The Acquisition of the Body-part Noun Object Construction in English and Japanese:

From the Viewpoints of Economy Principles and Parametric Variation in Nominal Phrases

（身体部位名詞目的語構文の獲得について―

経済性の原理と名詞句における言語間変異の観点から）

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Abstract

This thesis investigates the acquisition of constructions with a body-part noun object (the BPN object construction) in Japanese and English within the framework of generative grammar, especially, the principles-and-parameters approach. The BPN object construction is potentially associated with two interpretations as in (1): an inalienable interpretation and an alienable interpretation. In the inalienable interpretation, the object is interpreted as denoting an inseparable body-part of an entity denoted by the subject. In the alienable interpretation, on the other hand, the object is interpreted as denoting a body-part of some entity other than the subject.

(1) Taro-ga   kao-o   arat-ta.

     Taro-Nom   face-Acc   wash-Past

     i. Taro washed his face.   (inalienable interpretation)

     ii. Taro washed someone's face(s).   (alienable interpretation)

This ambiguity is observed in many languages. With respect to the availability of the inalienable interpretation, the BPN object construction in Romance languages shows similar syntactic and semantic properties to the construction with a reflexive expression in Germanic languages (e.g. *himself* in English). Focusing on such similarities, an analysis has been proposed which uniformly explains the properties of these constructions in terms of the principles which license reflexivity of predicates. However, no analyses have been proposed for the BPN object construction in Japanese or in English. With respect to the acquisition of the BPN object construction, some studies have been conducted in English, but no studies have focused on morpho-syntactic differences between these two languages. In order to make a cross-linguistic study of the acquisition of the construction, further investigation is required.

One of the basic tenets of Generative grammar is that children are equipped with a device which enables them to acquire any natural language (Language Acquisition Device:

LAD). The LAD is considered to involve universal principles (Universal Grammar: UG), principles which guide children to successfully choose their target grammar in the course of language acquisition, and parameters which are responsible for cross-linguistic variation.

With this theoretical and empirical background, this thesis addresses the following questions about adult and child grammar of English and Japanese.

(2)   a. Does the BPN object construction in adult grammar of Japanese and that of English show syntactic and semantic properties similar to the BPN object construction in Romance languages and/or the construction with a reflexive anaphor in Germanic languages?

b. Are properties of the BPN object construction in these two languages also explained in terms of the principles which license reflexivity of predicates?

(3)   What kind of principles need to be available in the LAD for the acquisition of the BPN object construction by English and Japanese children?

(4)   a. Do the predictions made by the analyses of adult grammar hold in the acquisition of the BPN object construction?

b. Is there any difference observed (i) between adult grammar and child grammar or (ii) between child grammar of English and that of Japanese?

c. If any difference is observed, do the analyses of adult grammar provide a natural explanation for it?

Except for the introduction (Chapter 1) and the conclusion (Chapter 9), the body of this thesis consists of three parts. Part I (Chapter 2 and Chapter 3), Part II (Chapter 4), and Part III (Chapter 5, Chapter 6, Chapter 7, and Chapter 8) consider the questions in (2), (3) and (4) respectively from theoretical and empirical perspectives. In the Appendix, the materials used in the experiments presented in this thesis are provided. Each chapter is briefly summarized as follows.

Chapter 1 specifies the scope of this thesis. After briefly introducing constructions and

languages closely investigated in this thesis, this chapter presents basic theoretical assumptions and mechanisms. In addition to the assumption about the LAD, assumptions concerning principles and parameters given in the LAD are provided. Particularly, following Reuland (2011), three possible ways to encode a referential dependency between the BPN object and the subject NP are introduced as computational systems allowed in UG: Agree in narrow syntax, logical binding at the C-I interface, and (accidental) coreference in the discourse component. Among these, Agree in narrow syntax is of particular importance because it is responsible for the inalienable interpretation of the BPN object. Another important assumption concerns the hierarchical structure within DP. Following the basic tenet of the Minimalist Program, this thesis attributes the locus of parameters to the features in heads of functional projections. It is assumed that a lexical projection NP has a layered structure of functional projections, and among these are, at least, NumP and DP. Each functional projection hosts a parameter, and parameters associated with projections within DP play an important role in explaining the acquisition of the BPN object construction in Japanese and English. Based on the overview of cross-linguistic variation of the BPN object constructions, the questions in (2)-(4) are specified as issues to be discussed in this thesis.

Chapter 2 and Chapter 3 in Part I closely investigate and consider properties of adult grammar of Japanese and of English respectively. With respect to the questions in (2a), the following conclusions are reached:

(5)   The BPN object construction in Japanese and English shows similar syntactic and semantic properties to the BPN object construction in Romance languages and/or the construction with a reflexive anaphor in Germanic languages. However morphological variation is observed within a BPN phrase and on a BPN itself: (i) within a BPN phrase, variation is observed with respect to the overt realization of a possessive pronoun; (ii) on a BPN, variation is observed with respect to the morphological realization of number-marking on a head noun.

The BPN object construction in Romance languages has the following syntactic and semantic properties. It allows a possessor of the BPN to occur outside of the BPN phrase: The BPN in the object position can be interpreted as being in an inalienable possessive relationship with an NP in the subject position. However, such an interpretation is possible only with a limited semantic class of predicates such as 'raise (one's/a) hand.' Furthermore, in this construction, the singular object is interpreted distributively when it occurs with a plural subject. Consider, for example, the French sentence *Les enfans ont levé la main.* ('The children raised the hand.'). This sentence does not have any possessive phrase within the BPN phrase or a plural marking on the BPN object. Instead, it has a singular definite object. Nevertheless, the singular BPN object 'the hand' can be distributively interpreted as being in a part-whole relation with the plural subject: The sentence has the meaning of 'Each child raises one of his/her hands.' This French sentence and the Japanese sentence in (1) are similar in that they allow a possessor of the BPN to occur outside of the BPN phrase. However they are morpho-syntactically different: the Japanese sentence in (1) does not have a definite determiner or number morphology on the head noun. Further cross-linguistic variation in morpho-syntactic properties of the BPN object construction is observed when English is taken into consideration. Unlike French, the inalienable interpretation is not available in English when the object has the definite determiner *the*. Instead, a form with a possessive pronoun within the BPN object phrase is preferred. In addition, number morphology is realized on head nouns and plural forms are preferred when the subject is plural. Thus, the inalienable interpretation is not available for the English sentence, *The children cleaned the face.* Rather, the sentence with a plural object and a possessive pronoun is preferred: *The children cleaned their faces.*

Based on these observations, Part I reaches the following conclusion for the question (2b).

(6)   Although it is possible to explain the semantic and syntactic properties of the BPN object construction in Japanese and English in terms of the principles which license reflexivity of predicates, slight modification is necessary to explain the cross-linguistic

variation in (5i-ii).

In order to explain the syntactic and semantic properties of the BPN object construction in Japanese and English, this thesis proposes a noun-incorporation analysis (NIA), based on the predicate-centered approach to the theory of binding and the Minimalist Program: Under this analysis, a BPN in the object position is incorporated into a predicate and makes a complex predicate with it. If the complex predicate is considered to be appropriate to express a reflexive situation, the derivation is licensed. An inalienable interpretation is derived as a result of Agree between a possessor-argument which the BPN takes and the subject of the sentence. With respect to the difference (5i), it is claimed that a parameter associated with the A-P interface is responsible for the difference: English does not allow the edge of a nominal projection to be unpronounced, but Japanese does. With respect to the difference (5ii), this thesis argues that an implicature related to number interpretation needs to be computed in English in order to choose an appropriate form of nominals in a given context. It is also claimed that the computation is carried out at the DP-level, which is the maximal level of nominal projections.

Chapter 4 in Part II introduces two economy principles: Economy of Encoding and Economy of Representation. Economy of Encoding has been proposed as a principle responsible for the choice of alternative anaphoric forms in adult grammar. According to this principle, the dependency resulting from Agree in narrow syntax is considered to be the most economical. Economy of Representation, on the other hand, has been proposed as a principle which determines the initial state of child grammar and possible developmental paths to an adult grammar of a particular language. Experimental results in previous studies have shown that English children acquire the projections of nominals in a stepwise manner: They start with the smallest projection, NP, and extend functional projections above it based on language-particular evidence.

Part III presents the results of five experiments conducted on Japanese and English children. Chapter 5 investigates the interpretation of the BPN object construction in child

grammar of Japanese. An experiment conducted on Japanese children compared the interpretation of the BPN object construction and that of the construction with a non-BPN object (non-BPN object construction) in child grammar. An inalienable interpretation resulting from Agree in narrow syntax is never available with the non-BPN object construction because of semantic properties of head nouns. The NIA and Economy of Encoding predict that the inalienable interpretation of the BPN object construction should be easiest for children. As expected, the experimental results show that the semantic properties of head nouns affect sentence interpretation in child grammar. Chapter 6 provides the results of three experiments conducted on English children. The main concern of each of the three experiments is summarized in (7).

(7)   Experiment 1: The effect of semantic properties of head nouns on the interpretation

Experiment 2: The effect of number information of head nouns and possessive pronouns on the interpretation

Experiment 3: The effect of gender information of possessive pronouns on the interpretation (and the effect of semantic properties of head nouns)

Experiment 1 focused on the acquisition of properties related to lexical categories and universal principles, and Experiment 2 and Experiment 3 investigated the acquisition of properties related to functional projections and those particular to English.

Through a series of experiments on Japanese children and English children, the following findings were obtained: Between the two interpretations available with the BPN object construction, a stronger preference for the inalienable interpretation is observed in children than in adults, irrespective of language. The same tendency was observed in both Japanese and English; the effect of semantic properties of head nouns was observed in both child grammar of Japanese and that of English; English children cannot use number and gender information of nominals and possessive pronouns in an adult-like manner at the earlier stages of acquisition. Based on these findings, Chapter 8 discusses how English children attain an

adult grammar of English and reaches the following conclusions with respect to the questions in (3) and (4).

(8) a. With respect to the interpretation of the BPN object construction, differences are observed between adult grammar and child grammar both in Japanese and English. Particularly, child grammar of English is quite different from adult grammar of English. Rather, child grammar of English is quite similar to child grammar of Japanese.

b. The noun-incorporation analysis of adult grammar can provide a natural explanation for the differences if the two economy principles are available as guiding principles in child grammar or in the LAD.

At the initial stage of acquisition, child grammar of English is quite similar to that of Japanese. At this stage, properties related to head nouns that are preferred by Economy of Encoding are observed in child grammar, because lexical projections and economy principles are expected to be available in the LAD. Then, being guided by Economy of Representation, English children start to extend functional projections above NP. The difference between child English and adult English is attributed to the late acquisition of properties related to functional projections. Number or gender information is not necessarily an intrinsic property of lexical items and can be inserted as features of functional heads projected above NP. The features on functional heads are considered to be a locus of parameters and children have to set parameters based on evidence available in their target language. Initial child grammar has a minimal projection, NP, and children extend functional projections in the course of acquiring a particular language. In the process of the extension, children set the values of parameters and associate these functional heads with morphemes. It is no wonder that English children cannot use number and gender information in an adult-like way even at later stages (7 or 8 years old) because it might take a long time to set these values on functional heads. In order to give a fully adult-like number interpretation to nominals, DP is necessary because it is the projection where implicature associated with number interpretation is computed. Before

reaching this maximal projection, children have to learn the semantics of gender, number, and definiteness and associate them with morphemes in their language. They also have to acquire the way implicature is computed based on pragmatic information as well as morpho-syntactic and semantic information.

Chapter 9 presents the answers obtained in Part I through Part III to the questions raised in Chapter 1 and concludes the thesis.

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List of Abbreviations

Abbreviations for terms:

BPN	body-part noun
non-BPN	non-body-part noun
EPC	external possessor construction
NIA	noun-incorporation analysis
BV	bound variable
FV	free variable
NP	noun phrase
DP	determiner phrase
NumP	number phrase
LAD	language acquisition device
UG	universal grammar
C_{HL}	computation of human language
A-P system	Articulatory-Perceptual system
C-I system	Conceptual-Intentional system

Abbreviations used in glosses:

Nom	nominative case
Acc	accusative case
Gen	genitive case
Erg	ergative case
Top	topic particle
Part	particle
Neg	negative morpheme
Pres	present tense morpheme
Past	past tense morpheme

Pass	passive morpheme
Prog	progressive morpheme
Q	question marker
Comp	complimentizer
Pl	plural
Sg	singular
Def	definite
Poss	possessive

Abbreviations related to experiments:

BPN condition	body-part noun condition
non-BPN condition	non-body-part noun condition
GM	gender match
GMM	gender mismatch

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Chapter 1

Introduction

1.1 Aims and Scope

This thesis investigates the acquisition of a construction with a body-part noun object (henceforth the BPN object construction) from a cross-linguistic perspective. The construction poses an interesting question about language acquisition because it is potentially associated with two interpretations and children have to associate these two interpretations with a single form in their target grammar.

The ambiguity of the BPN object construction comes from the following semantic property of the object noun: Body-part nouns (henceforth BPNs) differ from non-body-part nouns (non-BPNs) in that their interpretation presupposes a part-whole relation. This presupposition gives rise to two types of interpretations of a phrase containing a BPN (henceforth a BPN phrase) with respect to a possessive relation between the body-part and its possessor. Consider, for example, the following examples.

(1)   a. Mary's nose   (inalienable possession / alienable possession)

       b. Mary's book   (alienable possession)

In both examples, the entity denoted by the possessor noun can be interpreted as being in possession of a thing denoted by the possessed noun: Mary can be interpreted as a possessor of a nose in (1a) or a book in (1b). The BPN phrase in (1a) is ambiguous with respect to the possessor-possessee relationship. In one interpretation, the possessed noun is interpreted as denoting an inseparable body-part of the possessor (the inalienable interpretation). The BPN, *nose*, is interpreted as denoting the nose on Mary's face. In the other interpretation, the possessed noun is interpreted as denoting an object which is separable from the possessor (the

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alienable interpretation). For example, the denoted object can be a toy nose, which Mary is in temporary possession of. Such an ambiguity does not arise in (1b) because the interpretation of non-BPNs does not presuppose a part-whole relation.[1] A book cannot be an inseparable part of a human body and hence only the alienable interpretation obtains.

The ambiguity between inalienable and alienable interpretations is observed in many languages. If more than one interpretation can be associated with a single form, it does not seem an easy task for children to establish such an ambiguous form-meaning association in their target grammar. If a given situation in which a specific form is used is not always consistent, how do they find a meaning associated with that form? Do they start with or do they have any preference for any one of the possible interpretations? If so, where does such an order or a preference come from?

A further interesting question arises when morpho-syntactic variation within BPN object constructions is taken into consideration. As will be closely examined in the following subsection, morpho-syntactic differences are observed among languages with respect to the syntactic relation between possessor phrases and BPNs and with respect to morphological properties of BPN phrases. A word-by-word translation of a form associated with the inalienable-alienable ambiguity in one language into another language does not necessarily result in the same ambiguity. If the way to describe a certain situation is not uniformly determined across languages, how do children find an appropriate form in their target language?

This thesis considers these issues within the framework of generative grammar, especially, the principles-and-parameters approach. As specific examples of morpho-syntactically

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[1] (1b) gives interpretations other than a possessive one. For example, it can be interpreted as denoting a book which Mary wrote or a book about Mary. The same ambiguity is observed in Japanese. For example, the example in (i) is ambiguous between the three interpretations, 'a book which Mary has,' 'a book which Mary wrote,' and 'a book about Mary.'

(i) Mary-no   hon
     Mary-Gen   book
     'Mary's book'

The acquisition of such an ambiguity is also an interesting topic, but this thesis does not go into it.

different languages, this thesis focuses on child English and child Japanese and investigates how the BPN object construction is acquired in these two languages. This thesis also considers the syntax and semantics of the BPN object construction in adult English and adult Japanese. In doing so, this thesis discusses theoretical problems associated with cross-linguistic variation in adult grammar: How are the two interpretations computed in adult grammar and how is cross-linguistic variation among languages explained? This discussion makes it possible to consider possible developmental paths children go through before acquiring a particular grammar. Given similarities and differences among languages, how do children attain their target grammar on the basis of the limited information available to them? Do children learn their target grammar by remembering every utterance made around them or do they learn it just randomly? The principles-and-parameters approach takes the position that children have innate knowledge of language, which provides them with information rich enough for them to acquire a particular grammar, but not so specific as to limit their possibility to learn any language spoken in a community they are born into. For example, the knowledge allows a child whose parents' nationality is Japanese to acquire English if the child is brought up in an English speaking community. This thesis considers how much information is given to children from the onset of language acquisition and how much has to be learned before they attain fully adult-like knowledge about the BPN object construction in their target languages.

1.2 Morpho-syntactic Variation within Body-part Noun (BPN) Object Constructions

The ambiguity between inalienable and alienable interpretations is observed cross-linguistically; however, cross-linguistic differences are observed in morpho-syntactic properties within a BPN phrase and of a BPN itself because of fundamental differences within a nominal projection. Japanese, English and French/Spanish are very different from each other in morpho-syntactic properties within BPN object constructions because these four

languages are distinguished by the following two properties: (in)definiteness-marking within a nominal projection and morphological realization of number morphology on nouns.

First, these languages differ with respect to the constituency between a possessor noun and a BPN (Guéron (1985), Vergnaud and Zubizarreta (1992), Baauw (2002), Pérez-Leroux et al. (2002)). In order to derive the inalienable interpretation, English requires a possessor noun to make up a constituent with a BPN, while French, Spanish, and Japanese allow a possessor noun to occur outside of a BPN phrase. Consider the examples in (2) and (3).

(2) a. The children raised their hands.   (inalienable / alienable)

  b. The children raised the hand.   (alienable)

(3) a. Les enfants ont levé la   main.   (French)

    the children raised the hand   (Vergnaud and Zubizarreta (1992: 596))

  b. Los niños   levantaron la   mano.   (Spanish)

    the children raised   the hand   (Baauw (2002: 65))

  'The children raised their hands.'

(2a) has a possessive pronoun within a BPN phrase and (2b) has a definite determiner. (3a-b) are similar to (2b) in that they have definite determiners (*la*). (2a) yields both the inalienable and alienable interpretations but (2b) has only the alienable interpretation.[2] In contrast to (2b), (3a-b) allow both inalienable and alienable interpretations despite the absence of a possessive pronoun. (Henceforth, this specific type of BPN object construction, namely, the one with a possessive noun outside of a BPN phrase, is called the External Possessor Construction, the EPC.) Japanese also allows the EPC, but a BPN-phrase shows a different morpho-syntactic property from that in French and Spanish. Japanese, which does not mark (in)definiteness by

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[2] An inalienable interpretation becomes possible when the BPN is modified by a relative clause (see Guéron (2006)) .

a(n) (in)definite determiner, allows a BPN to occur in its bare form. Consider the example in (4).

(4) Kodomo-tati-ga   te-o   age-ta.   (inalienable / alienable)

     children-Nom   hand-Acc   raise-Past

     'The children raised their hands.'

(4) has neither a definite determiner nor a possessive pronoun. Nevertheless, it allows both inalienable and alienable interpretations.

   In addition to the difference within a BPN phrase, these languages vary with respect to number marking on a BPN itself. French and Spanish require a BPN to have a singular form even if the subject is plural, unless the body-part denoted by the noun comes in a pair or a larger group with respect to an individual. English, on the other hand, does not have such a strong requirement and most speakers consider a plural form to be most adequate or preferable.[3] This is exemplified by the sentences in (5) and (6).

(5) Juan y   Maria levantaron la   cabeza / *las cabezas.   (Spanish)

     Juan and Maria raised   the head /   *the heads

     'Juan and Maria raised their heads.'   (Pérez-Leroux et al. (2002: 200))

(6) Juan and Maria raised their head / their heads.

In the Spanish example in (5), the object 'head' has to be in its singular form and it is interpreted distributively with respect to the subject. In the English example in (6), both

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[3] A strong preference for a plural form is observed when an abstract noun is used in an idiomatic expression, which can be taken as an instance of the BPN object construction in a broader sense. For example, the plural form is preferred to the singular form in (i).

(i) a. The sailors lost their lives.
    b. The sailors lost their life.   (Roberts (1990: 173))

singular and plural forms are allowed and the object can be interpreted distributively irrespective of its number morphology. Because Japanese does not mark the singular-plural distinction on a nominal head, no effect of number-marking is observed. The object noun in its bare form can be interpreted distributively in the example in (7).[4]

(7) Taroo-to   Hanako-ga   kao-o   age-ta.

     Taroo-and   Hanako-Nom face-Acc raise-Past

     'Taro and Hanako raised their heads.'

These morpho-syntactic differences among the four languages are summarized in Table 1_1. The second and third columns show the variation with respect to nominal phrases in general: English, French and Spanish have determiners to mark (in)definiteness and number-morphology to mark the singular-plural distinction on N. Japanese, on the other hand, has neither of them. The fourth and fifth columns summarize variations with respect to the BPN object construction: In order to derive an inalienable interpretation, English requires a possessive noun inside of a BPN phrase but French, Spanish, and Japanese allow it to be realized outside of a BPN phrase; when the subject is plural, French and Spanish requires head nouns to be in their singular forms, while English prefers plural forms. In Japanese, head nouns are always in their bare forms.

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[4] Because of the absence of overt number marking on N, more interpretations can be given to the BPN object construction in Japanese than in English, French and Spanish. Consider, for example, the following contrast.

(i) a. Sono otokonoko-ga   te-o   age-ta.
       the   boy-Nom   hand-Acc raise-Past
       'The boy raised his hand / hands.'
    b. The boy raised his hand / hands.

The number of hands a boy raised is clear from the number marking on N in (ib). The singular form indicates that the number is one, and the plural indicates that the number is two. The sentence (ia) is ambiguous with respect to the number.

Table 1_1: Morpho-syntactic Variation among English, French and Spanish, and Japanese

	(In)definiteness	Number-marking on N	Possessor phrase within a BPN phrase	Number requirement on N when used with the plural subject
English	(In)definiteness is marked by determiners	Singular-plural distinction is marked	Possessor phrase is required	Both plural and singular forms are used, though plural forms are preferable
French and Spanish	(In)definiteness is marked by determiners	Singular-plural distinction is marked	Possessor phrase is not necessarily required	Singular forms are used
Japanese	(In)definiteness is not marked	Singular-plural distinction is not marked	Possessor phrase is not necessarily required	NA

The obligatory requirement of a possessive pronoun within a BPN phrase makes English quite different from the other three languages. In English, gender information about a possessor is necessarily realized within a BPN phrase: In order to give the inalienable interpretation, a possessive pronoun has to agree in gender with the subject. In the other three languages, on the other hand, gender information is not necessarily encoded within a BPN phrase because a possessive pronoun is not required within the phrase.

However, in an elliptical context, agreement in gender is not necessarily required even in English, which makes English similar to the other three languages. As the following examples show, there is a case where strict parallelism is not necessarily satisfied and gender mismatch is tolerated.

