion. Thus, sentences the children heard are as follows:

(22)

- a. *tabe-sase-te*
eat-CAUS-request
'Let (him) eat (it)'

- b. *mama kak-ase-te*
mommy write-CAUS-request
'Let (me) write (it) down'

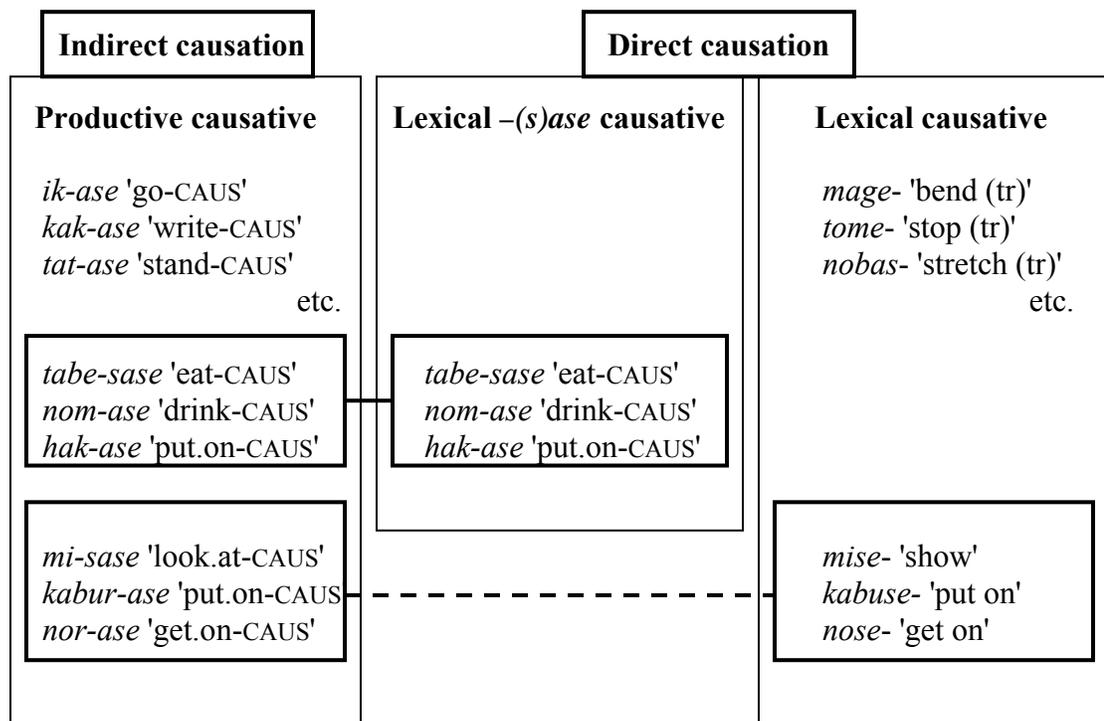
- c. *kuruma hasir-ase-te*
car run-CAUS-request
'Make the car run'

In addition, examples in (22) do not have any structural information for the productive causative affix *-(s)ase* because they consist of only a verbal complex and one argument with no overt case-marker, from which they cannot tell if they are bi-clausal or mono-clausal.

Moreover, and to make things harder for children, even if they might encounter a full version of the causative sentence, it does not help the children learn that the sentence with the causative morpheme is bi-clausal, because there exists the lexical *-(s)ase* causative (see section 2.2.4 of chapter 2). As we observed in Chapter 2, there are several verbs (eg.

tabe- 'eat', *nom-* 'drink', *hak-* 'put on') that are attached by the morpheme *-(s)ase* but express direct causative, unlike the productive causative. In other words, not all causative sentences with *-(s)ase* are bi-clausal and express indirect causation. In fact, verbs of this type that are used in the lexical *-(s)ase* causative seem to be very basic and familiar even to young children.

Thus, examples of the Japanese causative sentences that children hear as input are summarized as follows:



As the above figure shows, a small class of verbs with *-(s)ase* can express both indirect causation and direct causation. Also, another small class of verbs shares the same verb stem and the same case-marking pattern with the lexical causative counterpart, such as *mi-sase-* 'look.at-CAUS' and *kabur-ase-* 'put.on-CAUS.' How is it possible that children

learn this intricate causative verb system in Japanese and come to know that only the productive causative *-(s)ase*, but not the lexical causative, is bi-clausal in just a few years of exposure to haphazard input data? This is the question we will discuss in the following sections.