(8)   a. *Bush voted for himself, but Barbara didn't vote for himself.

b. Bush voted himself, but Barbara didn't vote herself.

c. Every man mentioned himself before Mary did.

d. Every man voted for himself, and Barbara did, too.

(Fiengo and May (1994: 209-210))

In a non-elliptical context like (8a) or (8b), anaphors, which have to be clause-internally bound, have to match in gender with the subjects: (8a) is ungrammatical because the anaphor in the second clause (*himself*) is masculine and the subject (*Barbara*) is feminine, while (8b) is grammatical because both the anaphor and the subject in the second clause are feminine. On the other hand, in an elliptical context like (8c) or (8d), such a gender mismatch is tolerated: the subordinate clause in (8c) can be understood as *before Mary mentioned herself* and the second clause in (8d) can be understood as *and Barbara voted for herself, too*. This makes English similar to Japanese (or Spanish/French) in the sense that gender information about a possessor is not necessarily morpho-phonologically realized. Nevertheless, the interpretation where a null (or an implicit) element is bound to the subject is available. Upon computing the gender information about a possessor, the gender information in the first clause is not strictly observed and the information on the morphologically realized pronoun can be switched.

Although it is not directly related to the issues to be discussed in this thesis, similar interesting facts are observed with respect to gender agreement between the subject and the object in an elliptical context. As the following examples show, some nouns allow gender mismatch between the subject and the elided element, but there is a masculine-feminine contrast (see Bobaljik and Zocca (2011)).

(9) a. John is a waiter, and Mary is … too.

     b. #Mary is a waitress, and John is … too.

     c. #Andrew is a prince, and Anne is … too.

     d. #Anne is a princess, and Andrew is … too.

As clearly shown by the contrast between (9a) and (9b), the masculine form (waiter) can license the feminine counterpart as the elided element, but not vice versa. In other words, the parallelism requirement between the overt element and the elided element does not have to be satisfied. Such a licensing is not allowed with a certain class of nouns, those denoting titles or

ranks as in (9c-d).[5] With respect to this morphological requirement, similar behavior is observed with some Spanish nouns. As shown in (10), the masculine form of a kinship noun cannot license the corresponding feminine form in an elliptical context.

(10) #Juan visitó a su tí-o y Pedro prometió visitor a la [tí-a] de él.

    Juan visited to his uncle and Pedro promised visit to the aunt of he

    #'Juan visited his uncle, and Pedro promised to visit his [i.e. aunt]'.

        (Bobaljik and Zocca (2011:151)) originally cited from (Kornfeld and Saab (2004))

1.3 Theoretical Background

1.3.1 The Faculty of Language and Language Acquisition under the Principles-and-parameters Approach

In the generative tradition, it is claimed that human beings are endowed with a system which enables children to acquire a language. The system is called a language acquisition device (LAD) (cf. Chomsky (1965:30-31)), which consists of universal principles or universal grammar (UG) and other principles which facilitate language acquisition. Under the principles-and-parameters approach to UG, UG principles are responsible for properties of human language in general and parameters take care of cross-linguistic variation. Children, who are born with universal principles and parameters, achieve the acquisition of particular grammars by setting values of parameters based on language-particular evidence.

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[5] The same contrast is observed when these nouns are used in questions where the speaker is uncertain about the gender of the referent as in (i).

(i)   a. Is there a waiter in that picture?   ?Yes – Mary.
      b. Is there a waitress in that picture? #Yes – John.
      c. Is there a prince in that picture?   #Yes – Princess Anne.
      d. Is there a princess in that picture? #Yes – Prince William. (Bobaljik and Zocca (2011:151))

1.3.2 The Minimalist Program

   Generative grammar claims that the cognitive architecture of the faculty of language is built into our brains, which enables us to generate a sentence and to perceive and articulate the sounds of the sentence in a way which successfully conveys some meaning. With a shift of theoretical perspective on the nature of human language, the assumptions about the architecture itself have undergone slight modifications (cf. Chomsky (1965, 1972, 1980, 1981, 1986) among others). This thesis adopts the current assumption (the Minimalist Program (Chomsky (1995, 2000, 2001, 2004, 2005, 2008))), which is schematically illustrated as in (11).

(11)   Lexicon

                                  C_{HL}

                         Spell-Out/Transfer

              PF   LF

A-P Interface↓   ↓C-I Interface

Phonetic/Phonological Computation   Semantic/Pragmatic Computation

      (A-P System)   (C-I System)
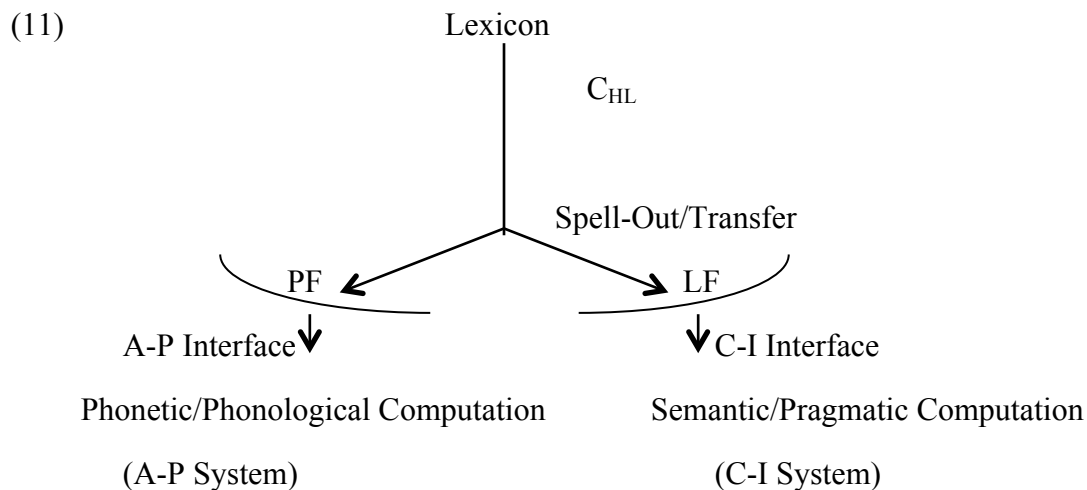
Each sentence is a pair of phonetic and semantic information, but an abstract hierarchical structure is behind the sentence. The syntactic component, which is called the computation of human language (C_{HL}) or narrow syntax, is responsible for the structure building. C_{HL} interfaces with the three components: the lexicon, where idiosyncratic properties of lexical items are listed, the Articulatory-Perceptual (henceforth A-P) system, where sound information of a sentence is computed, and the Conceptual-Intentional (henceforth C-I) system, where information on sentence meaning is computed.

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Lexical information is stored as a bundle of features (formal, semantic and phonological features). These features are divided into two types depending on their contribution to interpretation at LF: The first type is interpretable and visible at the interface. This type of feature plays a role in the computation at/after the C-I Interface. The second type is uninterpretable/unvalued. This type of feature does not make any contribution at/after the interface and has to be erased through the derivation within C_{HL}. Agree and Merge are two primitive operations within C_{HL}. No operation other than these two is assumed within C_{HL}. Properties of language which do not result from these operations are attributed to interface conditions. Relevant to our discussion are licensing conditions on reflexivity of predicates, which will be introduced in Section 1.3.3.

Items with a bundle of features belong to either of the following two types of categories: lexical categories and functional categories. Nouns, verbs, and adjectives are examples of the former, and determiners, quantifiers, and modals are examples of the latter. During structure building, lexical categories extend their projections and form layered structures with functional categories (Grimshaw (1991) among others). An inevitable assumption in our discussion is the structure within a nominal phrase. As already introduced in Section 1.2, the cross-linguistic variation within BPN object constructions is seen in the following three morpho-syntactic properties of functional items/morphemes within a BPN phrase: the presence/absence of (in)definite determiners/possessive pronouns, the presence/absence of number morphology on nominals, and the presence/absence of gender information. Under the Minimalist Program, the locus of parameters is attributed to values of (formal) features of functional categories. The most desirable explanation for language acquisition should be given in terms of parameters on features of functional items. An inevitable assumption in our discussion is the layered structure within a nominal phrase and parameters associated with functional projections, which will be introduced in Section 1.3.4. These play crucial roles in our discussion in Chapter 4 and Chapter 8.

The meaning of a sentence is computed in the semantic and pragmatic component. At the C-I interface, semantic information from a syntactic structure is read off and turned into a

semantic representation compositionally (Heim and Kratzer (1998) among others). Semantic interpretation of a sentence does not necessarily proceed independently of discourse information, and in some cases two or more derivations have to be compared before a unique interpretation is given to a sentence. This is related to reference assignment to anaphoric expressions, which will be explored throughout this thesis, and to number interpretation, which will be discussed in Chapter 3 and Chapter 8.

1.3.3   Theory of Binding from the Government and Binding Theory to the Minimalist Program

The distribution of anaphoric expressions has provoked a great deal of controversy in constructing the theory of binding. The standard binding theory advocated by Chomsky (1980,1981) is a theory of nominal types. Under this nominal approach, the distributive difference among anaphoric expressions is attributed to the difference in their inherent properties. Anaphoric expressions are classified into two types in accordance with referential defectiveness: Referentially defective ones are classified as anaphors and referentially independent ones are classified as pronouns. Their distribution is constrained by the binding principles, which are formalized with special reference to the types of anaphoric expressions and the domain in which each type of anaphoric expression should be bound or free.

Reinhart and Reuland (1993) argue against this nominal approach to the binding theory. Some languages have more than one anaphor, and in such languages the distribution of anaphors is not quite the same. Observing that the property of predicates plays a central role in determining the distribution of anaphors, Reinhart and Reuland argue that the binding theory is not a theory of the distribution of nominal expressions, but rather a theory of reflexivity of predicates. Accordingly, the binding conditions are reformulated in terms of reflexivity of predicates. Within this predicate-centered approach, a predicate can be reflexively marked in two ways: by being lexically-reflexive or by taking as one of its arguments an anaphor with reflexivizing function. Anaphors are classified into two types in

accordance with their ability to reflexivize a predicate: reflexivizers (SELF-anaphors) and non-reflexivizers (SE-anaphors and pronouns).

This predicate-centered approach is preferable to the argument-centered approach from an empirical point of view. Due to the current shift of the theoretical perspective on human language, however, it faces a theoretical problem. The Minimalist Program assumes that the "inclusiveness condition" holds in human language. This condition requires that no computation in C_{HL} and no syntactic representation involve anything other than lexical information or minimal information necessary for syntactic objects to be legible at the interfaces. Within this framework, the use of indices, which plays a central role in the definition of binding in both the predicate-centered and argument-centered approaches, violates the inclusiveness condition. Ideally, indices should be dispensed with and any theory which relies on indices should be reformulated without mentioning them.

This theoretical shift has encouraged many researchers to seek a way to solve this problem, which has lead to modifications of Reinhart and Reuland's (1993) predicate-centered approach along the lines of the Minimalist Program (Gallego (2010), Lidz (2000, 2001), Reinhart (2006), Reuland (2001, 2005, 2008, 2010a, b, 2011)). This modified predicate-centered approach has just started to take shape, but it seems to be promising. For this reason, the approach will be adopted in this thesis, although slight modifications will be proposed when necessary. The following sub-sections lay out the approach in detail.

1.3.3.1 The Argument-centered Approach vs. the Predicate-centered Approach

Within the Government and Binding framework, two approaches are taken to the distribution of nominal anaphoric expressions: the argument-centered approach, which is normally called the standard binding theory, and the predicate-centered approach.

The standard binding theory is formulated in order to explain referential dependency between anaphoric expressions and their antecedents in terms of syntactic principles. The basic observation that motivates the theoretical formulation is complementary distribution between English reflexive pronouns and (non-reflexive) pronouns: Reflexive pronouns

depend on an antecedent which is in the local domain (the locality requirement) and c-commands them (the c-command condition), while pronouns cannot. The examples in (12) show the local property of dependency between reflexive pronouns and their antecedents. Consider if the reflexive pronoun *himself* and the pronoun *him* can referentially depend on *Poirot* in these examples.

(12) a. Poirot invited himself / *him.

    b. Poirot thinks [CP that [IP Miss Marple hurt *himself / him]].

    c. Poirot believes [CP that [IP *himself /he is the best]].

As the contrast between (12a) and (12b-c) shows, the reflexive pronoun can take *Poirot* as its antecedent when the antecedent is within the same clause. On the other hand, only the pronoun can do so when the antecedent is not within the same clause.

    The example in (13) shows that locality is not the sole requirement for referential dependency between reflexive pronouns and their antecedents. Another relevant factor is the structural relation, c-command, defined as in (14).

(13) Poirot's sister invited *himself / him.

(14) C-command:

    α c-commands β if and only if

    (i)   α does not contain β;

    (ii) Suppose that $\gamma_1, \ldots, \gamma_n$ is the maximal sequence such that

        (a) $\gamma_n = \alpha$

        (b) $\gamma_i = \alpha^j$

        (c) γ_i immediately dominates γ_{i+1}

    Then if δ dominates α, then either (I) δ dominates β, or (II) $\delta = \gamma_i$ and γ_1 dominates β.

<div align="right">(Chomsky (1981: 166))</div>

In (13), the reflexive pronoun cannot referentially depend on *Poirot* although they are within the same clause. As expected, the pronoun can depend on it. The difference between (12a) and (13) is in the hierarchical position of the antecedent. In (12a), the antecedent itself is the subject noun phrase and c-commands the reflexive pronoun in the object position. In (13), on the other hand, the antecedent is embedded within the subject noun phrase and does not c-command anything outside of that phrase.

The standard binding theory aims to explain these facts by syntactic principles, which are formulated with specific reference to the types of nominal expressions. Referential dependency is syntactically represented as a binding relationship, which is encoded by co-indexation. Nominal expressions are classified into four types in terms of two features [±anaphor, ±pronominal].[6] Anaphoric expressions are classified into two types: anaphors with [+anaphor, − pronominal] and pronouns with [− anaphor, +pronominal]. The distribution of these expressions is constrained by the Binding Principles in (15).

(15) Binding Theory:[7]

    (A) An anaphor is bound in its governing category.

    (B) A pronominal is free in its governing category.

    (C) An R-expression is free.

(Chomsky (1981: 188))

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[6] Among the four possible combinations, the one with [+anaphor, +pronominal] cannot be observed in natural languages with morpho-phonological realization, but an abstract pronominal element with these feature values, PRO, is assumed to be in the inventory of pronominal elements and the PRO-theorem is proposed (see Chomsky (1981) for detail).

[7] A governing category is defined as in (i).

(i) β is a governing category for α if and only if β is the minimal category containing α, a governor of α, and a SUBJECT accessible to α. (Chomsky (1981: 220))

A binding relationship between an anaphoric expression and its antecedent is defined in terms of c-command and co-indexing as in (16), where X may be replaced by "A" or "Ā" depending on the position of β. If β is in an A(rgument)-position, it A-binds α. Otherwise, it Ā-binds α.

(16)   α is X-bound by β if and only if α and β are coindexed, β c-commands α, and β is in an X-position.   (Chomsky (1981: 184))

Under this theory, the sentences in (12) and (13) have the following representations where indices indicate binding and brackets indicate the governing category of the pronoun/anaphor.

(17) a. [$_{IP}$ Poirot$_i$ invited himself$_i$].

    b. Poirot$_i$ thinks that [$_{IP}$ Miss Marple hurt *himself$_i$].

    c. Poirot$_i$ believes that [$_{IP}$ *himself$_i$ is the best].

    d. [$_{IP}$ Poirot$_i$'s sister invited *himself$_i$].   (Haegeman (1994: 215))

(18) a. [$_{IP}$ Poirot$_i$ invited *him$_i$].

    b. Poirot$_i$ thinks that [$_{IP}$ Miss Marple hurt him$_i$].

    c. Poirot$_i$ believes that [$_{IP}$ he$_i$ is the best].

    d. [$_{IP}$ Poirot$_i$'s sister invited him$_i$].   (Haegeman (1994: 224-225))

With the rough definition of governing category as the smallest clause,[8] let us see how the principles work. English reflexive pronouns are classified as anaphors, and their distribution has to obey Principle A in (15). In (17a), the anaphor, *himself*, is in the object position (A-position). It is coindexed with the subject (*Poirot*) which is in the same clause and c-commands the object. In (17b) and (17c), the anaphor is coindexed with a c-commanding argument (*Poirot*), but this argument is not in the same clause. The anaphor is free in its

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[8] The definition of governing category is one of the controversial issues about the standard binding theory. This thesis does not go into this issue. See, for example, Koster and Reuland (1991) for references about this issue.

governing category and hence violates Principle A. In (17d), the anaphor is coindexed with an argument (*Poirot*) which is within the same clause, but this argument cannot c-command (and hence cannot bind) the anaphor, which results in a violation of the principle. English pronouns, on the other hand, have to obey Principle B in (15). (18a) violates this principle because the pronoun, *him*, is coindexed with an argument which is in its governing category and c-commands it. It can be coreferential with an argument within its governing category if the coindexed argument does not c-command it, and hence (18d) is exempted from the violation. The principle does not prevent it from being coreferential with an argument outside of the governing category, so (18b-c) are allowed.

This argument-centered approach works quite well, but it faces problems when the distribution of English anaphors and pronouns is more closely examined and cross-linguistic variation is taken into consideration. With the modification on the governing category and the proposal of parameters associated with it, the standard binding theory is developed, but there is still ample evidence which suggests the limit of the argument-centered approach. Observing that the property of predicates plays a crucial role in determining the distribution of nominal anaphoric expressions, Reinhart and Reuland (1993) reformulate the binding conditions in terms of reflexivity of predicates.

One piece of evidence for the predicate-centered approach comes from the break-down of complementary distribution between English anaphors and pronouns. English anaphors and pronouns show complementary distribution only when they are in a context where both anaphors/pronouns and their antecedents are arguments of a single predicate (henceforth the co-argument context). To illustrate, consider the examples in (19)-(20).

(19) a. Max_1 saw a gun near $himself_1/him_1$.

    b. $Lucie_1$ counted five tourists in the room apart from $herself_1/her_1$.

(20) a. $Lucie_1$ saw a picture of $herself_1/her_1$.

    b. Max_1 likes jokes about $himself_1/him_1$.   (Reinhart and Reuland (1993: 661))

In these examples, anaphors and pronouns are acceptable in the same environment, contrary to the expectation of Principles A and B in the standard binding theory. The crucial difference between these examples and the examples in (12) and (13) is in the relation between the anaphoric expression and the predicate. The anaphoric expressions are arguments of the predicates in (12) and (13), but not in (19) and (20). In (19), they are in an adjunct PP, which is not an argument of the predicate, and in (20), they are embedded in an argument NP. Pointing out such a difference, Reinhart and Reuland claim that anaphors and pronouns obey Principles A and B when they and their antecedents are in a co-argument context, but not in other syntactic environments. Their claim is further borne out by the following evidence. (21a) parallels (12b), where the anaphor *himself* is an internal argument of the predicate *invite*. The anaphor cannot be coreferential with the matrix subject, which is in conformity with Principle A. Interestingly enough, it can corefer with the matrix subject when it is embedded within a coordination phrase as in (21b). In this sentence, the anaphor itself is no longer an argument of a predicate but the entire phrase *Lucie and himself* is. Thus, the anaphor in this environment is exempt from a violation of Principle A and its distribution is not complementary to that of the pronoun *him* as shown in (21c).

(21) a. *Max$_1$ boasted that the queen invited himself$_1$ for a drink.

    b. Max$_1$ boasted that the queen invited Lucie and himself$_1$ for a drink.

<div align="right">(Reinhart and Reuland (1993: 670))</div>

    c. Max$_1$ said that the queen invited both Lucie and himself$_1$/him$_1$ for tea.

<div align="right">(Reinhart and Reuland (1993: 675))</div>

Another piece of evidence for their claim comes from the distribution of pronouns and anaphors in languages with more than one anaphor. Dutch is an example of such a language. It has two anaphors; a simplex anaphor *zich* and a complex anaphor *zichzelf*. Following Principles A and B, the anaphor *zichzelf* must be coreferential with the subject but the pronoun *hem* must not in (22a). The fact that *zich* in this example must not be coreferential

with the subject apparently shows that this expression is pronominal and follows Principle B. However, *zich*, not *hem*, can take a local antecedent when the predicate is replaced as in (22b) and it can take the matrix subject as its antecedent when it occurs in a small clause as in (22c).

(22) a. Willem$_1$ bewondert zichzelf$_1$/*zich$_1$/*hem$_1$.

Willem admires himself/*SE/*him

'Willem admires himself.'

b. Willem$_1$ schaamt   zich$_1$/*hem$_1$.

Willem   shames   SE/*him.

'Willem is ashamed of himself.'

c. Jan$_1$ hoorde [zich$_1$/*hem zingen].

Jan   heard   [SE/*him sing].

'Jan heard himself sing.'

(Reinhart and Reuland (1993: 690-692) with my English translation)

The distribution of *zich* cannot be explained by either Principle A or Principle B.

Pointing out the insufficiency of the argument-centered approach to the theory of binding, Reinhart and Reuland (1993) reformulate the theory in terms of reflexivity of predicates as in (23).

(23) Binding Conditions under the Predicate-centered Approach

Condition A: A reflexive-marked syntactic predicate is reflexive.

Condition B: A reflexive semantic predicate is reflexive-marked.

(Reinhart and Reuland (1993: 678))

(24) Definitions

a. The syntactic predicate formed of (a head) P is P, all its syntactic arguments, and an external argument of P (subject). The syntactic arguments of P are the projections assigned a θ-role or Case by P.

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b. The semantic predicate formed of P is P and all its arguments at the relevant semantic level.

c. A predicate is reflexive iff two of its arguments are coindexed.

d. A predicate (formed of P) is reflexive-marked iff either P is lexically reflexive or one of P's arguments is a SELF-anaphor.

(Reinhart and Reuland (1993: 678))

As in (24d), this theory divides reflexive-marking systems into two types: The first one is lexical reflexive-marking, where a predicate itself is lexically reflexive; the other is syntactic reflexive-marking, where a SELF-anaphor reflexively marks a predicate in syntax. Anaphoric expressions are classified in terms of their ability to reflexivize a predicate (reflexivizing function) and to have an independent reference (referential deficiency). Abandoning the two-way distinction between anaphors and pronouns, this theory classifies anaphoric expressions into three types by the combination of features with respect to reflexivizing function and referential deficiency. Anaphors, which are referentially deficient, are divided into two types in accordance with their ability to reflexively mark a predicate in syntax: SELF-anaphors which are referentially dependent and can reflexively mark a predicate and SE anaphors which are also referentially dependent but cannot reflexively mark a predicate. *Zichzelf* and *zich* in Dutch are classified as a SELF-anaphor and a SE anaphor, respectively. English anaphors are classified as SELF-anaphors. English pronouns are referentially independent and do not reflexively mark a predicate.

(25)	SELF	SE	Pronoun
Reflexivizing function	+	—	—
Referential independence	—	—	+

Under this theory, the break-down of complementary distribution of anaphors and pronouns is explained as follows. In the examples in (19) and (20), the anaphor and the pronoun are

neither syntactic nor semantic arguments of the predicate (see (24a-b) for the definition of syntactic and semantic predicates). The binding conditions in (23) say nothing about them. Their coreferential interpretation is not the one which results from syntactic or semantic binding. The anaphor is used as a logophor in these examples, and it is assigned an interpretation through a discourse. The same is true for (21b-c). The entire coordination phrase, not the anaphor itself, is an argument of the predicate, so the binding conditions do not apply. In (21a), the anaphor is a syntactic argument of the predicate. Being a SELF-anaphor, it reflexively marks the predicate (see (24d)), so the predicate has to meet Condition A. However, the predicate is not reflexive, because the anaphor is not coindexed with the other argument, *the queen* (see (24c)), and hence (21a) is ruled out due to a violation of Condition A.

The distribution of two anaphors in Dutch is explained as follows. Only *zichzelf* is allowed in (22a) because the predicate reflexively marked by it meets Condition A: The two syntactic arguments of the predicate, *Willem* and *zichzelf*, are coindexed. *Zich* and *hem* are ruled out due to a violation of Condition B. They are coindexed with the other argument of the predicate, but the reflexive predicate is not reflexively marked because it is not lexically reflexive or the anaphoric expressions do not syntactically reflexively mark it. *Zich* in (22c) is allowed because the predicate itself is lexically reflexive, and the chain formed with *Willem* and *zich* satisfies the chain condition in (26). *Zich* does not carry a full specification of ϕ-features, and so does not qualify as a referentially independent expression which carries the feature +R (see (27)). *Hem* in (22c) is ruled out because it cannot form an A-chain with *Willem*. It carries a full specification for ϕ-features and qualifies as +R.

(26) General condition on A-chains: A maximal A-chain $((\alpha_l, . . ., \alpha_n)$ contains exactly one
    link---α_1---that is both +R and Case-marked.   (Reinhart and Reuland (1993: 696))

(27) An NP is +R iff it carries a full specification for ϕ-features and structural Case.

                              (Reinhart and Reuland (1993: 697))

1.3.2.2 The Predicate-centered Approach under Minimalist Assumptions

As briefly summarized in the previous section, the predicate-centered approach has an advantage over the argument-centered approach in that it can give a natural explanation to a wider range of empirical evidence. However, the approach cannot be maintained as it is under the Minimalist Program, which aims to explain properties of language with a minimum of language specific devices. Under this program, a language should meet the condition of inclusiveness: No new object, such as indices, can be added in the course of derivation. As stated in (24c), the predicate-centered approach still employs indexation in the definition of "reflexivity." If predicates' reflexivity is licensed, coindexed arguments are mapped onto the same variable in a semantic representation, which results in bound interpretations of anaphoric expressions. If the inclusiveness condition holds, no indices should be inserted and it is impossible to define reflexivity of predicates without violating the condition. In order to avoid this, it is necessary to consider whether it is possible to encode binding relations without recourse to indexing.

The program assumes only two primitive operations in narrow syntax: Merge and Agree. Lexical items and other functional items are considered to be a bundle of features, which are classified into two types, depending on whether or not they are interpreted at the interfaces (the A-P and C-I interfaces). Some features on the highest head trigger agreement between them and the same type of features carried by some constituent within the syntactic object.[9] If all the features are valued and no uninterpretable feature remains in the structure, the syntactic object is transferred to the interfaces and undergoes further operation in the phonological and semantic components. Under these assumptions, only an Agree relation between interpretable and uninterpretable features can establish a dependency between constituents in syntax.

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[9] Move itself consists of two basic operations, Agree and Merge, and Copy and Pied-Piping: Features on the highest head trigger agreement and the EPP-feature on that head triggers Pied-Piping. The pied-piped constituent is (internally) merged with the highest (cyclic) node and extends the syntactic structure.

Given Merge and Agree as primitive operations in narrow syntax, one possible candidate to encode a "binding" relationship between an anaphoric expression and its antecedent is the Agree relation between some features on them. However, a language with only an Agree relation as a mechanism to encode a referential dependency is too simple. Human language shows much more intricate properties with respect to the use of anaphoric expressions, which sometimes manifest themselves as an ambiguity of a sentence with an anaphoric expression. The next question to ask is then what systems, other than an Agree relation in narrow syntax, are available to encode a referential dependency. Reuland (2001, 2005, 2008, 2010a, b, 2011) has proposed a fine-grained theory of binding. Since the elaborate study of English pronouns by Reinhart (1983), it is widely accepted that a referential dependency between an anaphoric expression and its antecedent is divided into the two types; one through coreference and the other through variable binding. In the former case, two expressions given different indices in a syntactic representation happen to have the same referent as a result of reference assignment in the discourse component. In a strict sense, this is not a referential dependency, since the anaphoric expression is assigned its referent independently of the antecedent. Such a coincidence of the referents is sometimes called 'accidental coreference.' In the latter case, two expressions are given the same index, which ensures that the two have the same referent. In addition to this traditional distinction, Reuland further subdivides the latter type: one established by an Agree relation in narrow syntax and the other by logical-binding (Reinhart (2006)) at the C-I interface. The definition of logical-binding is given in (28).

(28) A-Binding

   α A-binds β iff α is a sister of a λ-predicate whose operator binds β.

(Reinhart (2006:171))

Under this new theory, a language has three mechanisms to encode referential dependency, as schematically illustrated in (29). Here are three-types of objects which correspond to three different levels of representation: the level of syntactic objects, which results from the

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computation in narrow syntax, the level of C-I objects, which is part of the λ-formula at the C-I interface, and discourse storage, which consists of the actual values assigned to the nominal expressions. Two nominal expressions are assigned the same referent in one of the following ways. First, they can be assigned a referent independently of each other through a discourse ((29a)). There is no "binding" relationship between them. They happen to be assigned the same referent, and this corresponds to 'accidental coreference.' Second, two different syntactic objects are mapped onto the same variable at the C-I interface, and they are bound by the same operator (logical binding) ((29b)). To this variable, a referent is assigned in the discourse component and as a result, the two nominal expressions receive a coreferential interpretation. Finally, two syntactic objects form a chain through Agree in narrow syntax and they are treated as a single object at the C-I interface ((29c)). A referent is assigned to the variable, which also results in a coreferential interpretation of two apparently different nominal expressions.

(29) a. Discourse storage (values)   a   a
                                             | |
     C-I objects (variables) x_1 x_2
                                             | |
     Syntactic objects (CHAINs) C_1 C_2
     Basic expressions   α   …   β

   b. Discourse storage (values)   a
                                             |
     C-I objects (variables) x_1 ⟵   x
                                             | |
     Syntactic objects (CHAINs) C_1 C_2
     Basic expressions   α   …   β

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c. Discourse storage (values)   a
                                       |
   C-I objects (variables) x_1
                                       |
   Syntactic objects (CHAINs) C_1 ⟵ C_2
   Basic expressions   α   …   β
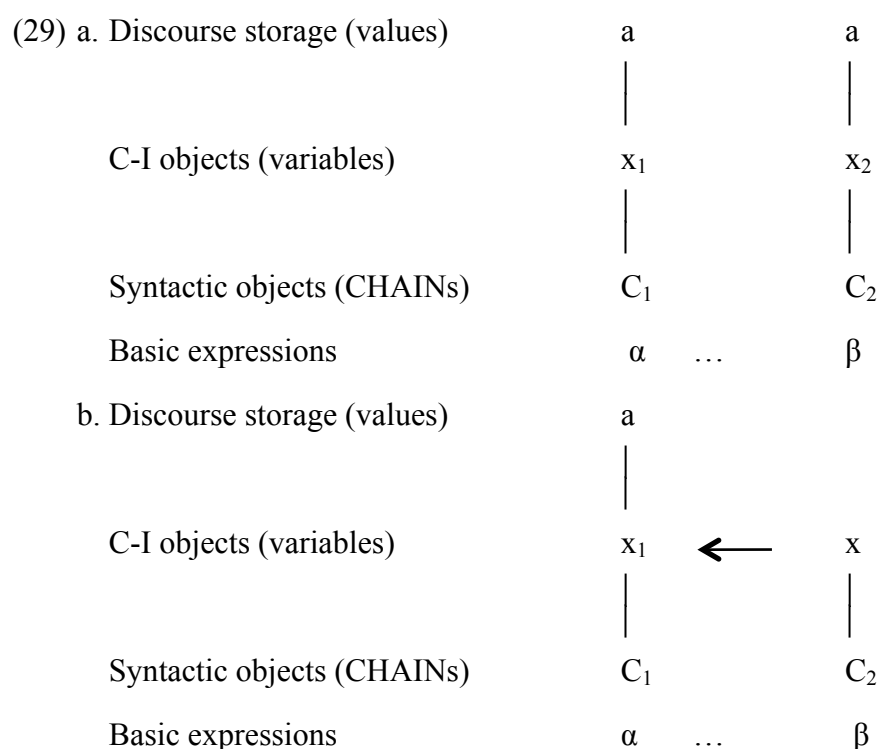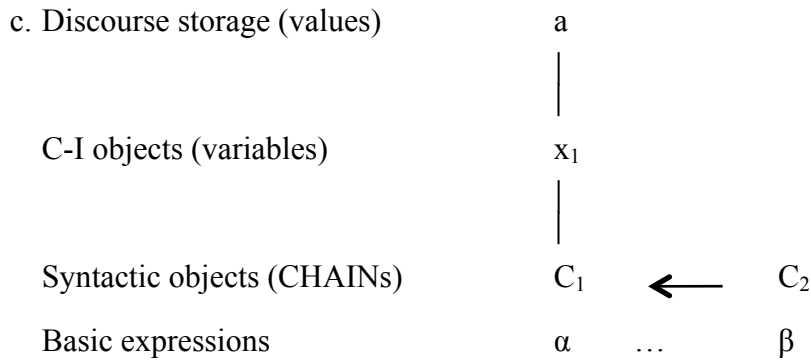
(Reuland (2011: 128))

Many researchers have tried to explain the locality requirement and c-command condition on English SELF-anaphors within Minimalist assumptions. For example, Gallego (2010) proposes that the referential dependency between an anaphor *himself* and its antecedent is established as a result of multiple Agree in narrow syntax. In a normal transitive sentence with two referential arguments, each of the arguments is in an agreement relation with C and v^* respectively as in (30). The external argument agrees with C, and it values C's unvalued ϕ-features and has its case-feature valued. The internal argument agrees with v^*, values v^*'s unvalued ϕ-features and has its case-feature valued.

(30) $[_{CP}$ C   … $[_{CP}$ T … $[_{v*P}$ EA v^* … $[_{VP}$ V … IA$]]]]$
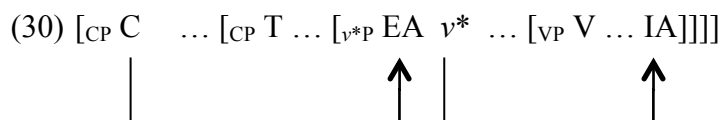
(Gallego (2010:165))

A crucial assumption here is that a reflexive anaphor *himself* is ϕ-defective and cannot value unvalued features on v^*. When the transitive verb takes the anaphor as its internal argument, the unvalued ϕ-features on v^* cannot be valued and it has to await another goal to have them valued and erased before the derivation is transferred. This is achieved via multiple Agree with the subject and C-v^* as in (31).

(31) $[_{CP}$ C ... $[_{CP}$ T ... $[_{v*P}$ EA IA $[v*$ ... $[_{VP}$ V ... $t_{IA}]]]]$
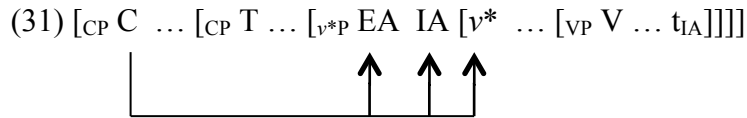
(Gallego (2010:165))

Under this system the binding relation between the subject and the anaphor results from an Agree relation between them. Since an Agree relation has to be local, the locality requirement between the anaphor *himself* and its antecedent automatically obtains and does not have to be stated as a separate principle as in the standard binding theory.

   If we confine our attention on the core examples Reinhart and Reuland (1993) put under consideration, it is possible to retain their proposal without recourse to indices. With a new definition of A-binding and the reflexivity condition as in (32), the essence of Reinhart and Reuland's theory can be retained.

(32) a. A-Binding

   α A-binds β iff α is a sister of a λ -predicate whose operator binds β .

(Reinhart (2006:171))

   b. Reflexivity Condition

   A reflexive-predicate must be reflexive-marked.

   c. A predicate is reflexive iff two of its arguments are *in an Agree relation*.

   d. A predicate (formed of P) is reflexive-marked iff either P is lexically reflexive or one of P's arguments is a SELF-anaphor.

(33)

26
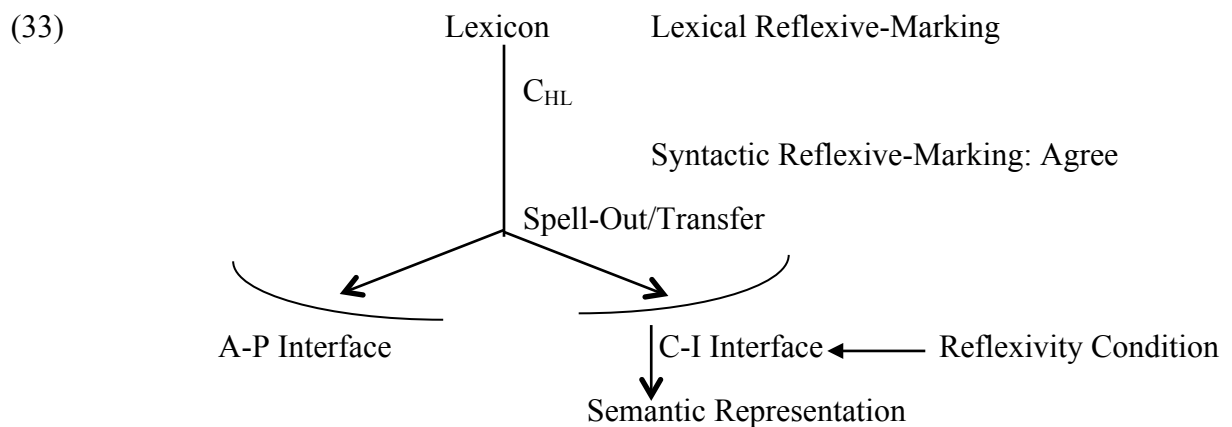
As schematically illustrated in (33), syntactic reflexive-marking is achieved in narrow syntax through an Agree relation, and reflexivity of a predicate is licensed by the reflexivity condition imposed at the C-I interface.

When we consider a typological variation of reflexive-marking systems, however, a question arises as to what can be used as a syntactic reflexive-marker. As shown in the subsequent section, there are some languages in which a BPN with a possessive pronoun can also be used as a syntactic reflexive-marker. Also, as discussed in subsequent chapters, some syntactic and semantic similarities are observed between the constructions with a reflexive anaphor (simplex or complex) and the BPN-object construction. Such observations lead us to reconsider if it is possible and preferable to extend the application of the predicate-centered approach to the BPN-object construction. Before going into detailed observation, let us reconsider the implication the predicate-centered approach has from a semantic (situation-based) point of view.

1.3.3.3 The Predicate-centered Approach and the BPN Object Construction

The predicate-centered approach provides us a totally different view of the use of anaphoric expressions. It claims that anaphoric expressions within the co-argument context have a totally different function from those outside of that context. Roughly speaking, anaphoric expressions modify an argument structure or an event structure of a predicate when they occur in a co-argument context: They indicate that the situation described by the predicate differs from the typical situation associated with the predicate's original lexical meaning.

Ideally, there should be a one-to-one correspondence between the number of arguments a predicate takes and the number of participants involved in the event the predicate describes: If a predicate takes one argument, it describes a one-participant event and if a predicate takes two arguments, it describes a two-participant event. The correspondence holds in typical cases. For example, the intransitive predicate *run* in (34a) describes a situation where one participant is doing the action, *running*. The sole argument the predicate takes is realized as the subject. *John*. The transitive predicate *hit* in (34b), on the other hand, describes a situation in which

two participants are involved. These two arguments are realized as the subject, *John*, and the object, *Bill*.

(34) a. John is running.

    b. John hit Bill.

Prototypically, a two-participant event described by a two-place predicate presupposes two separable entities. The two arguments the predicate takes are interpreted independently of each other and the entire sentence is interpreted as describing an event in which one participant acts on the other. In (34b), for example, the subject and the object have referents of their own. The sentence is interpreted as describing a hitting event in which *John* acted on *Bill*. In this event, two participants are separable and these two are realized as two independent arguments.

    There is, however, a case in which a person performs an action on him/herself. In this case, two participants of the event are identical. Such a case requires some specific-marking in most natural languages and they employ any one of the following ways. One way to mark such a case is to change the argument structure of the predicate in the lexicon, which Reinhart and Reuland call "lexical reflexive-marking." In this case, predicates which are normally used as transitives are turned into intransitives as in English ((35a)), or some element which is morphologically simple and cannot have independent reference by itself (henceforth a simplex anaphor) occurs in the object position as in Dutch ((35b)).

(35) a. John washes. / John shaves.

    b. Jan waste zich.

Another way is to mark the identity of the two participants by employing a morphologically complex anaphoric expression, which Reinhart and Reuland call "syntactic reflexive-marking." The use of *himself* in (36) is a typical example.

(36) John killed himself.

Still another way to mark the number mismatch between the arguments required by a predicate and the entities actually involved in the event is to use BPNs. As the following example shows, Basque uses a BPN *head* as such a marker.[10]

(37) Aitak bere burua   hil du.

   father+ERG 3SG.POSS head+NOM.DEF kill have+3SG+3SG

   'The father killed himself.'   (Reuland (2011:49))

To sum up, there are four possible ways to mark the number mismatch between the arguments a predicate requires and the entities involved in the event.

(38) I. Lexically marked

  i. Intransitivization (35a)

  ii. Simplex anaphor (35b)

  II. Syntactically marked

  i. SELF-anaphor (36)

  ii. BPNs (37)

  What makes the typological description of languages complex is that there is no one-to-one correspondence between languages and forms employed to mark the number mismatch. For example, English employs both intransitivization and a SELF-anaphor to mark the mismatch as in (35a) and (36). Japanese also employs a number of strategies. For example, Japanese has a four-way distinction in its inventory of anaphoric expressions as in (39).

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[10] Not only Basque but many other languages use some BPN as a reflexive anaphor. See also Anagnostopoulou and Everaert (1999) and Safir (2004) for examples of such languages.

(39) a. kare/kanozyo   (he/she)

      b. zibun   (SE)

      c. kare-zisin/kanozyo-zisin   (he-self/she-self)

      d. zibun-zisin   (SE-self)

Among the four types, the three, *zibun*, *kanozyo/kare-zisin* and *zibun-zisin,* can be used to mark the mismatch. For example, the predicate *semeru* ('blame') typically denotes a two-participant event and it requires two syntactic arguments as in (40).

(40) Hanako-ga   (dousite   kodomo-no   kimoti-ni   hayaku   kigatuka- nakat-ta no ka

      Hanako-Nom (why   children-Gen feeling   early   notice-not-Past   Q

      to)   otto-o   seme-ta.

      Comp) husband-Acc   blame-Past

      'Hanako blamed her husband (for not having noticed earlier how their children felt).'

In order to express a self-blaming situation, any one of the three types can be used as in (41).

(41) Hanako-ga   (dousite   kodomo-no   kimoti-ni   hayaku   kigatuka- nakat-ta no ka

      Hanako-Nom (why   children-Gen feeling   early   notice-not-Past   Q

      to)   *zibun/?kanozyo-zisin/zibun-zisin*-o seme-ta.

      Comp) SE/her-SELF/SE-SELF-Acc   blame-Past

      'Hanako blamed herself for not having noticed earlier how her children felt.'

    Even though Japanese has more types of anaphoric expressions than English, there is a case where none of them can naturally express the situation which is described by a sentence with an intransitive predicate or a SELF-anaphor in English. For example, to express the situations described by the sentences in (35a), Japanese cannot use corresponding verbs as intransitive predicates.

30

(42) a. ??Taro-ga   sot-ta.

      Taro-Nom   shave-Past

   'Taro shaved.'

  b. ??Taro-ga   arat-ta.

      Taro-Nom   wash-Past

   'Taro washed.'

None of the four anaphoric expressions naturally fit to describe the same situations as shown in (43).

(43) a. Taro-ga   */??[kare/kare-zisin/zibun/zibun-zisin]-o sot-ta.

     Taro-Nom   him/him-SELF/SE/SE-SELF-Acc   shave-Past

     'Taro shaved.'

  b. Taro-ga   */??[kare/kare-zisin/zibun/zibun-zisin]-o arat-ta.

     Taro-Nom   him/him-SELF/SE/SE-SELF-Acc   wash-Past

     'Taro washed.'

Rather, Japanese requires BPNs to occur in the object position as in (44) where the body-parts are interpreted as inalienably possessed by the subjects.

(44) a. Taro-ga   hige-o   sot-ta.

     Taro-Nom   beard-Acc   shave-Past

     'Taro shaved.' / 'Taro shaved his beard.'

  b. Taro-ga   karada-o   arat-ta.

     Taro-Nom   body-Acc   wash-Past

     'Taro washed.' / 'Taro washed his body.'

The construction with a BPN shows peculiar properties in many languages. For example, consider the English BPN object construction in (45). As already noted, the BPN object can be interpreted to be in an inalienable possessive relation with the subject. In addition, this sentence allows two types of inalienable interpretations: an (inalienable) agentive interpretation and an (inalienable) experiencer interpretation.

(45) John hit his head.

In this example, John can be interpreted to be volitionally involved in the event. John hit his own head on purpose against something. Also, John can be interpreted as a non-volitional experiencer of the event. He happened to walk into a pole and hit his head. As this example shows, a predicate sometimes loses its original meaning when it is used with a BPN.

In an extreme case, a BPN loses its meaning and the entire expression is used as an idiom. For example, in the following sentence, neither the predicate nor the BPN retain its literal meaning.

(46) Taro-ga   hara-o   tate-ta.
    Taro-Nom   stomach-Acc   put-in-a-standing-position
    '*Taro put his stomach in a standing position.'
    'Taro got angry.'

In this example, the predicate *tateru* retains its argument structure, but does not retain either one of the thematic roles. *Taro* is not someone who acts on his stomach, and *hara* is not something which is acted on: The sentence does not have its literal meaning 'Taro put his stomach in a standing position.' Rather, the entire sentence describes a one-participant event, which expresses one's emotional state: It bears an idiomatic meaning 'Taro got angry.'