5.3.2 Bootstrapping

How do children come to know the meanings of sentences with the causative affix *-(s)ase* and how do they learn that the productive causative is bi-clausal expressing a situation of indirect causation, while the lexical causative is mono-clausal expressing a direct causation situation, in spite of the existence of the homophonous lexical *-(s)ase* causative which makes this learning harder? There are two different, but not contradictory, proposals to consider; the semantic bootstrapping and the syntactic/morphological bootstrapping. These two learning mechanisms are alike in the sense that both presuppose a tight correspondence between syntax and semantics, while they are different in a crucial respect: the direction of learning. In what follows, we will briefly survey what each proposal claims about word-learning in general.

Semantic Bootstrapping

Semantic bootstrapping is learning mechanism hypothesizing that children utilize conceptual knowledge to infer syntactic categorizations. This learning mechanism was first hypothesized by Grimshaw (1981) as part of the human general cognitive capacity for language acquisition, assuming the cognitive ability as a part of Universal Grammar.

The idea was further elaborated by Pinker (1982, 1984, 1989), who argued that notions as physical object, physical action, agent-of-action, and so on, but not nounhood, verbhood and so on, are available to children and the children can perceive them in communication. Pinker further claimed that the categorization of words into syntactic classes can be inferred from their semantic properties, which the children presumably have from the beginning, and the grammatical relations can be inferred from the semantic relations in the event that the children perceive (Pinker 1984: 40). The fact that children make use of semantic information available in the context in which the verb is used is also supported by several studies (Bowerman 1974, Gropen et al. 1991). For example, Bowerman (1974) observed in the spontaneous speech of her own young child that she said "I'm gonna fall this on her" when she intended to mean "I'm gonna cause this to fall on her." This shows that the child conjectured that the verb *fall* would be used without phonological modification on analogy with verbs like *break* and *move*, exploiting the transitive – causative relation. In other words, this suggests that children can make predictions about sentence structure, given a novel verb meaning.

In sum, the semantic bootstrapping proposes that children first use semantic properties for learning structural properties.

However, as Pinker (1984) also admits, this type of bootstrapping is not the only mechanism that gives children a clue to verb learning. There is another possible word-learning mechanism, which states that children are sensitive to structural distributions of

words and they use this information for inferring the semantics of the words.⁵⁵ The hypothesis is widely called syntactic (or "morphological" for some studies) bootstrapping, which will be discussed below in turn.

Syntactic/Morphological Bootstrapping

Landau and Gleitman (1985) argue that syntactic information plays an important role in verb-learning and claim that children deduce verb meaning in a procedure that is sensitive to the syntactic environment in which words occur in speech. Gleitman (1990) further pursues this idea by pointing out that observational learning, i.e. semantic bootstrapping, fails because there are so many ways and perspectives to interpret a single event that it would be very hard to select and map one single interpretation onto a particular lexical item. She, moreover, argues against semantic bootstrapping by pointing out that there exist events that are unobservable therefore cannot be used as information to infer syntactic properties.

As support for Gleitman's claim, Naigles (1990) gives a piece of empirical evidence. Naigles argues that observational information is insufficient to account fully for the acquisition of words. She carried out an experiment designed to investigate whether young children can use the syntax to constrain and focus verb meanings in their interpretations of novel scenes (e.g. a rabbit pushing the duck up and down, two characters making arm circles) and novel verbs (e.g. *gorp*, *blick*). The experiment

⁵⁵ Pinker (1984) uses the term "structure-dependent distributional learning" for this idea, and argues that children can use the syntactic distribution of a newly heard word to infer its linguistic properties, even when the semantics of the accompanying situation are ambiguous (Pinker 1984: 59).

revealed that 2-year-old children conjecture different meanings for novel verbs in the context of the same scene, depending on whether they are presented in transitive frames or in intransitive ones.

Behrend et al. (1995) conducted two experiments with children aged three and five in order to assess the degree to which English verb inflections influence children's initial mapping of verb meanings. They claim that young children use simple verb inflections such as *-ing* and *-ed* to help them map the meaning of a novel verb during their initial exposures to that verb. This is dubbed "morphological bootstrapping," viz. that children make use of this kind of morphological information in guessing the meanings of novel verbs.

Taylor and Gelman (1988) also argue that children use the syntactic context of a word to learn its meaning based on experiments that examined 2-year-olds's ability to interpret novel nouns (e.g. "This is a *tiv*.") and adjectives (e.g. "This is a *tiv* one.") on the basis of form class.