As the examples above show, BPNs in object position seem to have a similar function to an anaphoric expression within a co-argument context: They modify the event structure of a

predicate, and in some cases, they also modify the thematic grid of the predicate. When BPNs in object position are interpreted as in an inalienable possessive relation with the subject, two participants of an event become inseparable. As a result, a typical two-participant event denoted by a predicate is turned into a one-participant event. Such peculiar properties of BPN constructions lead many researchers to propose a theory which, to some extent, provides a reasonable explanation for the similarities between the use of reflexive anaphors and BPNs (Safir (2004), Reuland (2011), Rooryck and Wyngaerd (2011)). The interpretations which associate BPNs with reflexive anaphors are summarized in (47).

(47) i. Inalienable Possessive Interpretation (Event Structure Modification)

      a. Agentive Interpretation

      b. Experiencer Interpretation

   ii. Idiomatic Interpretation

   iii. Reflexive Interpretation

The fact that BPNs often function as event-structure modifiers, not as true arguments, suggests the possibility that their properties can be explained by the same principles as reflexive anaphors. This thesis puts this argument forward and proposes an analysis which attributes the properties of the BPN-construction to the interface condition, the licensing condition of reflexivity of predicates. Furthermore, this thesis considers a theoretical implication the analysis has with respect to properties of semantic/pragmatic computation after the C-I interface. The licensing of reflexivity at the C-I interface might not be absolute, where the "naturalness" of the expressed event as a "reflexive" event is computed on the basis of the meaning of a predicate and a BPN.[11] The determination of what can be used as a

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[11] If it is taken in a broader sense, reflexivity can be expressed even with a non-BPN object as in (i), where the sentence can be interpreted as a self-acting event.

(i) Taro-ga   huku-o   ki-ta.
   Taro-Nom   clothes-Acc   put on-Past

reflexive-marker in a language might not be absolute. Not only purely functional reflexive anaphors such as English *himself/herself/themselves*, relational nouns and other nominals can function as a "reflexive-maker" (cf. Safir (2004)). The notion of reflexivity is not perceptibly discrete or clearly defined, but rather there is a continuum from a typical one-participant event to a typical two-participant event: These two extremes are quite distinct, but in-between there is a continuous sequence in which adjacent events are not perceptibly different from each other; reflexive events are those sitting somewhere in-between the two extremes. This is reflected in the use of linguistic expressions in one language and this is why there is no absolute definition of "reflexive-markers."

1.3.4   The Layered Structure within a Nominal Projection

Under the Minimalist Program, the locus of parameters is attributed to values of (formal) features of functional categories. The most desirable explanation for language acquisition should be given in terms of parameters on these features. As already introduced in Section 1.2, the differences investigated in this thesis among English, French/Spanish, and Japanese are in morpho-phonological properties within nominal projections (see Table 1_1). Thus the structure within a nominal projection is crucial to our discussion. This thesis basically adopts the following assumption with respect to the structure: A layer of functional categories is projected above a noun phrase (NP). Although different proposals have been made with respect to the types of projections within NP (Abney (1987), Carminati (2005), Harley and Ritter (2002), Longobardi (1994, 2001), Munn and Schmitt (2005), Watanabe (2006, 2008)) this thesis assumes that a determiner phrase (DP), which is related to definiteness or referential properties of nominals, and a number phrase (NumP), which hosts number information of nominals, are at least within the projection.

"Taro dressed."

I would like to express my gratitude to Tohru Noguchi (p.c.) for pointing out this possibility.

(48) Layered Structure in DP

```
            DP
           /\
          /\
         D   NumP
             /\
          Num   NP
                /\
                  N
```
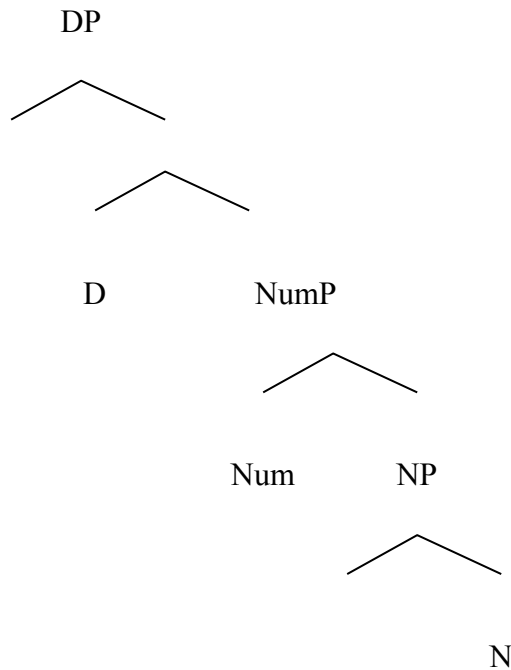
These functional projections host parameters, which are supposed to be given in the form of (formal) features of functional elements. To set the values of these parameters is one of the things children have to do in the course of the acquisition of their target language. A parameter related to the cross-linguistic variation between Japanese and English will be proposed in this thesis, although it will be roughly formulated and not stated in terms of formal features of functional heads (see Chapter 3). In addition to these two functional projections and the formal and semantic features associated with them, gender information is also relevant to our later discussion, but whether or not it has an independent functional projection is still a controversial issue. This thesis will discuss this issue based on the results from our experimental studies (see Chapter 8).

Furthermore, this thesis will consider what kind of guiding principles are included in the LAD and argues that two economy principles play an important role: The first one, the Economy of Encoding (Reuland (2011)), is related to the acquisition of the universal property of the BPN-object construction. This principle states that a referential dependency established through a syntactic operation is more economical than others; the second, the Economy of

Representation (Pérez-Leroux and Roeper (1999)), is concerned with both the acquisition of universal properties and that of language specific properties. This principle guides children to start from a minimum (=lexical) projection and to extend functional projections stepwise above a lexical projection. The former is not only a principle specific to C_{HL} in general but also works in the course of language acquisition, and the latter works in the course of language acquisition.

1.4. Questions to be Discussed

Given the cross-linguistic variation introduced in Section 1.2, a question arises as to how children attain such intricate knowledge in their target grammar based on limited information available to them. In order to settle the question, a firm theory of adult grammar is necessary, but as far as I know, no fully articulated theory has been proposed about the construction due to the following empirical and theoretical problems.

Most of the research has focused on similarities and differences between Romance languages and Germanic languages (mainly English and Dutch). For example, previous studies on the EPC in Romance languages have observed that the EPC in these languages shows syntactic and semantic properties similar to reflexive anaphors in Germanic languages (Guéron (1985), Vergnaud and Zubizarreta (1992), Baauw (2002)). For example, a reflexive anaphor in English has to find an expression on which it referentially depends (henceforth an antecedent) within the same clause. As shown in (49a-b), the antecedent of the English reflexive anaphor *himself* has to be within the same clause. *Poirot* can be the antecedent in (49a) but cannot in (49b).[12]

(49) a. Miss Marple thinks [that [Poirot$_i$ hurt himself$_i$]].

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[12] As discussed in Section 1.3.2.2, the use of indices poses a theoretical problem for binding theories formulated within the Government and Binding framework (Chomsky (1981), Reinhart and Reuland (1993) among others). In this thesis, indices are used just for expository purposes. Co-indexation indicates that two (or more) expressions are referentially dependent and contra-indexation indicates that they are not.

b. *Poirot[i] thinks [that [Miss Marple hurt himself[i]]].   (Haegeman (1994: 208))

Similarly, a BPN object in Romance languages requires its possessor to occur in the same clause. As shown in (50), the possessor of the BPN 'eyes' has to be within the same clause. *La hermana* ('the sister') can be the possessor, but *María* ('Mary') cannot.

(50) María[i] dijo [que [la   hermana[j] de Pedro cerró   los[*i/j]   ojos]].

Mary   said that the   sister   of Peter   closed the   eyes

'Mary said that Peter's sister closed her eyes.'

(Baauw (2002: 66) with my English translation)

Based on this and other similarities, some previous studies (Delfitto and d' Hulst (1995) and Baauw (2002)) have proposed that principles which derive the properties of the EPC in Romance languages are subsumed under those which license reflexivity of predicates − the predicate-centered theory of binding.

   Because the focus of previous studies has been centered around the comparison between the EPC in Romance languages and the construction with a reflexive anaphor in Germanic languages, they have not considered if the principles are universally applicable to the BPN object construction. This leads us to the following specific questions.

(51)   a. Does the BPN object construction in adult grammar of Japanese and that of English show syntactic and semantic properties similar to the EPC in Romance languages and/or the construction with a reflexive anaphor in Germanic languages?
       b. Are properties of the BPN object construction in these two languages also explained in terms of the principles which license reflexivity of predicates?

Before investigating the acquisition of the BPN object construction, this thesis considers these questions from a cross-linguistic perspective. Adopting the Minimalist Program (Chomsky

(1995 afterwards)) and the predicate-centered approach to the theory of binding (Reinhart and Reuland (1993), Reuland (2010b, 2011)), this thesis will propose an analysis which explains the properties of the construction in terms of licensing conditions of reflexivity of predicates at the C-I interface: the BPN-object can be taken as having the same function as a reflexive anaphor in an argument position.

Based on this analysis, this thesis turns to the question concerning language acquisition: How do children attain intricate knowledge about the construction in their target grammar on the basis of limited information available to them? Before investigating the BPN object construction in child grammar, this thesis considers the following theoretical issue.

(52) What kind of principles need to be available in the LAD for the acquisition of the BPN object construction by English and Japanese children?

Two principles of economy are introduced and it is argued that these are at work as guiding principles from the onset of language acquisition.

In order to make clear how the BPN object construction is acquired in English and Japanese, the following specific questions have to be addressed.

(53) a. Do the predictions made by the analyses of adult grammar hold in the acquisition of the BPN object construction?
b. Is there any difference observed (i) between adult grammar and child grammar or (ii) between child grammar of English and that of Japanese?
c. If any difference is observed, do the analyses of adult grammar provide a natural explanation for it?

Since no studies have focused on the acquisition of the BPN-object construction in Japanese, this thesis shows the results from our original experiments. Some acquisition studies have been conducted on children's interpretation of possessive pronouns in English (Wilkins and

Rogers (1987), Avrutin and Thornton (1994), Pérez-Leroux and Roeper (1999), de Villiers and Roeper (1995), Pérez-Leroux et al. (2002), Foley et al. (2003)) and two of them (Pérez-Leroux et al. (2002), Foley et al. (2003)) have put the inalienable-alienable ambiguity into focus. In order to answer the questions in (53) and to make clear the acquisition path of the construction under consideration, experimental results from previous studies are not sufficient for the following three reasons. First, their experimental findings are not consistent with respect to children's preference in interpretations of possessive pronouns. Second, none of them have focused on the correlation between the acquisition of number morphology and that of morpho-syntactic properties of the BPN-object construction. Third, no investigation has been carried out which asks if English children use gender features carried by possessive pronouns in an adult-like manner when they assign an interpretation to the pronouns. This thesis provides additional evidence from our own experiments, which focus on semantic properties of possessed nouns, their number-marking, and gender morphology of possessive pronouns. Furthermore, a comparison between child English and child Japanese is made based on the data collected using the same experimental conditions in both languages.

1.5 Organization

This thesis consists of three parts. Part I (Chapter 2 and Chapter 3) considers properties of adult grammar, to be more specific, principles which derive syntactic and semantic properties of the BPN object construction and parameters which yield variation within and across languages. These chapters work on the questions in (51). After close investigation of the BPN-object construction in Japanese and English, an analysis of the construction is provided. Under this analysis, BPNs are analyzed as having the same function as reflexive anaphors: They syntactically reflexive-mark predicates. Given the analysis, a theoretical implication is also considered with respect to licensing of reflexivity of predicates after the C-I Interface. Part II (Chapter 4) focuses on principles available in the LAD in order to consider developmental paths children may take on their way to acquiring a particular grammar. More specifically, this chapter considers the question in (52) and introduces two principles of

economy, which play a crucial role in later discussions. These principles work in child grammar to ensure that children successfully choose an appropriate grammar based on information available to them from permissible grammars provided from the beginning of language acquisition. Based on these two parts, Part III (Chapters 5, 6, 7 and 8) investigates the BPN object construction in child grammar of English and Japanese. These chapters turn to the questions in (53) and present the results of our experiments on the BPN object construction. Chapter 9 concludes the thesis.

Part I

Chapter 2

The BPN Object Construction in Adult Japanese[1]

2.1 Introduction

This chapter closely examines semantic and syntactic properties of the BPN object construction in adult Japanese by comparing it with the BPN object construction in Romance languages (French and Spanish) and the construction with a reflexive anaphor in Germanic languages (English and Dutch) and Japanese. As briefly mentioned in Chapter 1, French and Spanish allow the EPC, while English does not. The following sentences in French and Spanish have two interpretations: an alienable interpretation and an inalienable interpretation.

(1) a. Les enfants   ont levé la   main.   (French)

       The children   raised   the hand   (Vergnaud and Zubizarreta (1992: 596))

     b. Los niños   levantaron   la   mano.   (Spanish)

       The children raised   the hand   (Baauw (2002: 65))

       'The children raised their hands.'

The corresponding English sentence (2a) does not have an inalienable interpretation. Alternatively, English employs the internal possessor construction as in (2b).

(2) a. The children raised the hand.   (Vergnaud and Zubizarreta (1992: 596))

     b. The children raised their hands.   (Baauw (2002: 65))

In order to explain this cross-linguistic variation, different syntactic analyses have been proposed (cf. Guéron (1985), Vergnaud and Zubizarreta (1992) and Landau (1999), among

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[1] This chapter is based on Nakato-Miyashita (2011c/2014).

others). However, most of them have left one property of the EPC unexplained: A semantic restriction is imposed on the EPC. As will be shown in the following section, the EPC is possible only with a certain class of verbs. This property has been left simply stated as a construction specific semantic restriction, but among the previous studies, Delfitto and d'Hulst (1995) and Baauw (2002) pursue the possibility of explaining this property in terms of Reinhart and Reuland's (1993) reflexivity theory of binding. They claim that the EPC is an instance of lexical reflexive-marking and propose a noun incorporation analysis of the EPC: N-to-V incorporation takes place in the lexicon, where the lexical restriction is expected. Their analysis is appealing in that it takes a step forward and aims to formalize an idea intuitively mentioned in many previous studies: BPNs share certain properties with anaphors. This idea is in conformity with Reuland (2011), which this thesis aims to develop.

Taking a hint from their analysis, this chapter investigates whether the BPN object construction in Japanese shows syntactic and semantic similarities to the EPC in Romance languages and the construction with a reflexive anaphor in the Germanic languages. Based on the investigation, this chapter considers whether the properties of the BPN object construction in Japanese are also explained in terms of the principles which license reflexivity of predicates. After brief introduction of syntactic and semantic properties of the EPC in Romance languages and lexical-reflexive marking in Germanic languages, verbs will be classified into three classes, which interact with the syntax of "reflexive-marking" in these languages. It will be shown that this verb classification is relevant to the syntax of "reflexive-marking" in Japanese. Based on this observation and partly following the analysis by Delfitto and d'Hulst (1995) and Baauw (2002), this chapter will propose that the EPC in Japanese is also subsumed under Reinhart and Reuland's reflexivity theory of binding: a Noun-Incorporation Analysis (NIA). However, it will be argued that Japanese BPNs reflexively mark a predicate in narrow syntax, not in the lexicon. The inalienable-alienable ambiguity will be attributed to a structural ambiguity, specifically, a difference in the size of projection within a BPN phrase. This analysis will lead us to further consideration of the classification of verbs and its relation to the syntax of "reflexive-marking." Especially, the

problem of why cross-linguistic variation is observed with respect to the range of semantic classes of verbs with which a certain syntactic form is allowed will be discussed.

2.2 The External Possessor Construction (EPC) in Romance Languages and Lexical Reflexive-marking in Germanic Languages

2.2.1 Semantic Restrictions on the EPC in Romance Languages

As already mentioned in Chapter 1, the EPC in Romance languages has the following peculiar morpho-syntactic properties: (i) Inalienable BPNs are obligatorily singular, whether they have a plural possessor or not; (ii) Inalienable BPNs occur with a definite determiner.

(1) a. Les enfants   ont levé   la   main.   (French)

    The children   raised   the hand   (Vergnaud and Zubizarreta (1992: 596))

   b. Los niños   levantaron   la   mano.   (Spanish)

    The children   raised   the hand   (Baauw (2002: 65))

   'The children raised their hands.'

In addition, the EPC has the following semantic and syntactic properties. The BPN is interpreted distributively irrespective of its singular morphology ('distributivity effect'): The sentences in (1) are interpreted as 'each child raised his/her own hand.' The EPC resembles anaphoric binding in that (i) locality is respected, and (ii) the antecedent must c-command the BPN-phrase (cf. Guéron (1985)).

(3) María$_i$ dijo que la hermana$_j$ de Pedro$_k$ cerró   los$_{*i/j/*k}$ ojos.

   Mary   said   that the sister   of Peter   closed   the   eyes

                                        (Baauw (2002: 66))

The EPC is not possible with all transitive verbs, and the verbs which allow the EPC form a natural class: verbs which denote a "body-part" movement allow it, while other verbs do not

(Kayne (1975) among others).[2] Each sentence in (4a-b) and (5a-c) can be interpreted as describing an event in which the body-part denoted by the object noun is moved. In contrast, none of the sentences in (4c) and (5d-f) can be interpreted as such. Each event may include movement of some body-parts, but what is moved is not the one denoted by the object noun itself.

(4) a. Las niñas han   levantado   la   mano.   (Spanish)

     the girls   have raised   the hand

  b. Juan y   Maria volvieron la   cabeza.

    John and Mary turned   the head

  c. *Juan y   Maria lavaron   la   cara.

    John and Mary washed   the face   (Baauw (2002: 70-71))

(5) a. Les hommes ont levé   le   bras.   (French)

    the men   raised   the arm

  b. Les hommes   ont claqué les doigts.

    the men   snapped   the fingers

  c. Les hommes   ont ouvert   les yeux.

    the men   opened   the eyes

  d. *Les   hommes   ont lavé   le   visage.

    the   men   washed   the face

  e. *Les   hommes   ont rasé   la   barbe.

    the   men   shaved   the beard

  f. *Les   hommes   ont cassé   la   tête.

    the   men   broke   the head (Vergnaud and Zubizarreta (1992: 621))

  Based on these observations, Delfitto and d' Hulst (1995) and Baauw (2002) propose an

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[2] Here we use "body-part" as a cover term referring to everything making up a human being, including voice, power, tears, blood and so on.

abstract noun-incorporation analysis to the EPC: The BPN is incorporated into the verb and makes a complex V + N predicate. They assume that BPNs take a possessor argument and after the incorporation, the possessor argument becomes the direct object as in (6a). It is interpreted as bound to the subject, which results in creation of a "reflexive predicate." A reflexive predicate is licensed at the interface if and only if it takes a SELF-anaphor as one of its argument (syntactic reflexive-marking) or the predicate itself is inherently reflexive (lexical reflexive-marking) (cf. Reinhart and Reuland (1993)). The complex V + N reflexive predicate formation under discussion is an example of the latter type, and hence a lexical restriction is expected. The restriction in (6b) is imposed in licensing the complex V + N predicate in the Romance languages.

(6) a. [Las niñas vuelven [la cabeza [Poss]] → [Las niñas cabeza-vuelven [Poss]]
      the girls turn   the head Poss   the girls head-turn   Poss

                                                          (Baauw (2002:71))

    b. A complex V+N predicate is inherently reflexive if its lexical meaning is exclusively associated with a reflexive lexical meaning.

               (Baauw (2002:74) originally cited from Delfitto and d' Hulst (1995:35))

To define a "reflexive" lexical meaning, their analysis decomposes an action a verb denotes into some more basic semantic properties: An action including a "body-part" movement by "internal control" and an action including a body-part movement by "external control." The example in (4a) is possible because "raise one's hand" is an action including a movement of one's hand by a signal from the nervous system ("internal control"). It is distinguished from the action in which the agent raises, for example, his/her right hand by using his/her left hand. The latter type is an instance of an action involving a body-part movement by "external control," and this interpretation corresponds to the reflexive representation of the verb's "non-reflexive" lexical meaning. It has no difference from the action in which the agent raises another entity's hand by using his/her right hand.

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All the examples in (4c) and (5d-f) can be associated with the reflexive representation of the verb's "non-reflexive" lexical meaning, but cannot denote an "internally controlled" action, and thus the V + N complex predicates are not licensed. Note that the reflexive representation of "externally controlled" action becomes possible when the reflexive-marker *se* occurs, in addition to the BPN.[3] Consider the contrast in (7a-d). As illustrated in (7a), *se* cannot be used with a predicate exclusively associated with lexically reflexive meaning. The sentence is ungrammatical because a person cannot raise another person's voice. The action denoted by the predicate 'raise one's voice' cannot be externally controlled. (7b) has the same predicate as (4b), and (7c) has the predicate corresponding to the one in (5c). These sentences can yield an interpretation where the subject performs the action denoted by a predicate by external control. For example, the action denoted by the predicate 'turn one's head' can be performed without using one's hand or by using one's hand. The sentences without *se* in (4a) and (5c) are given the interpretations where the action is internally controlled. On the other hand, the sentences with *se* in (7b) and (7c) are given the interpretations where the action is externally controlled, namely, performed by using one's hand. (7d) has the same predicate as (5d). The action denoted by this predicate cannot be performed without externally controlled body-part movement: One cannot wash one's face without using one's hands. Consequently, the

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[3] In Norwegian, the EPC is found with verbs that denote grooming habits or body movements as in (i). Unlike Japanese *zibun*, a simplex anaphor in Norwegian, *seg*, can also be used with these verbs to express reflexivity (Vergnaud and Zubizarreta (1992: 622)).

(i)   a. De   wasket   ansiktet/seg.   (Norwegian)
          they   washed   the face/self
      b. De   barberte skjegget/seg.
          they   shaved   the beard/self
      c. De   reiste   hodet/seg.
          they   raised   the head/self

Although it is not clearly stated, verbs which do not allow the EPC seem not to allow *seg*, either. Instead, they require an internal possessor (*sit*) or a complex anaphor *seg selv* as in (ii).

(ii) a. *Han   stolte på   hodet/seg.
          he   trusted   the head/self
      b. Han stolte på   sit hodet/seg selv.
          he   trusted   his head/himself

predicate requires *se* as shown in (7d).

(7) a. *Juan se   levantó la   voz.

          John SE raised   the voice

          'John raised his voice.'

     b. Juan se volvió la   cabeza.

         John SE turned the head

         'John turned his head.'

     c. María se abrió   los ojos.

         Mary SE opened the eyes

         'Mary opened her eyes.'

     d. Les enfants   se   ont   lavé le   visage.

         the children   SE   washed   the face

         'The children washed their faces.'   (Baauw (2002: 75, 108))

2.2.2 Semantic Restrictions on Lexical Reflexive-marking in Germanic Languages

   Among the verbs which include a body-part movement by "external control," certain verbs

form another natural class, and its syntactic effect is observed in reflexive-marking in

Germanic languages: verbs which denote grooming actions can be used reflexively without

realizing the object argument in English, and they allow a simplex anaphor *zich* in Dutch.

(8) a. John washed.   (English)

     b. John shaved.

     c. John dressed.

     d. *John hit. / John hit himself.

(9) a. Oscar wast zich.   (Dutch)

         'Oscar is washing himself.'

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b. Peter scheert   zich.

   'Peter is shaving himself.'

c. Jan   aaide ??zich/zichzelf.

   'John petted himself.'

These are examples based on which Reinhart and Reuland (1993) originally reformulate the theory of binding in terms of reflexivity of predicates: These verbs are listed in the lexicon as inherently reflexive verbs, and as such their reflexivity is licensed at the interface. Though Reinhart and Reuland and subsequent works adopting their theory (cf. Reuland (2001), Reinhart (2006), Reinhart and Siloni (2005) among others) do not further decompose semantic properties of the verbs, the verbs of grooming are distinguished from other verbs by the notion of "agent-orientation." The verbs which disallow lexical reflexive-marking denote typical two-participant events: Their lexical meanings are most naturally satisfied when the two participants of the events are separable. The verbs which allow this type of marking, on the other hand, can denote one-participant events: Their lexical meaning can be naturally satisfied if the two participants of the events are identical. In other words, the latter ones denote an action which can be "agent-oriented," while the former ones denote an action which is oriented to an entity other than the agent (henceforth we will use the term "anti-agent-oriented" in this sense).

To sum up so far, transitive verbs can be classified into three different types based on their semantic properties: verbs which denote "externally controlled anti-agent-oriented" action, verbs which can denote "externally controlled agent-oriented" action, and verbs which denote "internally controlled" action.[5] These semantic classes interact with the syntax, which results

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[5] It makes no sense to ask if an "internally-controlled body-part movement" is agent-oriented or not. In such an event, the participants of the event cannot be distinguished. In Kemmer's (1993) terminology, the three classes of verbs are semantically different in the degree of "relative distinguishability of participants." "Body-part" movement verbs denote "one participant events," while verbs which disallow lexical reflexive-marking in the Germanic languages denote "typical two participant events." Verbs of grooming lie in-between.

in the distributional difference of anaphoric expressions or other expressions.[6]

2.3 The EPC in Japanese

2.3.1 The Interaction between Semantic Classes of Verbs and the Syntax of "Reflexive-marking"

As the following examples show, none of the three classes of verbs can be used as a reflexive predicate without realizing the object argument in Japanese.

(10) a. Hanako-ga *(te-o) age-ta.

Hanako-Nom hand raise-Past

'Hanako raised her hand.'

b. Taro-ga *(me-o) ake-ta.

Taro-Nom eye open-Past

'Taro opened his eye(s)'

c. Hanako-ga *(koe-o) hariage-ta.

Hanako-Nom voice raise-Past

'Hanako raised her voice.'

(11) a. Taro-ga *(kao-o/karada-o) arat-ta.

Taro-Nom face/body wash-Past

'Taro washed his face/body.'

b. Taro-ga *(hige-o) sot-ta.

Taro-Nom beard shave-Past

'Taro shaved (his beard).'

---

[6] Although we do not take them into discussion, "experiencer" verbs are similar to "externally controlled anti-agent-oriented" verbs with respect to the possibilities of "reflexive" marking: they cannot be used reflexively without realizing the object argument in English, and they disallow *zich* as the object argument in Dutch.

(i) *John hated.
(ii) *Oscar haatte zich.
    'Oscar hates himself.'

c. Hanako-ga *(kami-o) tokasi-ta.

   Hanako-Nom hair   comb-Past

   'Hanako combed her hair.'

(12) Taro-ga *(kao-o) tatai-ta.

   Taro-Nom face   hit-Past

   'Taro hit his face.'

Japanese has a simplex anaphoric expression *zibun*, which lacks a full ϕ-feature specification and apparently corresponds to the Dutch simplex anaphor *zich*. *Zibun* can occur as the object argument, but only with a limited class of verbs: It cannot occur with "internally controlled" verbs ((13a-c)) or "externally controlled agent-oriented" verbs ((14a-c)), but it can with "externally controlled anti-agent-oriented" verbs ((15)).[7]

(13) a. *Hanako-ga   zibun-o   age-ta.

       Hanako-Nom ZIBUN-Acc   raise-Past

   b. *Taro-ga   zibun-o   ake-ta.

       Taro-Nom ZIBUN-Acc   open-Past

   c. *Hanako-ga   zibun-o   hariage-ta.

       Hanako-Nom ZIBUN-Acc   raise-Past

(14) a. */??Taro-ga   zibun-o   arat-ta.

       Taro-Nom ZIBUN-Acc   wash-Past

   b. *Taro-ga   zibun-o   sot-ta.

       Taro-Nom ZIBUN-Acc   shave-Past

   c. *Hanako-ga   zibun-o   tokasi-ta.

       Hanako-Nom   ZIBUN-Acc   comb-Past

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[7] Some speakers judge (14a) as marginally acceptable. In such a case, however, the sentence bears some contrastive or holistic meaning.

(15)   Taro-ga   zibun-o   tatai-ta.

        Taro-Nom   ZIBUN-Acc   hit-Past

The syntactic effect of the other two classes of verbs is observed when the EPC in Japanese is taken into consideration. Japanese allows the EPC, though it does not strictly correspond to the one in Romance languages morpho-syntactically. Since Japanese is a language with a null-determiner system and without overt marking for number on head nouns, the BPN occurs in its bare form. However, the construction with the BPN in the object position shares semantic and syntactic properties with the Romance EPC.[8] In (16a), the BPN 'hand' is interpreted distributively with the possessor identified as each child. In (16b), under the most natural interpretation, the possessor of the BPN "eyes" is identified as the embedded subject "sister."

(16) a. Kodomo-tati-ga   te-o   age-ta.

        children-Nom   hand-Acc   raise-Past

        'The children raised their hands."

     b. Hanako-ga   [Taro-no   oneesan-ga   me-o   tozi-ta]-to   it-ta.

        Hanako-Nom   Taro-Gen   sister-Nom   eye-Acc   close-Past-Comp say-Past

        'Hanako said Taro's sister closed her eyes."

All of the three classes of verbs allow a BPN in object position, which can be "bound" to the subject.

(17) a. Hanako-ga   te-o   age-ta.

         Hanako-Nom   hand-Acc   raise-Past

         'Hanako raised her hand.'

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b. Taro-ga   me-o   ake-ta.

Taro-Nom   eye-Acc   open-Past

'Taro opened his eyes.'

c. Hanako-ga   koe-o   hariage-ta.

Hanako-Nom   voice-Acc raise-Past

'Hanako raised her voice.'

(18) a. Taro-ga   kao-o   arat-ta.

Taro-Nom   face-Acc   wash-Past

'Taro washed his face.'

b. Taro-ga   hige-o   sot-ta.

Taro-Nom   beard-Acc   shave-Past

'Taro shaved his beard.'

c. Hanako-ga   kami-o   tokasi-ta.

Hanako-Nom   hear-Acc   comb-Past

'Hanako combed her hair.'

(19) Taro-ga   kao-o   tatai-ta.

Taro-Nom   face-Acc   hit-Past

'Taro hit his face.'

A sharp contrast, however, is observed between the "internally controlled" verbs and the "externally controlled" verbs when these verbs are embedded. The locality effect is observed with the former, but not with the latter: The matrix subject cannot be the possessor of the BPN in (20a)–(20c), while it can be in (21a)–(21c) and (22).[9,10]

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[9] As in the Romance languages, the predicate "te-o ageru (raise the hand)" is ambiguous between the lexical reflexive meaning and the lexical non-reflexive meaning (see Section 2.2). In the interpretation where the verb is interpreted in the latter meaning, the locality effect disappears. The same is true of (16b) and (20b), but not of (20c).

(20) a. Saburo-to   Siro-ga   [Taro-to Ziro-ga   te-o   age-ta]-to

      Saburo-and Siro-Nom Taro-and Ziro-Nom hand-Acc raise-Past-Comp

      houkokusi-ta.

      report-Past

      'Saburo and Siro reported that Taro and Ziro raised their hands.'

    b. Saburo-to   Siro-ga   [Taro-to Ziro-ga   me-o   ake-ta]-to

      Saburo-and Siro-Nom Taro-and Ziro-Nom   eye-Acc   open-Past-Comp

      houkokusi-ta.

      report-Past

      'Saburo and Siro reported that Taro and Ziro opened their eyes.'

    c. Saburo-to   Siro-ga   [Taro-to Ziro-ga   koe-o   hariage-ta]-to

      Saburo-and Siro-Nom Taro-and Ziro-Nom voice-Acc raise-Past-Comp

      houkokusi-ta.

      report-Past

      'Saburo and Siro reported that Taro and Ziro raised their voice.'

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[10] As in English and in Dutch, "experiencer" verbs are similar to "externally controlled anti-agent-oriented" verbs: (i) they cannot be used reflexively without an object argument, (ii) they allow *zibun* as an object argument, and (iii) they allow the EPC.

(i)   *Taro-ga   kirat-te-iru (koto).
     Taro-Nom   hates
     '(the fact that) Taro hates.'
(ii) Taro-ga   zibun-o   kirat-te-iru (koto).
     Taro-Nom   ZIBUN-Acc hates
     '(the fact that) Taro hates himself.'
(iii) ?Taro-ga (zibun-no)   koe-o   kirat-te-iru (koto).
     Taro-Nom (ZIBUN-Gen) voice-Acc   hates
     '(the fact that) Taro hates his voice.'

(21) a. Saburo-to   Siro-ga   [Taro-to   Ziro-ga   kao-o   arat-ta]-to

     Saburo-and   Siro-Nom   Taro-and   Ziro-Nom   face-Acc   wash-Past-Comp

     houkokusi-ta.

     report-Past

     'Saburo and Siro reported that Taro and Ziro washed their faces.'

   b. Saburo-to   Siro-ga   [Taro-to   Ziro-ga   hige-o   sot-ta]-to

     Saburo-and   Siro-Nom   Taro-and   Ziro-Nom   beard-Acc shave-Past-Comp

     houkokusi-ta.

     report-Past

     'Saburo and Siro reported that Taro and Ziro shaved their beards.'

   c. Satiko-to   Keiko-ga   [Hanako-to   Yoko-ga   kami-o   tokasi-ta]-to

     Satiko-and   Keiko-Nom   Hanako-and Yoko-Nom   hair-Acc   comb-Past-Comp

     houkokusi-ta.

     report-Past

     'Satiko and Keiko reported that Hanako and Yoko combed their hair.'

(22) Saburo-to   Siro-ga   [Taro-to   Ziro-ga   kao-o   tatai-ta]-to

     Saburo-and   Siro-Nom Taro-and   Ziro-Nom   face-Acc   hit-Past-Comp

     houkokusi-ta.

     report-Past

     'Saburo and Siro reported that Taro and Ziro hit their faces.'

The examples in (10)–(22) show that the syntax of "reflexive-marking" in Japanese interacts with properties of verbs and that the decisive semantic properties coincide with those observed in the Romance languages and the Germanic languages. However, the syntactic structures licensed are not uniform across languages: The interaction between the semantic properties and licensing of the structures in Japanese is summarized in Table 2_1.

Table 2_1: Semantic Properties of Predicates and Their Effect on Syntax in Japanese

	External Control		Internal Control
	Anti-Agent-oriented	Agent-oriented	
without the object argument	*	*	*
Zibun as the object argument	Possible	*	*
BPN	Possible	Possible	Possible
Locality Effect (with body-part N obj.)	Not observed	Not observed	Observed

Verbs without an object argument are licensed if they have the properties of "external control" and "agent-orientation" in English, but not in Japanese. Verbs with a simplex anaphor are licensed if they have the properties of "external control" and "agent-orientation" in Dutch but the apparent corresponding structure in Japanese is licensed if verbs have the properties of "external control" and "anti-agent-orientation." The EPC in the Romance languages is licensed if verbs have the property of "internal control," and it requires an anaphoric expression *se* if verbs have the property of "external control." The EPC in Japanese is licensed with all types of verbs, but strict locality is observed when verbs have the property of "internal control."

2.3.2 The EPC and Idioms

So far, we have observed that the EPC in Japanese shows similarities to the EPC in the Romance languages and the construction with lexical reflexive-marking in the Germanic languages, as summarized in (23).

(23) a. Semantic restriction/effect

b. Locality effect

c. C-command condition

Given these similarities, a question arises as to whether the EPC in Japanese is also an instance of lexical reflexive-marking. Careful consideration of the lexicon and closer observation of the EPC in Japanese, however, lead us to the conclusion that the EPC in Japanese should be taken as an instance of syntactic reflexive-marking.

Let us first consider how much information is stored in the lexicon. The strongest position is that the lexicon is the repository of all and only idiosyncratic properties of particular lexical items. If a certain property is predictable from other properties of that item or can be derived as a result of syntactic or semantic computation, it need not be listed in a particular lexical entry (Chomsky (1995)). Idioms are linguistic expressions whose meaning cannot be compositionally derived. Thus they are listed as such in the lexicon.

With respect to this point, the constructions with a body-part object in Japanese show interesting properties. They can be used as idioms or the EPC. Some of them yield only the idiomatic interpretation and others allow two or three interpretations. For example, the sentence in (24) yields only an idiomatic interpretation. On the other hand, the sentence in (25) allows three interpretations, alienable, inalienable, and idiomatic interpretations.

(24)　　Taro-ga　　hara-o　　　　　tate-ta.
　　　　Taro-Nom stomach-Acc　　stand/set up-Past
　　　　'*Taro stood his stomach.'
　　　　'Taro got angry.'　　　　　　　　　　　　　　　(idiomatic interpretation)

(25)　　Taro-ga　　asi-o　　　　　arat-ta.
　　　　Taro-Nom foot-Acc　　　wash-Past
　　　　'Taro washed the foot/feet.'　　　　　　　　(alienable interpretation)
　　　　'Taro washed his foot/feet.'　　　　　　　　(inalienable interpretation)
　　　　'Taro got himself out of something unfavorable.'　(idiomatic interpretation)

The idiomatic expressions and the EPC show semantic and syntactic differences, which seem to reflect the division of labor between the lexicon and narrow syntax. First, let us

consider how they receive their interpretations. The idiomatic interpretation and the other two interpretations, that is, the alienable and the inalienable interpretations, are distinguished by whether they are compositionally derived or not. For example, *hara-o tateru* in (24) does not mean 'stand one's stomach,' but rather, it means 'get angry.' This is not derived from the composition of the meaning of *hara* 'stomach' and *tateru* 'stand.' The same is true for the idiomatic interpretation in (25). The phrase *asi-o arau* means 'get oneself out of something unfavorable.' This meaning is not derived from the composition of the meaning of *asi* and *arau*. In contrast, the alienable and inalienable interpretations in (25) are compositionally derived from the meaning of each word. In both interpretations, *asi* 'foot' refers to an object which is at the end of a leg, and *arau* 'wash' denotes an action in which someone cleans something with water or other liquid.

In addition to the difference in compositionality, the idiomatic examples and the EPC show some syntactic contrasts. As shown in the contrast between (26b) and (27), the BPN cannot be modified in the idiomatic examples, but this can be done in the EPC. *Hara* in *hara-o tateru* cannot be modified by the adjective *kuroi* 'black.' On the other hand, *kao* 'face' in *kao-o arau* can be modified by the expression *yogoreta* 'dirty.'

(26) a. Taro-ga   hara-o   tate-ta.

      Taro-Nom stomach-Acc   stand-Past

      'Taro got angry.'

   b. *Taro-ga   kuroi   hara-o   tate-ta.   (cf. hara-guroi otoko)

      Taro-Nom black   stomach-Acc   stand/set up-Past

(27) a. Taro-ga   yogoreta kao-o   arat-ta.

      Taro-Nom dirty   face-Acc wash-Past

      'Taro washed his dirty face.'

   b. Taro-ga   hosoi ude-o   age-ta.

      Taro-Nom slender arm-Acc raise-Past

      'Taro raised his slender arm.'

The following contrast illustrates this point more clearly. As mentioned above, some of the examples with a body-part object yield three interpretations. The expressions *asi-o arau* in (28a) and *kubi-o hineru* in (28c) are such examples. When the BPNs are modified, however, one of the interpretations becomes impossible. In (28b) and (28d), both alienable and inalienable interpretations are available, but an idiomatic interpretation is not.

(28) a. Taro-ga   asi-o   arat-ta.

       Taro-Nom foot-Acc wash-Past

       'Taro washed the foot/feet.'   (alienable interpretation)

       'Taro washed his foot/feet.'   (inalienable interpretation)

       'Taro got himself out of something unfavorable.'   (idiomatic interpretation)

  b. Taro-ga   hosoi asi-o   arat-ta.

       Taro-Nom slender foot/feet wash-Past

       'Taro washed the slender foot/feet.'

       'Taro washed his slender foot/feet.'

  c. Taro-ga   kubi-o   hinet-ta.

       Taro-Nom neck-Acc twist-Past

       'Taro twisted the neck.'   (alienable interpretation)

       'Taro twisted his neck (to look back).'   (inalienable interpretation)

       'Taro thought over (the difficult question).'   (idiomatic interpretation)

  d. Taro-ga   hosoi kubi-o   hinet-ta.

       Taro-Nom slender neck-Acc twist-Past

       'Taro twisted the slender neck.'

       'Taro twisted his slender neck (to look back).'

Another difference between the idiomatic expressions and the EPC can be seen in (29) and (30): The possessive form of the anaphoric expression *zibun* cannot occur inside the

BPN-phrase in the idiomatic examples, but it can in the EPC.[11]

(29)   *Taro-ga   zibun-no hara-o   tate-ta.

          Taro-Nom   his-Gen   stomach-Acc   stand/set up-Past

(30) a. Taro-ga   zibun-no   kao-o   arat-ta.

       Taro-Nom his-Gen   face-Acc   wash-Past

       'Taro washed his face.'

    b. Taro-ga   zibun-no   te-o   age-ta.

       Taro-Nom his-Gen   hand-Acc raise-Past

       'Taro raised his hand.'

The three-way ambiguity of the sentence (25) disappears when *zibun* occurs in the possessor position. The sentence (31) yields only the inalienable interpretation.

(31)   Taro-ga   zibun-no   asi-o   arat-ta.

       Taro-Nom his-Gen   foot-Acc   wash-Past

       'Taro washed his foot.'

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[11] English idioms with the BPN object differ from Japanese idioms. Some of them allow or require possessive pronouns to occur inside the BPN phrase, while others do not. See Roeper (2000) for discussion. I would like to thank Tohru Noguchi for pointing this out.

(i)   John lost his cool / *John lost cool
(ii)   John lost his virginity / *John lost virginity
(iii) *John lost his face / John lost face

As the following example shows, a limited number of Japanese idioms allow *zibun-no* inside the BPN phrase.

(iv) Taro-ga   zibun-de   zibun-no asi-o   hippat-ta.
     Taro-Nom himself-by his-Gen foot-Acc pull-Past
     'Taro held himself back.'

I would like to consider this point in future research.

These contrasts suggest that the idiomatic predicates and the predicates in the EPC have different syntactic structures. The former have a word-like structure, so they do not allow a modifying expression or a possessor noun inside them. The latter, on the other hand, have a phrasal structure, and thus allow a modifying expression or a possessor noun inside the noun phrase. For this reason, this thesis does not consider the EPC to be an instance of lexical reflexive-marking.

2.4 Noun-Incorporation Analysis (NIA) of the EPC in Japanese

If the EPC in Japanese cannot be an instance of lexical reflexive-marking, how can the properties of the construction be derived? As a possible explanation, this section proposes a noun-incorporation analysis (henceforth NIA) of the EPC in Japanese (Nakato 2009a, b), which extends the application of Reinhart and Reuland's (1993) reflexivity theory of binding to the EPC in Japanese. As summarized in (32) and (33), Reinhart and Reuland (1993) propose that morphologically complex anaphors, such as English *himself*, can reflexively mark a predicate in narrow syntax. They divide reflexive-marking systems into two types: The first one is lexical and the second one is syntactic. They point out that lexical reflexive-marking is semantically restricted, while syntactic reflexive-marking is semantically unrestricted.

(32) Syntactic Reflexive-markers: SELF-anaphors

(33) a. Lexical Reflexive-marking: Semantically restricted

  b. Syntactic Reflexive-marking: Semantically unrestricted

This section argues that their theory can be applied to the BPN object construction. As summarized in (34)-(35), not only SELF-anaphors but also BPNs can reflexively mark a predicate in narrow syntax; the syntactic reflexive-marking system is divided into two subtypes. The first one is possible only with a limited class of verbs, and the second one is possible with any class of verbs.

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(34) Syntactic Reflexive-markers: SELF anaphors and BPNs

(35) a. Lexical Reflexive-marking: Semantically restricted

b. Syntactic Reflexive-marking: i. Semantically restricted

ii. Semantically unrestricted

Before going into the main discussion, let us clarify the notions adopted in our discussion. As briefly summarized in Chapter 1, Reinhart and Reuland's original proposal was cast within the framework of the Government and Binding Theory. For that reason, the notion of binding is defined in terms of c-command and co-indexing. Under the Minimalist Program, the use of indices violates the condition of inclusiveness and so binding relations need to be explained without recourse to indexing. Reinhart (2006) redefines binding as in (36a), a definition adopted in the following discussion. The Reflexivity Condition in (36b) is also presupposed as one of the licensing conditions at the C-I interface.

(36) a. A-Binding   (Reinhart (2006: 171))

α A-binds β iff α is the sister of a λ-predicate whose operator binds β.

b. Reflexivity Condition   (Reinhart (2006: 177))

A reflexive-predicate must be reflexive-marked.

Under the NIA, the ambiguity observed with the BPN object construction is attributed to two different syntactic structures. With respect to the properties within a DP, the analysis assumes (37)-(39).[12,13]

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[12] Adopting Munn and Schmitt (2005), Nakato-Miyashita (2011c/2014) assumes AgrP within a nominal projection. Because the existence of that functional phrase is not relevant to later discussion, this thesis employs a simpler structure as in (37).

[13] The internal structure of nominal projections is still a matter of debate, especially in languages which lack overt determiners or agreement morphology. In a theory which does not assume any functional projection above NP in the absence of overt morphological realization, we need to hypothesize some operation such as a type-shifting operation or coercion (Partee (1987), Partee and Borschev (1998)), and some rules which regulate its application. In a theory which does assume

(37) Layered Structure in DP

```
              DP
             /  \
            /    \
           /      \
          D      NumP
                 /    \
                /      \
              Num      NP
                      /  \
                     /    \
                     N
```
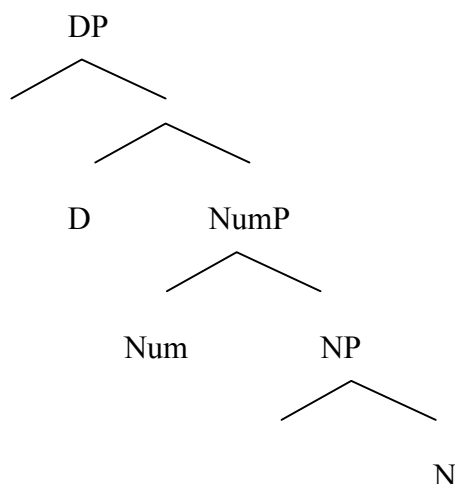
(38) The DP in Japanese has D or Num, though it is not phonetically realized.