As indicated in some studies (Pinker 1994, Naigles 1990), these two approaches are not contradictory. It seems correct to consider both as playing important roles in language development and that children are endowed with the ability to make use of both semantic and syntactic (and morphological) properties of words during their early developmental stage.

Since the experiments of our present research reported in the previous two chapters were not designed to assess the bootstrapping hypotheses, the experimental data we have at hand cannot reveal how exactly children begin to acquire the semantic and syntactic

properties of each word. We will, however, speculate about approach which can account for the children's early acquisition of Japanese causative constructions in the next section.

5.3.3 Early Acquisition of Productive Causative

In this section, we discuss what kind of linguistic ability makes the early acquisition of causative constructions in Japanese possible, referring to the various bootstrapping hypotheses. We mentioned earlier that the input data regarding the Japanese causative constructions that is available to children during the first few years of language development is limited and haphazard. Despite the limitations, children succeed in acquiring both the semantic and syntactic properties of Japanese causatives by the age of 4, correctly interpreting the productive causative as denoting indirect causation and the lexical causative as denoting direct causation. Moreover, they correctly build a bi-clausal structure for the productive causative and a mono-clausal for the lexical causative. Could either or both of the bootstrapping hypotheses provide insight into how this is possible?

Let us begin with a discussion of the semantic/syntactic correspondence with respect to causative constructions. Comrie (1981) investigated causative constructions cross-linguistically, and proposed that causatives can be categorized into roughly three types; analytic, morphological, and lexical. Based on the typological examination, he pointed out the relationship between the formal properties and the semantic notion of causative constructions as follows:

"... when one contrasts different causative constructions that differ on the analytic – morphological – lexical continuum, then it becomes clear that the construction

closer to the analytic end is more appropriate for the distant⁵⁶ causative, while the one closer to the lexical end is more appropriate for the direct causative." (Comrie 1981:173)

We do not know at this point if indirect causation in any language is always realized as bi-clausal in structure and direct causation is always linked to mono-clausal structure. However, given that this relationship between the form and meaning is observed in many languages, as indicated by Comrie, it does not seem too farfetched to assume that children have the ability to link the indirect causation to bi-clausal structure and the direct causation to mono-clausal structure as part of universal linguistic knowledge.

Assuming that children are implicitly aware of the semantic and structural relationships with respect to the causative constructions, let us move on to discussion of the two bootstrapping approaches. As mentioned above, semantic bootstrapping hypothesizes that children pay attention to situation in which a word is used to infer the meaning of the word. On the other hand, syntactic/morphological bootstrapping assumes that the structural context in which a word is used plays an important role for learning the meaning of the word. Let us examine each proposal in light of the acquisition of Japanese causative constructions. What children need to acquire is the linguistic knowledge that a productive causative sentence with *-(s)ase* morpheme, but not the lexical *-(s)ase* causative, has a bi-clausal structure and denotes an indirect causation situation.

Suppose children first observe contexts in which words and sentences are uttered and make use of their semantic properties to infer the structural properties, as the semantic bootstrapping proposes. Whenever children detect an indirect causation situation where

⁵⁶ The term *distant* used here corresponds to *indirect* which has been used throughout this thesis.

an individual (i.e. causer) indirectly (e.g., by ordering or forcing) causes an event to take place in which another individual (i.e. causee) does something, they (unconsciously) realize that the situation they have witnessed should be expressed as a bi-clausal sentence, given the assumption that this semantic and syntactic correspondence is universally attested. They then look for a language-specific word or morpheme that allows a sentence to have two clauses. In the case of Japanese causatives, children seem to be able to pinpoint the productive causative morpheme *-(s)ase*, because whenever they detect the indirect causation in a context, they encounter the causative morpheme. On the other hand, when they detect the direct causation situation, they assume that the sentence should be mono-clausal, given the relationship between the semantic and structural properties. Eventually they succeed in obtaining the linguistic knowledge that only the productive causative with *-(s)ase* has a bi-clausal structure and denotes the indirect causation. We could account for the early acquisition of causative constructions in this way, if we assume that children are good at observing and picking up meanings of situations relevant to the sentence structures. And indeed previous studies (Bowerman 1974, 1979, among others) have observed that children have the cognitive ability to understand the causation situation.