(39) [poss [N$_{body-part}$]]   (cf. Vergnaud and Zubizarreta (1992))

DP has a layered structure like (37), although the functional heads Num and D do not have morpho-phonological realization in Japanese. A nominal phrase does not necessarily project onto a full DP. A BPN is a predicate and it takes a possessor argument as in (39). The argument must be "discharged" in the course of derivation to have an interpretation and there are two ways to discharge the argument: The first is to take a null determiner D and the second is to be incorporated into a verb and form a complex predicate with the verb.

  With these assumptions, let us consider how the two interpretations of the BPN object construction are derived. The sentence with the body-part object (40a) can be assigned two syntactic structures: One has a full DP as in (40b), and the other one has a projection smaller than DP as in (40c).

---

functional projections above NP, on the other hand, we need to hypothesize functional projections, whose head can be phonetically null. Nakato (2009b) and Nakato-Miyashita (2011a) argue that at least the NP-DP distinction is necessary to explain the syntactic and semantic properties of the BPN construction in Japanese. For an analysis which favors full-fledged DP in Japanese, see Watanabe (2006). For an analysis which claims that Japanese is an NP-language which lacks functional projections, see Fukui (1986, 1988), Bošković (2005, 2008, 2009) and Bošković and Gajewski (2011).

(40) a. Taro-ga   kao-o   arat-ta.

      Taro-Nom face-Acc   wash-Past

b.
```
                        IP
                    ┌────┴────┐
                  Taro      ┌──┴──┐
                           vP      I
                        ┌───┴──┐   ta
                      t_Taro ┌──┴──┐
                            VP      v
                         ┌───┴──┐
                        DP       V
                     ┌───┴──┐   arau
                  ┌──┴──┐    D
                 NP      the
              ┌───┴──┐
             poss    N
                    kao
```

c.

IP

Taro

*v*P   I

   ta

t_Taro

VP   *v*

V

arau

NP

poss   N

kao

d.

IP

Taro

*v*P   I

   ta

t_Taro

VP   *v*

poss   V

arau-kao
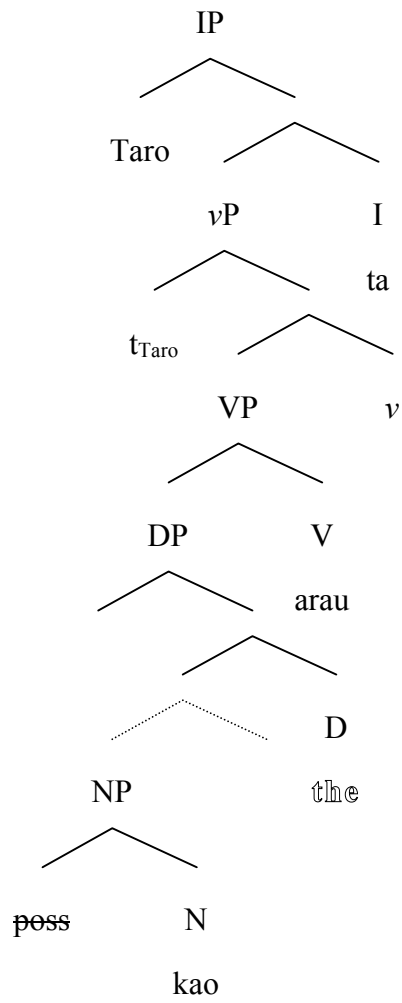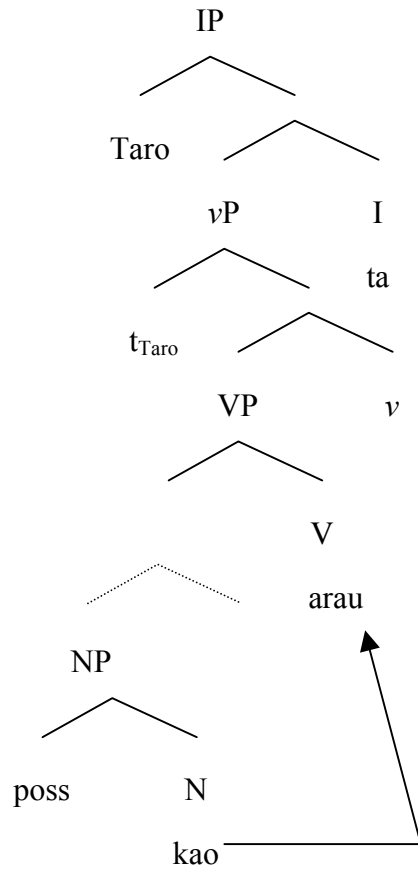
(40b) is one possible way for a BPN to discharge its argument. The noun takes a null determiner D and the entire phrase, DP, receives a definite interpretation. It can refer to some entity in the discourse and this yields the alienable interpretation. In contrast, the nominal

phrase with a smaller projection in (40c) must have a bound variable interpretation. The BPN must discharge its argument to have an interpretation. This forces the BPN to be incorpor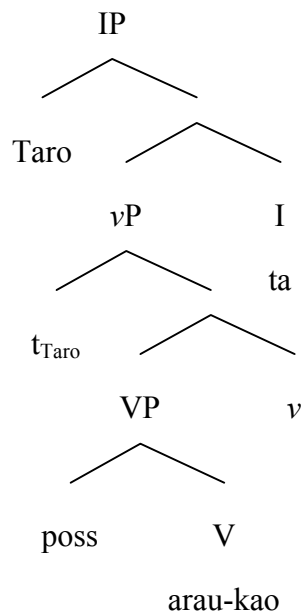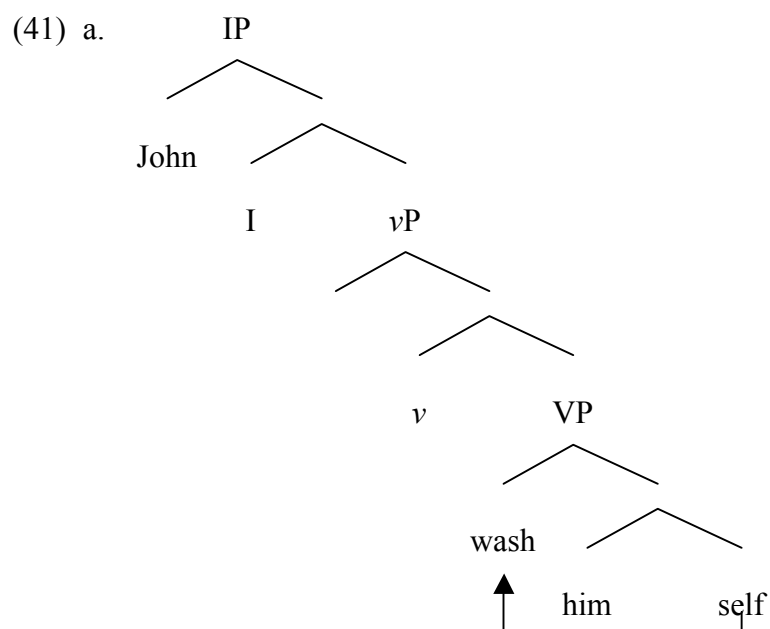ated into the verb (cf. Baauw (2002)). The noun *kao* is incorporated into the verb *arau* after Spell-Out/Transfer and they form a complex predicate.[14] After the incorporation, the sentence has the structure in (40d).

This operation reminds us of SELF-incorporation. As illustrated in (41), the SELF-part of a SELF-anaphor is incorporated into a predicate to reflexively mark it (Reinhart and Reuland (1991), Reuland (2011)).[15]

(41) a.

```
                    IP
                   /  \
               John    \
                      /  \
                    I     vP
                         /  \
                        /    \
                       v      VP
                      wash   /  \
                            /    \
                          him    self
```

---

[14] If we adopt this analysis, a question arises as to how the EPC in Romance languages is explained, because BPNs obligatorily take a definite determiner. If their argument taking property is satisfied, they do not have to be incorporated into a verb. Vergnaud and Zubizarreta claim that *la*/*le* in the EPC is not a definite determiner but an expletive element. Following their idea that *la*/*le* is not associated with definiteness, this thesis assumes that the BPN phrase in the EPC in Romance languages does not have a full DP-projection. *La*/*le* occurs somewhere below DP.

[15] The internal structure of *himself* in English is left unspecified in this paper. See Reuland (2011) for discussion.

b.　　　IP
John
　　　I　　vP
　　　　v　　VP
　　　self-wash　him
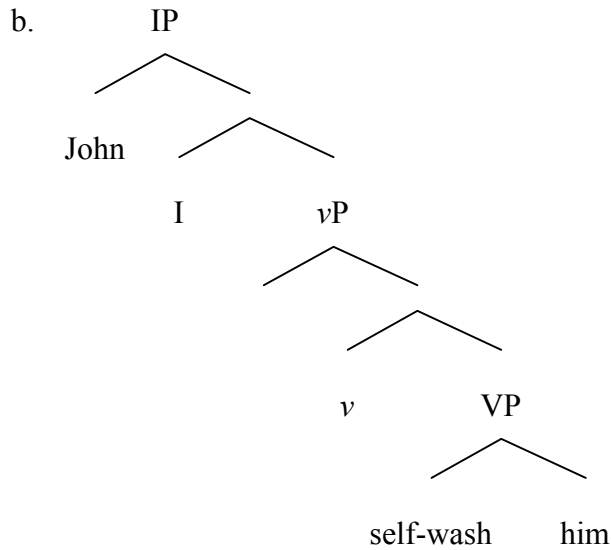
The LF-structure in (41b) is mapped onto a semantic representation like (42).

(42)　　λx [x washes x] (John)

The structure in (41b) is equivalent to the LF-structure after the noun-incorporation in (40d). Like SELF-incorporation, noun incorporation turns a transitive predicate into a reflexive predicate, and it is mapped onto a semantic representation as in (43).

(43)　　λx [x arau-kao x] (Taro)

In both of the semantic representations in (42) and (43), the binding relation (36a) holds and licensed by the Reflexivity Condition (36b). As a result, the inalienable interpretation is derived.[16]

The examples in (44) provide supporting evidence to this analysis. When sentences with a BPN are made passive, the inalienable interpretation becomes impossible.[17]

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[16] For another possible explanation, see Noguchi (2005).

[17] As the following example shows, passivization is possible if it does not include any movement or anaphoric relation. For the interaction of passive with Noun Incorporation, see Baker (1988:83).

(44) a. Kao-ga   Taro-niyotte araw-are-ta.

    face-Nom Taro-by   wash-Pass-Past

    'The face was washed by Taro.'

    '*His_i face was washed by Taro_i.'

  b. Te-ga   Taro-niyotte   age-rare-ta.

    hand-Nom Taro-by   raise-Pass-Past

    'The hand was raised by Taro.'

    '*His_i hand was raised by Taro_i.'

This fact follows from the NIA. (45a) and (45b) illustrate the structures of passive sentences after Transfer/Spell-Out.

(45) a.

```
                        IP
              _____/  _____
             /                    \
           DP                    /  \
         /    \               Taro  /  \
        /      \                   /    \
       /      / \                vP      I
      /      /   \              /  \     ta
    NP      /   D              /    \
   /  \    /   the           VP    v-rare
 poss   N                   /  \
       kao               t_DP    V
                                arau
```
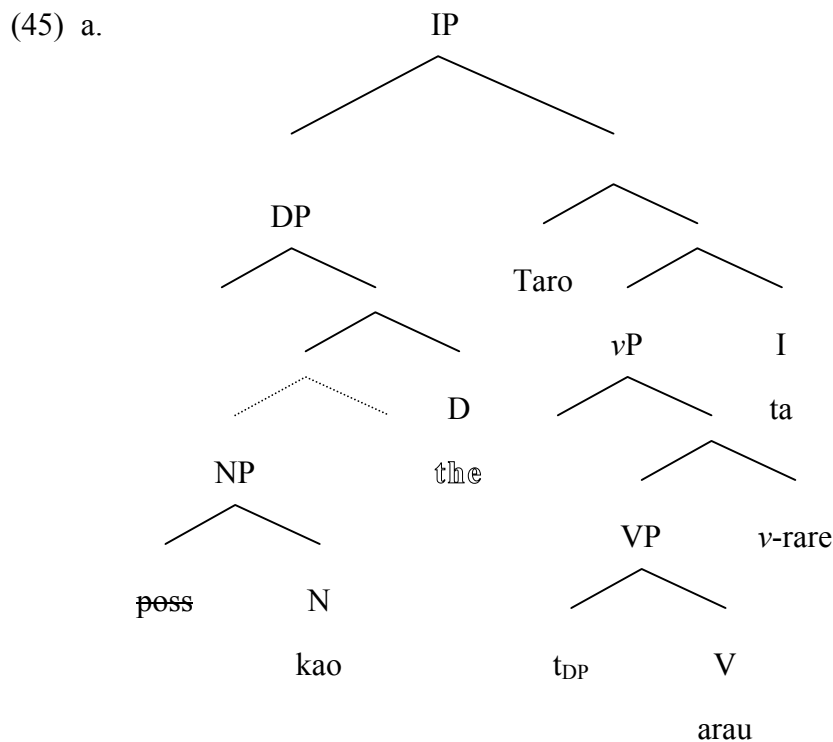
(i) Kao-ga   ame-ni   araw-are-ta.
    face-Nom   rain-by   wash-Pass-Past
    'The face was washed by rain.'

b.

IP

NP   Taro

poss   N   vP   I

kao   VP   ta

                 V   v-rare

                 arau
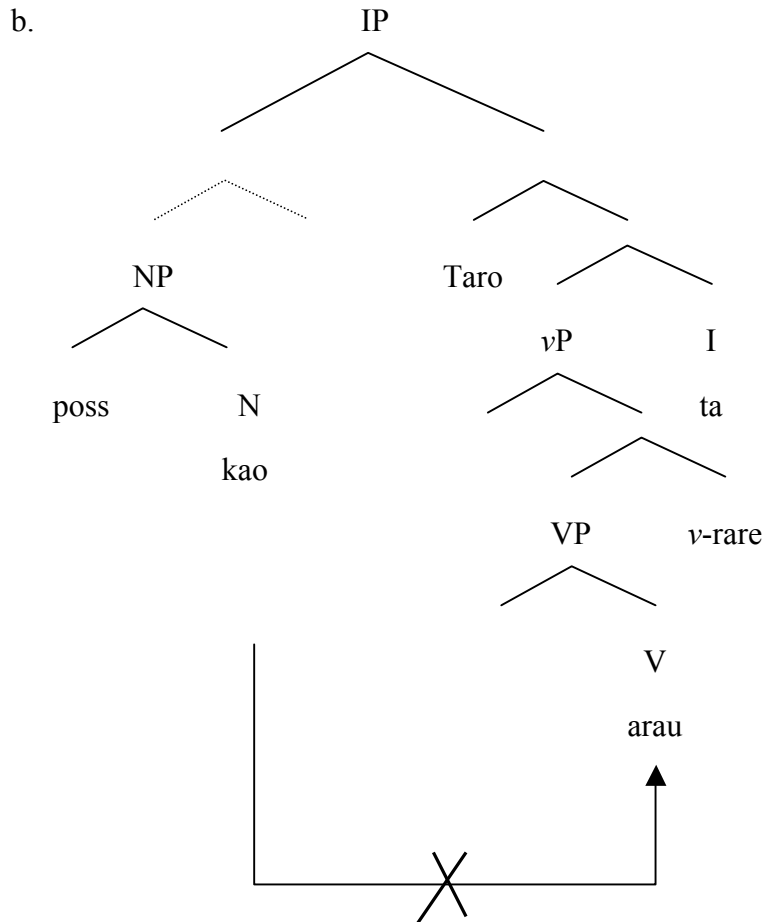
In (45b), the head noun cannot be incorporated into the verb because it has already moved up to the subject position. In other words, the noun cannot reflexively mark a predicate and hence the inalienable interpretation becomes impossible.

The noun-incorporation analysis of BPNs suggests that Reinhart and Reuland's proposal should be partly modified as in (46) and (47). Not only a SELF-anaphor but also a BPN can reflexively mark a predicate in narrow syntax (cf. Anagnostopoulou and Everaert (1999)).

(46)   Syntactic Reflexive-markers

        SELF-anaphor →   a. SELF-anaphor

                          b. BPN

Syntactic reflexive-marking is divided into two subtypes. The first type is restricted with respect to the semantic class of verbs, while the second type is unrestricted. The Japanese

EPC is an example of the first type of syntactic reflexive-marking.

(47) Reflexive-marking Systems

    a. Lexical Reflexive-marking: Semantically restricted

    b. Syntactic Reflexive-marking: Semantically unrestricted

    ↓

    a. Lexical Reflexive-marking: Semantically restricted

    b. Syntactic Reflexive-marking:

    i. Semantically restricted   ← The EPC in Japanese

    ii. Semantically unrestricted

2.5 BPNs as Reflexive-markers: Semantic Computation at the C-I Interface

In this chapter, the syntactic and semantic properties of the EPC in Japanese have been closely examined and as one possible analysis to explain them, an NIA of the EPC has been presented.

Through the investigation and comparison between English, Spanish/French, and Japanese, it has been argued that these languages do not differ so much with respect to the properties related to the semantic component (or the C-I Interface), but do differ with respect to morpho-phonological properties: Every language imposes some semantic restrictions on the licensing of reflexivity of predicates. The semantic properties observed to be necessary for such reflexivity-licensing in one language also play an important role in reflexivity-licensing in another language, although the key properties are not quite the same in every language but overlap. "Internal/external control" and "agent-orientation" are two important semantic properties; furthermore, the forms licensed are not uniform across languages. One language employs a construction with a null argument, another an EPC, and still another a construction with a simplex anaphor. Showing that Japanese employs the EPC for such reflexivity-licensing, this chapter has proposed an analysis, the NIA. Under this analysis, BPNs are assumed to have the same function as reflexive anaphors.

To sum up, this chapter has argued I) that the mechanisms which license reflexivity of a predicate at the C-I Interface, and the licensing condition, and semantic features necessary for such licensing are universally given, but II) that each language takes a different morpho-phonological solution to satisfy the condition. The analysis leaves some problems still unsolved. First, the optional property of the operation cannot be derived under the analysis: Why is SELF-incorporation obligatory while noun-incorporation is not?[18] Second, no explanation for the cross-linguistic variation is provided yet: Why is some form used in one language but not in another and why are some semantic properties necessary for reflexivity-licensing in one language but not in another? The analysis proposed in this chapter has some implications for these questions.

The observations made in previous studies (Safir (2004), Reuland (2011), for example) and this chapter suggest that behind the variations which give rise to these questions are I) a difference in the degree of "grammaticalization" of an "anaphoric" expression, II) a difference in the inventory of pronominal forms in each language and III) a difference in the range of meaning specified in a word, or a verb. These differences interact with each other and result in the variations.

Taking into consideration these differences, let us consider the first question. As summarized in (48), SELF-incorporation and BPN-incorporation differ in their optionality

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[18] The optional property of noun-incorporation cannot be attributed to an inherent property of a BPN itself. Rather, it derives from properties of predicates. As Hasegawa (2007) argues, adopting this analysis, a question arises as to how French/Spanish examples are explained. See note 13 in this chapter.

Some sentences with a body-part object, such as (i), involve possessor-raising.

(i) Tomoko-ga   kosi-o   itame-ta
    Tomoko-Nom back-Acc   hurt-Past
    'Tomoko hurt her back.'

Hasegawa divides predicates into four types depending on the feature specification of [±External Role] and [±Object Case]. See Hasegawa for details. I would like to thank Yuki Ishihara for suggesting that I take this point into consideration. The observation made in this paper shows that verbs which denote "grooming action" or "internally controlled body-part movement" allow noun-incorporation, but others do not. My analysis suggests that predicates with the [+ER, +OC] features, which Hasegawa calls "agentive transitive" predicates, are further divided into two sub-types. I would like to consider what feature plays a decisive role in distinguishing these sub-types.

and their semantic restriction: SELF-incorporation is obligatory and semantically unrestricted, but BPN-incorporation is optional and semantically restricted. Why is the latter optional, instead of obligatory?

(48) a. SELF-incorporation: Obligatory, Semantically unrestricted

b. BPN-incorporation: Optional, Semantically restricted

One possible explanation is that reflexive anaphors and BPNs differ in their semantic content and the difference leads to the optionality of BPN-incorporation: In contrast to SELF-anaphors, which are highly grammaticalized and contribute no (nontrivial) property to the interpretation, BPNs in the Japanese EPC retain their meaning as independent words. Unlike SELF-anaphors, BPNs contribute a property to the interpretation. Consequently, reflexivity of a predicate is not blindly licensed but some restrictions are observed.

Although it is not clearly formalized, the idea behind the NIA is informally stated as follows: When a syntactic derivation reaches the C-I Interface, where the Reflexivity Condition works as a licensing condition, the C-I system reads off semantic features of a verb and its object. From these features, the entire meaning of the predicate (the verb and the object noun) is compositionally computed. The naturalness of the derived meaning is evaluated as a reflexive event, or a one-participant event. If it is, the derivation is given a reflexive interpretation.

Reuland (2011) claims that the function of a syntactic reflexivizer is to create a match between formal and thematic arity. In order to express a reflexive relation with a predicate which normally requires two syntactic arguments, an expression which makes minimal semantic contribution has to be used. The expression has the structure in (49a) whose interpretation is roughly expressed by the representation in (49b), where M is interpreted to be a function mapping x onto the object that can be a proxy for x. The expression with a pronominal part and a morphological element Morph is called a reflexive licenser and the condition in (50) is imposed on the choice of such a licenser.

71

(49) a. DP V [*Pronoun* Morph]

    b. DP (λx [V (x, [x M])])

(50) DP (λx V(x, f(x)))

    Condition: ‖f(x)‖ is sufficiently close to ‖x‖ to stand proxy for ‖x‖

<div align="right">(Reuland (2011: 206-207))</div>

Not only SELF-anaphors, but BPNs are also good candidates for such a licenser, but in the Japanese BPN-object construction, they still do not completely lose their semantic contents.

    As Reuland (2011) argues, in some languages, the semantic content of some elements "is under a certain threshold." They lose their referential property and hence are used as a reflexivizer as –*self*. In languages whose lexical inventory does not have any pronoun, a BPN is often employed as such an element whose semantic content is lost and gets a grammatical function to reflexively mark a predicate (Anagnostopoulou and Everaert (1999), Harley and Ritter (2002), Reuland (2011), Safir (2004)). They are called body-part reflexives or body-part anaphors, one of which is exemplified in the following Basque sentence.

(51) Aitak   bere   burua   hil du.

    father+ERG 3SG.POSS   head+NOM.DEF kill have+3SG+3SG

    'The father killed himself.'   (Reuland (2011: 49))

In these languages, BPNs are semantically bleached and they can stand proxy for their antecedents, and this is why (51) can be interpreted reflexively.[19] Safir (2004) also argues that a body-part anaphor is a metonymic use of a BPN: when a BPN is grammaticalized, its original meaning in (52a) is substituted by (52b), and it is interpreted as instantiating the part-whole relation as an identity relation.

---

[19] In fact, English *self* was semantically bleached and became a part of one word *my/your/his/herself* as a result of a diachronic change. It was used as an independent word and spelled out like *his self*. See Keenan (1994, 2002, 2003) for details.

(52) a. BODYPART (x, y) holds if x is animate and y is a portion of the anatomy of x.

b. METONYMY for BODYPART (x, y) ⊃ (x = y)　　　　(Safir (2004: 195-196))

Whatever terminologies are used, the claims these previous studies made are essentially the same: Some computation/operation in the semantic component which causes semantic bleaching or metaphorical use of a BPN is given by UG and the possibility of such a computation/operation is related to an inalienable interpretation of that noun. The complete bleaching/change of meaning may happen diachronically, but the notion of inalienable possession and the synchronic and repeated use of BPNs in an inalienable possessive situation are the basis of such change.

Our analysis given in this chapter has advanced this idea and it implies that the semantic computation which licenses "reflexivity" of a predicate at the C-I Interface is behind the change. When a BPN retains its semantic content as an independent word, the naturalness of reflexivity of an event denoted by a noun-verb complex is computed, which results in the semantic restriction. If it sounds natural as a one-participant event, reflexivity of the noun-verb complex is licensed and an inalienable interpretation of the BPN-object obtains. If it does not, the BPN-object construction yields only an alienable possessor interpretation. Through repeated or conventionalized use in an inalienable situation or in an idiomatic expression, a BPN can be semantically bleached and grammaticalized, and when this happens, its incorporation becomes obligatory and no semantic restriction is imposed on the operation.

The notion expressed by the BPN-object construction or idioms with BPNs can be considered to be somewhere in-between a pure-transitive and a pure-reflexive, and BPNs used in them may be taken to be on their way toward semantic bleaching or grammaticalization. Whether or not BPNs lose their semantic content depends on many factors, one of which is availability of an appropriate anaphoric form in a given language. In languages without pronominal forms, BPNs may easily lose their meaning and come to be used as a pure functional reflexive-marker like SELF.

In languages whose inventory has some alternative pronominal forms, on the other hand, more dependent forms are chosen as a form to be bound in a related domain, in our case, as a reflexive-marker. Safir (2004) formulates such a competition among pronominal forms as the Form to Interpretation Principle (FTIP) as in (53). According to his theory, pronominal forms in a language are ordered on a scale in accordance with their degree of "dependency" and the FTIP Algorithm in (54) determines which one should be used with a given interpretation.

(53) FTIP (Form to Interpretation Principle)

    If a) X c-commands position Y,

      b) z is the lexical form or string that fills Y,

      c) w is a single form more dependent than z,

      d) both w and z could support the same identity-dependent interpretation if Y were exhaustively dependent on X, then (the referential value for) Y cannot be interpreted as identity dependent on X.   (Safir (2004: 74))

(54) FTIP Algorithm: The input is a given numeration and the resulting LF that contains a nominal A potentially dependent on and c-commanded by a nominal B. Substitute the next most dependent form for the lexical content of A (the target) in the given numeration. If the new test numeration permits an LF to be derived that permits the same dependency relation without crashing, then a dependent reading on B for the target form is unavailable, but if the test derivation crashes, then repeat the process with an even more dependent form substituting for the target until there is no dependent form for the target that permits the derivation to converge, then the dependent reading is indeed available for the target.   (Safir (2004: 81))

For example, pronominal forms in Germanic languages are ordered in accordance with the scale (55): One with fewer morphological specifications or one with a reflexivizing function (or SELF) is more dependent than others: SIG forms, which have fewer ϕ-feature specifications, are more dependent than pronouns, and SELF forms are more dependent than

morphologically simple forms (SIG, pronoun).

(55) SIG-SELF >> pronoun-SELF >> SIG >> pronoun >> r-expression

Possible derivations with alternative pronominal forms are computed and compared, and the one with the most dependent form possible is chosen as the best derivation for a given interpretation. For example, English *himself* competes with *him* in a co-argument context and because it is more dependent than *him*, a bound interpretation is given to the derivation with *himself*, not to the one with *him*.

   Dependency itself is determined in terms of lexical specification. As Safir (2004) notes, his definition of "dependent" forms is quite different from those assumed in previous studies (Burzio (1991), Rainhart and Reuland (1993) among others). He takes the position that SELF-forms are more specified and more dependent than other forms, while it is normally assumed that the principle in (56) holds and that a SELF-form is less specified and more dependent.

(56) Morphological Economy: A bound NP must be maximally underspecified.

<div align="right">(Safir (2004: 69))</div>

   The observation made in this chapter suggests that not only pronominal forms but also BPNs compete with other pronominal forms and that a derivation with a BPN is chosen over others to express a "reflexive" situation. Such a competition among pronominal forms and BPNs interacts with the range of meaning specified in a word, and this gives a partial answer to the second question: Why is some form used in one language but not in another? As we have already seen in Section 2.3.1, a reflexive situation expressed by a sentence with a lexically reflexive verb in English and Dutch cannot be expressed by a sentence with a null argument or an anaphoric expression in Japanese. For example, as in (57), the English verbs *wash* and *shave* can be used without an object to express a reflexive situation. In contrast, as

in (58), the corresponding Japanese verbs *arau* and *soru* cannot be used as such if they do not take any object ((58a)) or even if they take an anaphoric expression *zibun/zibun-zisin*, which is normally used to express reflexivity, as one of their arguments ((58b)). Rather, they have to take a specific BPN, such as *karada* or *hige*, to express corresponding situations as in (59).

(57) John washed/shaved.

(58) a. *Taro-ga   arat-ta/sot-ta.

         Taro-Nom wash-Past/shave-Past

    b. *Taro-ga   zibun/zibun-zisin-o   arat-ta/sot-ta.

         Taro-Nom   ZIBUN/ZIBUN-ZISIN-Acc   wash-Past/shave-Past

(59) a. Taro-ga   karada-o   arat-ta.

         Taro-Nom   body-Acc wash-Past

         'Taro washed.'

    b. Taro-ga   hige-o   sot-ta.

         Taro-Nom   beard-Acc   shave-Past

         'Taro shaved.'

In these examples, the derivations with a BPN in (59) are chosen over the ones with a null argument or an anaphoric expression in (58) in Japanese, which indicates that not only pronominal forms but BPNs are also on a scale of anaphoric expressions. FTIP compares derivations with these nouns with ones with other anaphoric expressions. The necessary use of a specific body-part in Japanese and the difference between English and Japanese come from the difference in the lexical specification of a verb's meaning. The English verb *shave*, for example, specifies, in its lexical content, what is shaved while the Japanese verb *soru*, does not.[20]

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[20] Given such an argument, a further question arises as to what can be considered by the FTIP Algorithm as a possible expression to be on the scale and compete with pronominal forms. If a notion expressed by a lexically reflexive verb in one language is defined as "reflexive," and a noun which is used to express the corresponding notion in another language is considered to be on the scale of

anaphoric expressions as in the examples above, would the noun *huku* in (i) also be taken to be on that scale? As the English translation shows, the same notion expressed by *huku-o kiru* in Japanese can be paraphrased by an intransitive verb, *dress*, in English, which is normally analyzed as an example of lexically reflexive verb.

(i) Taro-ga   huku-o   ki-ta.
    Taro-Nom clothes-Acc   put on-Past
    'Taro dressed.'

This thesis does not have much to say about this question, but it would be possible to say that the definition of reflexivity or of a reflexive-marker is not absolute, but determined relatively depending on what kind of lexical items are available in a given language. Undoubtedly, the reason why BPNs can be put onto a scale is that they denote an inseparable part of a body. In a broader sense, the noun *huku* can be taken as a part of a body when it is worn and the same is true as all nouns denoting clothing items. However, BPNs and nouns for clothing items are different in the degree of "dependency" in reference. In contrast to BPNs, whose interpretation normally presupposes the existence of their possessors, nouns for clothing items do not necessarily presuppose their possessors and can be interpreted independently. A clothing item can be taken as a "body-part" in an extended sense under the situation mentioned above, but it is still a separable part of the body, and in this sense there is a distinction between BPNs and nouns for clothing items. The example in (i) can be taken as expressing a reflexive action, but the degree of its reflexivity is not so strong, and it is closer to a transitive action than those expressed by the examples in (59). Admitting that the decision about reflexivity or reflexive-markers is not absolute, this thesis still distinguishes the examples with BPNs and those with nouns for clothing items, and considers the latter examples as conventionalized expressions. Reflexivity of a predicate is derived not only through a syntactic operation but through a computation in the semantic or pragmatic component. SELF-anaphors are highly productive syntactic reflexive markers and nouns for clothing items are items used in a limited number of conventionalized "reflexive" expressions. In-between these two extremes on a scale are BPNs: Reflexive-marking with them is more restricted than "highly functional" syntactic reflexive-marking with SELF-anaphors, but more productive than conventionally used "reflexive" expressions with nouns for clothing. I would like to express my gratitude to Tohru Noguchi for bringing up this issue. See Nitta (1982) and Katayama (2005) for discussion on related issues.

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Chapter 3

The BPN Object Construction in Adult English

3.1 Introduction

Chapter 2 investigated the syntactic and semantic properties of the BPN object construction in Japanese and proposed an analysis which explains the properties in terms of principles which license reflexivity of predicates. This chapter investigates the BPN object construction in English and further considers the questions initially raised (see (51) in Chapter 1). After comparing the BPN object construction in English with the construction with a reflexive pronoun in English and the BPN object construction in Japanese, this chapter considers whether or not the analysis provided in Chapter 2 is also applicable to English.

As repeatedly mentioned, the BPN object construction in English exhibits some morpho-phonological differences from the BPN object constructions in Romance languages and in Japanese. One of them is the requirement of a possessive pronoun within a BPN phrase: In order to express the situation described by the EPC in Romance languages and in Japanese, a sentence with a possessive pronoun is preferably used in English. A sentence with a BPN object has only an alienable interpretation when it has a definite determiner within the BPN phrase.[1] An inalienable interpretation is obtainable when it has a possessive pronoun or an indefinite determiner within the BPN phrase or the BPN is in its bare plural form. Among these, a sentence with a possessive pronoun is normally used to describe an action including an inalienable possessive relationship.[2]

Another difference is in the effect of number marking on head nouns. This difference is clearly observed when the BPN object construction has a plural subject. A plural form of the

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[1] For exceptional cases, see footnote 2 in Chapter 1.

[2] The question as to how the inalienable interpretation of indefinite forms of BPN objects is derived should be answered, but this thesis leaves the issue open.

object is preferred in English, but a singular form is used in Romance languages.

Because of the requirement of a possessive pronoun within a BPN phrase and the preference for a plural form of head nouns, the BPN object construction in English shares some morpho-syntactic properties with the construction with a reflexive pronoun, but their properties are not quite identical.

Taking into consideration these differences, this chapter aims to explain the properties of the English BPN object construction by the NIA proposed in Chapter 2. Under this analysis, morpho-syntactic similarities between the English BPN object construction and the construction with a reflexive pronoun will be partially attributed to the Agree operation in narrow syntax. However, some additional claims are necessary to provide a full account of the morpho-phonological differences between the two constructions in English and between English and Japanese. It will be argued that in addition to the syntactic operation, semantic/pragmatic principles are responsible for the morpho-syntactic properties of the English BPN object construction. Furthermore, one of the differences between English and Japanese will be attributed to a parameter at the A-P Interface, which requires the left edge of every nominal phrase to have a phonetic realization.

3.2 Possessive and Reflexive Pronouns in English and the Japanese BPN Object Construction

English reflexive and possessive pronouns share the property that they have to agree with their antecedents in person and number (and gender if they are singular) to have a bound interpretation. In (1a), (2a) and (3a), the subject is 3rd person singular (masculine). The pronominal part of the reflexive pronoun in (1a) and the possessive pronoun in (2a) and (3a) agree in these features with the subject, and thus they can be bound to the subject.

(1) a. John washed himself.

 b. *John washed herself.

c. *John washed themselves.

(2) a. John$_i$ washed his$_{i/j}$ face.

b. John$_i$ washed her$_{*i/j}$ face.

c. John$_i$ washed their $_{*i/j}$ face.

(3) a. John$_i$ put his$_{i/j}$ book on the shelf.

b. John$_i$ put her$_{*i/j}$ book on the shelf.

c. John$_i$ put their$_{*i/j}$ book on the shelf.

However, a difference is observed between reflexive pronouns and possessive pronoun phrases in their grammatical status when there is any mismatch in these features. The mismatch makes a sentence with a reflexive pronoun ungrammatical as in (1b, c), but it does not result in ungrammaticality of a sentence with a possessive pronoun as in (2b, c) and (3b, c). The possessive pronoun is not necessarily bound to the subject, and it can be interpreted to refer to some entity given in the discourse (unbound interpretation). Therefore, bound interpretations are not available in (2b, c) and (3b, c), but unbound interpretations are possible.

In addition to the difference in DP-external morpho-syntactic requirements, reflexive pronouns and possessive pronoun phrases also differ DP-internally. Pronominal parts and head nouns of reflexive pronouns obligatorily agree in number, but those of possessive pronoun phrases do not. The combination of a pronominal part with singular morphology and a head with plural morphology, or vice versa, is illicit and ruled out.[3]

(4) a. *himselves / *herselves

b. *themself

---

[3] The form in (4b) has come to be used in order to avoid mentioning gender as in (i). I would like to express my gratitude to Christopher Tancredi for pointing out this possibility.

(i)   If a person injures themself, they should see a doctor.

On the other hand, a possessive pronoun can be used with both singular and plural heads as in (5).

(5)   a. John$_i$ put his$_{i/j}$ book/books on the shelf.

      b. John and Bill$_i$ put their$_{i/j}$ book/books on the shelf.

However, when BPNs are used as head nouns, number morphology on them affects the interpretation of possessive pronouns: When a BPN which presupposes a one-to-one correspondence between a body-part and its possessor is used and it is interpreted in an inalienable possessive relation with the subject, adult prefer its number morphology to match that of the subject. For example, the sentences in (6) have the BPN *face* in the object position. Our knowledge about the human body tells us that a person has only one face and because of this knowledge most native speakers of English say that (6a) is unnatural or even unacceptable when it is used out of the blue. On the other hand, (6b) is judged perfectly fine even when it is used out of the blue. Conversely, most native speakers of English prefer (6d) to (6c). This leads to a difference between English and Romance languages, which was already introduced in Chapter 1. In French and Spanish, a singular form of the BPN object is used with a plural subject, but in English a plural form of the BPN object is preferred (see (5) and (6) in Section 1.2). Henceforth, this preference for forms matching in number will be referred to as number agreement between a possessive pronoun and a head noun without taking a stand on whether this agreement is syntactic in nature.

(6)   a. John$_i$ cleaned his$_{\#i/\#j}$ faces.

      b. John$_i$ cleaned his$_{i/j}$ face.

      c. The children$_i$ cleaned their$_{\#i/\#j}$ face.

      d. The children$_i$ cleaned their$_{i/j}$ faces.

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(6a) and (6c) are not completely ruled out as illicit sentences. They will become felicitous under appropriate contexts, although the "true" inalienable possessive interpretations are unavailable. Consider (6a), for example. Imagine a situation where John, who is a sculptor, carved his face in marble and made copies of the work.[4] This situation makes the bound interpretation of a possessive pronoun in (6a) felicitous, and the sentence will be true if he cleaned the copies. The bound interpretation is also possible even if the models of his works are not John himself. They can be modeled on different people, for example, Mary, Sue, and Lilly. The unbound interpretation is also made felicitous if appropriate context is provided, for example, the sculptor is a person other than John, say, Bill, and John has a responsibility to clean Bill's works.

The effect of our knowledge about head nouns can be seen more clearly in the following examples. In (7) the noun 'ears' is used, which also denotes body-parts and is marked as plural. In this case, an inalienable interpretation of the sentence does not sound unnatural because we can easily imagine a situation where someone is pulling both of his/her own ears.

(7)   a. John$_i$ pulled his$_{i/j}$ ears.

       b. The children$_i$ pulled their$_{i/j}$ ears.

---

[4] This reminds us of Ringo sentences, which are discussed in Jackendoff (1992, 1997) in detail. Interestingly, reflexive pronouns allow a non-coreferential use and the possibility depends on semantic properties of predicates. Suppose that Ringo Starr is in a wax museum and there is a statue of him. (i) is an acceptable utterance by a person who sees Ringo undressing the statue, but (ii) is unacceptable even if the person sees him falling on the statue.

(i) Ringo starts undressing himself.   (Jackendoff (1997:73))
(ii) Ringo falls on himself.

This fact is related to our discussion, but we cannot go into this topic further. See also Safir (2004).
 A fact worth pointing out here is that the following sentence is never allowed even if there are multiple statues and Ringo undresses all of them.

(iii) *Ringo starts undressing himselves.

The observations above pose the following questions.

(8)   a. Why are similar DP-external morpho-syntactic requirements imposed on reflexive

and possessive pronouns?

b. Why is a difference in DP-internal morpho-syntactic property observed between

reflexive pronouns and the BPN object phrase?

Under the Minimalist Program, both DP-external and DP-internal morpho-syntactic properties of reflexive pronouns are explained in terms of a narrow syntactic operation, namely, Agree (Reuland (2001, 2010b, 2011), Gallego (2010)). However, as far as I know, no principled explanations have been given of the properties of possessive pronoun phrases. Then, the questions in (8) are narrowed down as follows.

(9)   a. How is the ambiguity observed with possessive pronouns explained under the

Minimalist Program?

b. How is the effect of number morphology on head nouns on the interpretation of a

possessive pronoun explained under the Minimalist Program?

In addition to these questions, further questions arise when the following morpho-syntactic differences between English and Japanese are taken into consideration. First, English requires a possessor phrase to be phonologically realized within a BPN-object phrase, but Japanese does not. Second, the effect of number morphology on head nouns is observed only in English, but not in Japanese, because number information is not morphologically marked on a head noun in Japanese. As in (10) and (11), BPNs in Japanese can be used in their bare forms and the same forms are used irrespective of the number feature on the subject. (10-11a) with a singular subject and (10-11b) with a plural subject, where plurality of the subject is marked by a plural classifier *–tati*, are not different in the form of the object: *kao* ('face') and *mimi*

('ear') are used in their bare forms. The object can be given both singular and plural interpretations, and the determination depends on our world knowledge. In (10), the most natural interpretation is that each individual (John in (10a) and each child in (10b)) cleaned his (or her) face. In (11), two interpretations are easily available; the first is that each individual pulled one of his (or her) ears and the second is that each individual pulled both of his (or her) ears.

(10) a. John-ga   kao-o   arat-ta.

      John-Nom   face-Acc   wash-Past

      'John cleaned his face.'

   b. Kodomo-tati-ga kao-o   arat-ta.

      Child-Pl-Nom face-Acc   wash-Past

      'The children cleaned their faces.'

(11) a. John-ga   mimi-o   hippat-ta.

      John-Nom   ear-Acc   pull-Past

      'John pulled his ear/ears.'

   b. Kodomo-tati-ga mimi-o   hippat-ta

      Child-Pl-Nom ear-ACC   pull-Past

      'The children pulled their ears.'

These differences lead us to raise the following questions.

(12)   a. Is it possible to explain the properties of the BPN object construction in English in terms of the principles which explain the properties of the BPN object construction in Japanese?

   b. If it is possible, how are the differences between Japanese and English explained?

The following sections consider these questions and propose possible analyses.

3.3 Noun-Incorporation Analysis (NIA) of the BPN Object Construction in English

As summarized in Chapter 1, Gallego (2010) argues that the referential dependency between a reflexive pronoun and its antecedent can be established through multiple Agree in narrow syntax. In a normal transitive sentence with two referential arguments, the internal and external arguments are in an agreement relation with C and $v*$ respectively as in (13).

(13) $[_{CP}$ C … $[_{CP}$ T … $[_{v*P}$ EA $v*$ … $[_{VP}$ V … IA]]]]

(Gallego (2010:165))
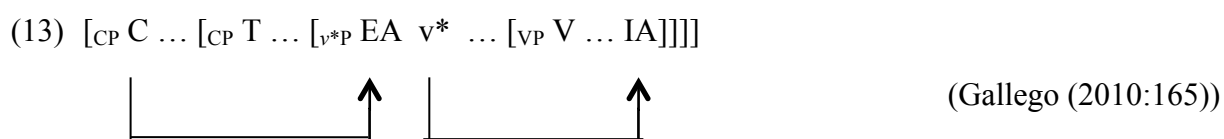
A reflexive anaphor is ϕ-defective and cannot value unvalued features on $v*$. When the transitive verb takes an anaphor as its internal argument, they cannot be valued. The valuation of the unvalued features is achieved via multiple Agree with the subject and C- $v*$ as in (14). The anaphor is indirectly in an Agree relation with the subject, and as a result of the relation, syntactic dependency is established.

(14) $[_{CP}$ C … $[_{CP}$ T … $[_{v*P}$ EA IA $[v*$ … $[_{VP}$ V … $t_{IA}]]]]$

(Gallego (2010:165))
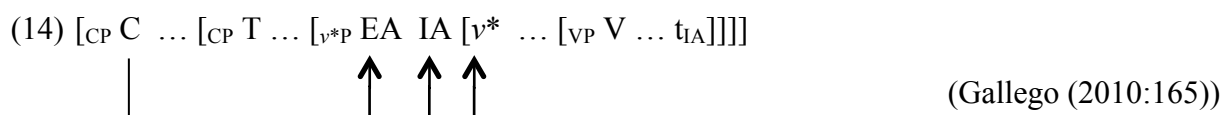
Although there are some differences in technical details, especially in the reason why *–self* has to be adjoined to V, Reuland (2001) also proposes an analysis in which the "referential" dependency between the subject and the anaphor is established in narrow syntax through Agree. Thus, both the DP-external and DP–internal properties of a reflexive pronoun are given an explanation under the Minimalist Program.

If we assume Agree as the only possible way to encode syntactic dependency, we are left with the question of how the DP-external and DP–internal properties of the BPN-object

construction are explained. As introduced in Chapter 1, the Minimalist Program allows three ways to encode dependency between a possessive pronoun and its antecedent. Under this theory, there are three logical possibilities to explain the DP-external properties as in (15).