What does the other bootstrapping approach predict about the acquisition of Japanese causative constructions? This approach states that children first exploit syntactic (or morphological) information to infer the meaning of a word. According to this hypothesis, children would search for a syntactic clue to the meaning of the morpheme *-(s)ase*. As we observed many times, the productive causative has a nominative marked subject NP

and a dative marked embedded subject NP. On the surface, it shares the same case-marking pattern with many other ditransitive sentences that are mono-clausal and with a small group of lexical causative sentences. Thus, the case-marking of the sentence in which *-(s)ase* appears cannot be a crucial clue to infer the meaning. Moreover, even if children find out that the *-(s)ase* morpheme is used for causation, they cannot tell whether it is used in indirect causation or direction causation, because they also encounter the lexical *-(s)ase* causative sentences sporadically. Recall that the lexical *-(s)ase* causative denotes a direct causation event and is mono-clausal, though the form contains the causative affix *-(s)ase*. Therefore, children cannot extract the meaning of the morpheme *-(s)ase* and acquire the whole system of Japanese causative constructions only because the syntactic environment in which the morpheme is used.

As mentioned above, the experiments in this thesis were not conducted to test the bootstrapping proposals. However, we have hypothesized that children could use semantic properties to infer the syntactic properties of words (i.e. semantic bootstrapping) and this might be able to account for their early acquisition of causative constructions in Japanese.

5.4 Summary

In this chapter, we have discussed two major issues concerning the children's competence and performance on constructions with bi-clausal structure. We first discussed the processing mechanism of constructions with a bi-clausal structure. We surveyed some previous literature on incremental processing and reanalysis difficulty.

Taking them into consideration, we have suggested that the response patterns that the children demonstrated in a series of experiments reported in previous chapters can be accounted for. We observed in Experiment III that the children have the ability to build a bi-clausal structure for the productive causative, structurally distinguishing it from the lexical counterpart. Nevertheless, they had difficulty accepting the embedded subject of the productive causative as an antecedent of *zibun* 'self' or controller of PRO in adverbials in Experiments I and II. The source of this discrepancy can be explained by assuming that the children process the sentences incrementally and treating them as mono-clausal sentences, and that they have difficulty with canceling the initial interpretation and obtain a new interpretation, though we assume that they can reanalyze structurally.

We also looked at the issue of learnability, raising the question as to why it is possible for children to quickly learn that the productive causative in Japanese is bi-clausal with a meaning of indirect causation while the lexical causative is mono-clausal, expressing a situation of direct causation. We observed that children face a learnability problem during the acquisition of Japanese causatives because of the limited and haphazard input data. After surveying the bootstrapping hypotheses, we speculated that children are good at observing scenes in which causative events take place and they are able to infer the syntactic property of the productive causative from its meaning, i.e. indirect causation. We also noted that the existence of the lexical *-(s)ase* causative means that they cannot deduce the meaning of the causative with the morpheme *-(s)ase* only from its syntactic environment. Our experimental data that children as young as 4 know both the semantic and the syntactic differences between the productive and the lexical causatives suggest

that children are endowed with the acquisition mechanism that guides them to unconsciously detect the difference between indirect and direct causations and to link each of the meanings to the syntactic properties.

CHAPTER 6

CONCLUDING REMARKS

This dissertation examined children's comprehension of causative constructions in Japanese. A series of experiments were carried out to elucidate whether children aged 4 to 6 were able to distinguish the lexical causative from the productive causative with respect to their semantic and structural properties. This dissertation provided a new piece of experimental evidence that children as young as 4 know not only the semantic difference between the two types of causatives, but also their structural differences. In this chapter, I summarize the findings of each experiment reported in chapters 3 and 4 and point out the implications of the results for children's linguistic knowledge.

Experiment I first revealed that children acquired the productive causative morpheme *-(s)ase* by the age of 4. We also found that the same children correctly distinguish the semantics of the productive and the lexical causatives. Specifically, they knew that the productive causative generally denotes indirect causation while the lexical causative is

used in direct causation situations. Yet, despite the fact that they knew the semantic difference between the two, the same children did not seem able to treat the embedded subject of the productive causative as a subject, when there were two possible referents in the scenarios that serve as antecedent of *zibun* 'self' or controller of PRO. In other words, they wrongly disallowed the embedded subject as antecedent of *zibun* 'self.'

In Experiment II, the same linguistic knowledge was examined with a different group of children. In this experiment, I examined different causative verbs from the first experiment and used causative sentences with both *zibun* 'self' and PRO-control adverbial phrases as stimuli. I also modified a way of presenting the stimuli to children. Nevertheless, the same performance pattern was observed: children had difficulty accepting the embedded subject of the productive causative as antecedent of *zibun* 'self' and controller of PRO in adverbials, though they demonstrated the ability to distinguish the two types of causative meanings.

In order to make clear whether or not children assigned a similar structure to both of the causative constructions, Experiment III was conducted. In this experiment, the scenarios presented to children were slightly changed: only one referent for antecedent of *zibun* 'self' was available in the scenarios. The results showed that the same children who showed non-target-like performance with the productive causative did accept the embedded subject as antecedent of *zibun* 'self,' leading us to conclude that the children had the ability to build a bi-clausal structure for the productive causative and a mono-clausal structure for the lexical causative.

We next tried to clarify the reasons for the children's non-adult-like performances. Experiment IV revealed that children did prefer the local embedded subject as antecedent of *zibun* 'self' in the case of complex sentences with a finite embedded clause. Based on this result, we concluded that children do not just choose the highest subject as antecedent to *zibun* 'self' regardless of sentence type.

The last experiment then examined children's comprehension of the indirect benefactive, and compared it to that of productive causative sentences in an attempt to understand the source of their non-target-like responses to the productive causative. We found that 20 children out of 27 performed poorly on the productive causative when they should have accepted the embedded subject as antecedent of *zibun* 'self' and controller of PRO. Among those 20 children, 14 children also performed poorly on the indirect benefactive. 6 of them performed well on the indirect benefactive.

In sum, the experimental data showed that the children demonstrated non-target-like performance on the productive causative, even though the same children showed the ability to assign a correct bi-clausal structure to the productive causative. Next, we discussed why they performed differently from adults with respect to the comprehension of certain constructions and how they acquire the semantic and structural differences between the two types of causatives under the poverty of the stimulus condition.

I approached to the first question concerning the children's non-target-like responses to the productive causative and the indirect benefactive by assuming that children interpret sentences incrementally just like adults, but they have difficulty with referential reanalysis unlike adults. Children as well as adults interpret an incoming productive

causative sentence incrementally and assume the sentence is mono-clausal, associating *zibun* 'self' with the nominative-marked subject until they encounter the causative morpheme. Adults would cancel the initial commitment and associate *zibun* 'self' with the embedded subject, which matches the scenario presented to them, when they realized that the sentence contains a second subject. I suggested that most of the children, however, had difficulty with canceling their initial interpretation. And this difficulty prevents the children from associating *zibun* 'self' with the embedded subject even if they realize that the sentence has two subjects.

Most of the children's non-adult-like behavior was successfully accounted for by the assumptions of incremental processing mechanism and the referential reanalysis difficulty. However, we found that a small group of children treated the productive causative and the indirect benefactive differently regarding the status of the embedded subjects: they accepted the embedded subject of the indirect benefactive as antecedent of *zibun* 'self' and PRO-controller, but rejected that of the productive causative. This means that the children did cancel the initial commitment, and allowed the embedded subject of the indirect benefactive as antecedent and controller, but only when the embedded subject was in Spec TP position. I suggested that the Minimal Distance (locality) Principle might be at work, and could override the initial commitment.

These explanations, however, do not go beyond speculations. Our processing accounts are based solely on the results of the off-line experimental studies. To verify the accounts proposed in this dissertation, on-line experimental studies on children's comprehension of sentences involving two clauses are necessary. We might also be able

to examine adults' on-line processing of the similar constructions to see if the adults' initial commitment corresponds to children's initial and only interpretation.

As for the second question regarding the learnability problem, we surveyed various bootstrapping hypotheses. I then proposed that the children are sensitive to the distinction between the direct and indirect causation, and that they utilize the semantic difference to infer the structures for the two types of causatives. Otherwise, the children would not be able to acquire the whole system of Japanese causative constructions, facing the fact that the input they receive is limited and that there is the lexical *-(s)ase* causative which is homophonous to the productive causative with a small group of verbs. In other words, the children cannot infer the meanings of causatives only from the syntactic environment of causatives because the causative morpheme *-(s)ase* can appear both in the lexical (and hence mono-clausal) and in the productive (and hence bi-clausal) causatives.

Although it was not the aim of the current study to directly examine the bootstrapping hypotheses, I suggested that the semantic bootstrapping could provide a possible account for the fundamental question as to how children acquire such a complex system of causative constructions within a few years of experience under the poverty of the stimulus circumstances. I further suggested that children are endowed with an acquisition mechanism that would guide them to be sensitive to the meaning difference between the direct and indirect causations, and to link each of them to structural properties of the lexical and the productive causative constructions, respectively.

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