(15) Possible ways to derive an inalienable interpretation of a BPN-object/a bound interpretation of a possessive pronoun

    a. Binding through Agree in narrow syntax

    b. Logical binding at the C-I Interface

    c. Accidental Co-reference

A bound interpretation of a possessive pronoun can be derived through Agree in narrow syntax, through logical binding at the C-I interface, or as a result of accidental co-reference through discourse binding. In other words, a possessive pronoun within a BPN object phrase is interpreted as being bound to the subject when either a CHAIN is formed between it and the subject in narrow syntax or the pronoun itself is mapped onto the same variable as the subject at the C-I interface. An apparently "bound" interpretation of a possessive pronoun can also be given when it is mapped onto a free variable and assigned a referent independently of the subject, but the referent happens to be the same as the one assigned to the subject. Under the NIA proposed in Chapter 2, an inalienable interpretation of the BPN object construction is derived as a result of (15a).

    The DP-internal property within the BPN-object phrase, however, cannot be explained by the NIA, because number is not marked on a head noun in Japanese. Unlike Japanese, English encodes number information on a head noun and the choice of preferable forms of a head noun is one of the peculiar properties of the BPN object construction in English: A plural form of the object is preferred when the subject is plural. Then, some modification is necessary to explain the properties peculiar to the English BPN-object construction. Under the Minimalist Program, there seem to be two logically possible explanations: the first one

attributes the preference to a semantic/pragmatic requirement imposed on the interpretation of BPN nouns, and the second one to a syntactic requirement resulting from Agree in narrow syntax.

Pursuing the first possibility, the following section will modify the NIA so that it can explain not only the properties specific to Japanese or English, but also the cross-linguistic variation observed between these two languages. After the modification, other logically possible explanations will be considered.

3.3.1 Modified NIA

Chapter 2 proposed an analysis where the inalienable-alienable ambiguity of the BPN-object construction is attributed to a structural ambiguity within the nominal projection. The structure with a full DP-projection is associated with the alienable interpretation, and the one without it is associated with the inalienable interpretation. Because of the lack of the DP projection, nominals cannot be referential in the latter structure. In this structure, a BPN object is incorporated into a verb to make a complex predicate. As a result of incorporation, a predicate is reflexively marked and its reflexivity is licensed at the C-I Interface. The same analysis can be applied to the BPN object construction in English, although some modification is necessary because it morpho-syntactically differs from the BPN object construction in Japanese in the two respects: it requires a possessor pronoun within a BPN object phrase, and number agreement between a possessive pronoun and a head noun is observed with a certain type of BPNs under their inalienable interpretations.

Let us first consider how the first difference is explained. If a possessive pronoun is inserted into a derivation as it is, the analysis faces a theoretical problem: Under Minimalist assumptions, Agree cannot be applied between two elements without any unvalued features. If English possessive pronouns have fully specified features, they cannot be in an Agree relation in narrow syntax. One non-implausible assumption is that English has two types of possessive pronouns: one inserted with a full ϕ-feature specification and the other without any

specification of ϕ- or phonological features. In fact, many languages have two possessive forms; one without a full ϕ-feature specification (a possessive anaphor) and the other with a full specification (possessive pronoun) as in (16).[5]

(16) a. Taroo$_i$-ga   zibun$_i$-no/kare$_{j/*i}$ -no e-o   kai-ta.   (Japanese)

    Taro-Nom   self's/his   picture-Acc   drew

  b. Ioannes$_i$ sororem suam$_i$/eius$_{j/*i}$ vidit.   (Latin)

    Ioannes   sister   self's/his   saw

    'Ioannes saw his sister.'

  c. Jorgem$_i$ elsker sin$_i$/hans$_{j/*i}$ wife .   (Danish)

    Jorgen   loves   self's/his   wife

    'Jorgen loves his wife.'   (Haegeman (1994: 232))

If these examples are right, a possessive pronoun whose ϕ-features remain unspecified is included in the inventory of possessive pronouns allowed by UG. According to the NIA proposed in Chapter 2, the BPN object construction in Japanese has a null possessive pronoun within a BPN phrase. Under this analysis, possessive pronouns without fully specified ϕ-features can be further divided into two sub-types: one with phonological features and the other without these features. Japanese *zibun*(-*tati*)-*no* is an example of the former and a null possessor of the latter. Table 3_1 summarizes the inventory of possessive pronouns allowed by UG.

---

[5] However, the correspondence between two types of possessive forms and bound-unbound interpretations is not necessarily uniform across languages. In Chinese and Malayalam, both possessive anaphors and pronouns allow a bound interpretation as in (i) and (ii).

(i)   Zhangsan kanjian-le [ziji$_i$/ta$_i$ de shu].
      Zhangsan see-aspect self/him   of book]
      'Zhangsan saw his book.'
(ii)   Mohan$_i$ [tante$_i$/awante$_i$ bhaaryaye]   nulli.
      Mohan self's/he's   wife   pinched
      'Mohan pinched his wife.'   (Haegeman (1994: 232))

Table 3_1: Inventory of Possessive Pronouns Allowed by UG

		Phonological Feature	
		Non-null	Null
ϕ-feature	Fully Specified	his/her/their kare-no/kanozyo-no/ karera-no	
	Unspecified	zibun-no/zibun-tati-no	his/her/their poss

Given this inventory, it is possible to claim that, not only Japanese, but also English has a possessive pronoun whose ϕ-features and phonological features remain unspecified in the lexicon. This is the same type as the Japanese null possessive pronoun (poss). The only difference between English and Japanese is that the Japanese null possessive pronoun does not have to be assigned any phonological features throughout the derivation, but the corresponding null possessive pronoun in English, indicated as his/her/their for expository purposes, must be assigned phonological features after Spell-Out/Transfer.

Under this claim, the difference between the two languages with respect to the overt realization of a possessive pronoun within a BPN object phrase can be attributed to the following parameter at the A-P Interface based on Longobardi (1994, 2001).[6]

(17) The Requirement of Obligatory Morpho-phonological Realization of the Edge of a Nominal Projection: Do not allow/Allow the left edge of a nominal projection to be left phonetically empty.

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[6] Alternatively the parameter could be formalized as follows: Do not allow/Allow an element with valued ϕ-features to be left phonetically empty.

The parameter will be set negative (Do not allow) in English but positive (Allow) in Japanese. (17) requires a null possessive pronoun whose ϕ-features are valued through the derivation in narrow syntax to be pronounced in English. However, because only one paradigm of possessive forms is available in the inventory of possessive pronouns in English, the null possessive pronoun ends up having the same phonetic realization as the one with a full ϕ-feature specification.

A further claim is necessary with respect to the position in which the null possessive pronoun occurs. In the layered structure within DP, multiple options are available for the position. Among them are [Spec NP] and [Spec DP]. [Spec DP] is considered to be the position for English possessive pronouns. Then, the claim that is considered to be consistent with the NIA is that in [Spec NP], not [Spec DP], the null possessive pronoun occurs.[7]

This claim is not only theoretically preferable, but is supported by the following empirical evidence. In some languages, possessive pronouns can occur with a definite determiner. For example, in Brazilian Portuguese the possessive pronoun *seu* can be used in isolation as in (18a) or with a definite determiner *o* as in (18b). Without the determiner ((18a)), a bound interpretation of the pronoun tends to be given, while with the determiner ((18b)), an unbound interpretation is preferred.

(18) a. O Pedro$_i$ viu   seu$_i$ carr.

  Peter   saw   his   car

 b. O Pedro$_i$ viu   o   seu$_j$ carr.

  Peter   saw   the   his   car.   (Amaral (p.c.))

---

[7] There is still another possible position when more functional projections are assumed within DP. For example, NumP is also assumed within DP in Chapter 2 (see (37)), and [Spec NumP] is one of the possible positions. This might be more preferable if we take into consideration the fact that possessive pronouns in English cannot co-occur with indefinite and definite determiners. If the English indefinite determiner is assumed to occur in [Spec NumP], then that should be the position for the null possessor.

This example suggests that the presence of the definite determiner blocks the binding relationship between the subject and the possessive pronoun. It is plausible to claim that this possessive pronoun occurs not in [Spec DP], but in [Spec NP], and that it can be bound when the object noun does not have a full DP-projection.

This claim is in conformity with the NIA, which attributes the alienable-inalienable ambiguity to a structural ambiguity, more specifically, the difference in the size of the nominal projection. The alienable interpretation is derived from the structure with a full-fledged DP because a DP is referentially independent. The inalienable interpretation, on the other hand, results from the structure with a smaller projection, where each BPN still remains a predicate. If UG allows the two options exemplified in (18), it does not seem so unnatural to assume that possessive pronouns without a full ϕ-feature specification occur in [Spec NP] and enter into an Agree relation with the subject, and that possessive pronouns with a full ϕ-feature specification occur in [Spec DP] and do not enter into an Agree relation.[8,9,10]
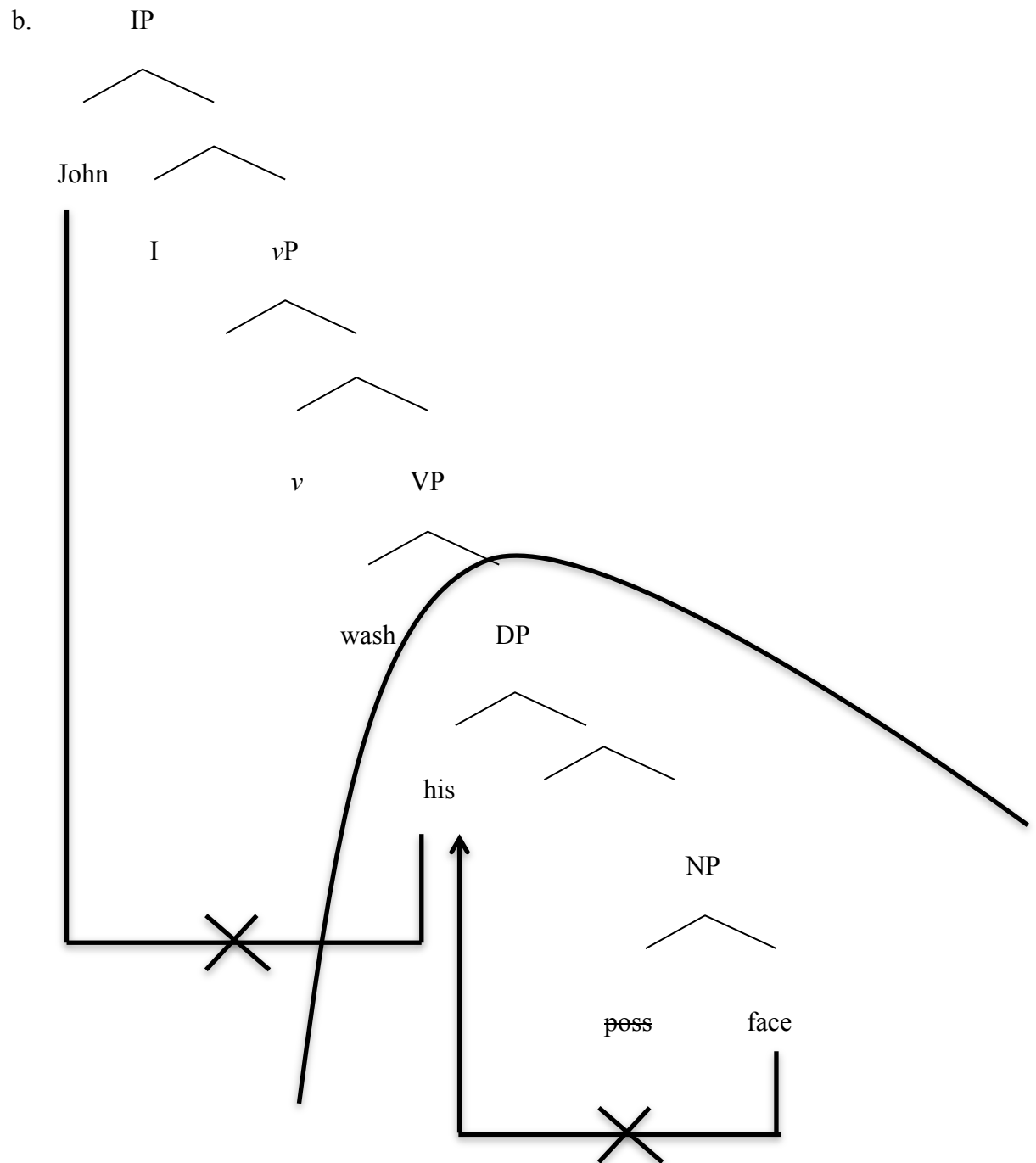
Based on these additional claims, let us consider how the ambiguity of the sentence (19a) is explained under the modified NIA. The sentence allows both alienable and inalienable interpretations of the BPN-object and such an ambiguity comes from the two structures in (19b) and (19c).
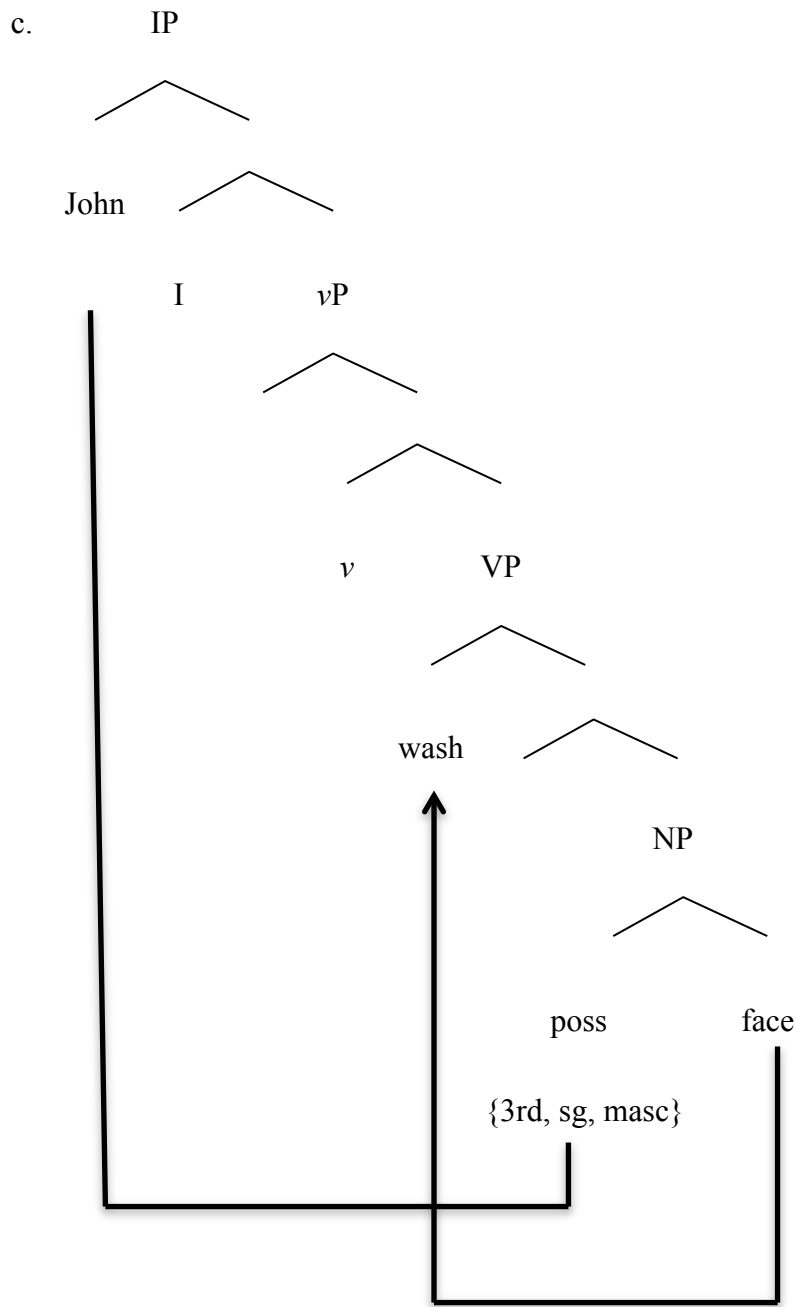
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[8] This analysis leaves one issue unanswered with respect to the interpretation of the object in (18a). If it lacks DP, the object cannot be referential, but in this example, it seems to have a referent by itself. The issue of how the object can get a referent should be settled, but it is left open because it is beyond the scope of this thesis.

[9] This is a reasonable assumption for a theory which takes DP as a phase. If a derivation and its interpretation proceed phase-by-phase, DP should be the domain in which all unvalued features are valued and all elements have features interpretable by the interfaces. DP in object position is sent to Spell-Out/Transfer and can be interpreted independently of the remaining part of the sentence. NP in object position, on the other hand, is not sent to Spell-Out/Transfer by itself and it is incorporated into a larger structure, vP. It is spelled out at this phase level and can be interpreted together with a verb as a complex predicate.

[10] This assumption might sound unnatural, especially for English, because English is normally analyzed as a language where nominals always have a DP-projection. Acknowledging that it is not innocuous, this thesis considers that the assumption still holds in English.
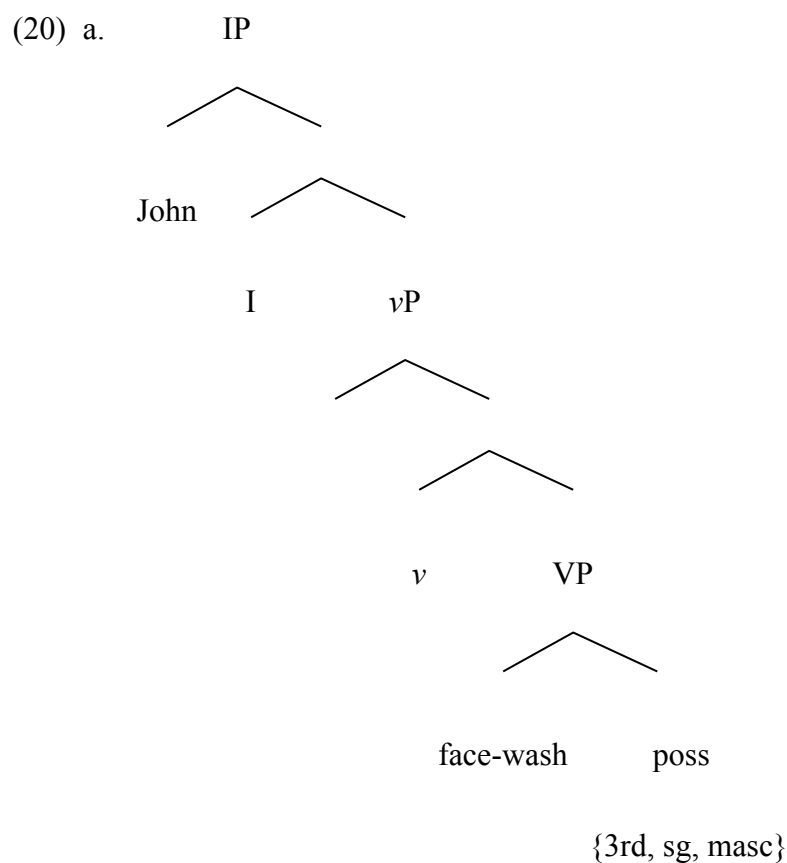
(19) a. John washed his face.

b.   IP

John

I   *v*P

v   VP

wash   DP

his

NP

poss   face

c.　　　　IP

John

　　　　　　I　　　vP

　　　　　　　　　　v　　　　VP

　　　　　　　　　　　wash

　　　　　　　　　　　　　　NP

　　　　　　　　　　poss　　　　face

　　　　　　　　{3rd, sg, masc}

The derivation in (19b) has a possessive pronoun with a full φ-feature specification. It occurs in [Spec, DP] and the BPN-object has a full DP-projection. The argument-taking property of the object is satisfied by the possessive pronoun. There is no Agree relation between the subject and the pronoun, and no referential dependency between them is established. The pronoun is assigned a referent through a discourse and the alienable interpretation is derived.

In contrast, the derivation in (19c) does not have such a fully φ-specified possessive pronoun. The object requires a possessor as its argument and a possessive pronoun without a φ–feature specification is in [Spec, NP]. The lack of DP-projection makes it possible for the pronoun to be in an Agree relation with the subject. As a result, the argument-taking property of the object is satisfied and after φ–feature valuation, the derivation is sent to Spell-Out/Transfer. After Spell-Out/Transfer, the BPN-object is incorporated into the verb as in (20a), and it turns a transitive predicate into a reflexive predicate. At the C-I interface, the structure is mapped onto a semantic representation like (20b) and the inalienable interpretation is derived.

(20) a.

```
                IP
              /    \
          John      \
                   /   \
                  I     vP
                      /    \
                     /      \
                    /   \
                   v     VP
                       /    \
                 face-wash   poss
                          {3rd, sg, masc}
```

b. λx [x face-wash x] (John)

On the LF side, the derivation with NP in (19c) is not so much different from the one we have seen in the Japanese example (see (40) in Section 2.4). However, it is different from the derivation of the Japanese example on the PF side because of the parameter (17): English does not allow the left edge of a nominal projection to be phonetically empty and so it must be assigned phonological features after Spell-Out/Transfer. Unlike Japanese, English does not have separate possessive forms from the ones with a full ϕ-feature specification, and as a result, the possessive pronoun ~~his~~, which happens to have the same phonological realization as *his*, is "inserted" after the A-P interface as in (21).

(21)

        *v*P

      v   VP

          wash   NP

                       ~~his~~   face
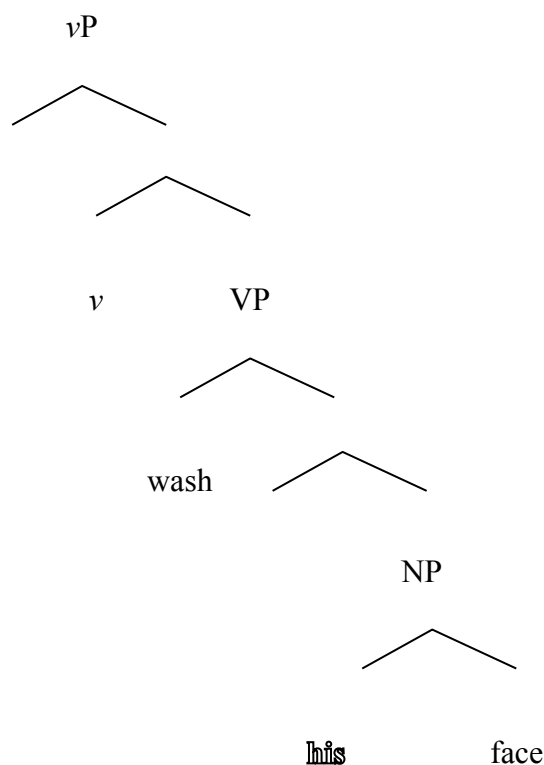
Now that the first difference between English and Japanese is accounted for by the modified NIA, let us turn to the second difference: number agreement between a possessive pronoun and a head noun as in (22).

(22) a. John$_i$ cleaned his$_{\#i/\#j}$ faces.

    b. John$_i$ cleaned his$_{i/j}$ face.

    c. The children$_i$ cleaned their$_{\#i/\#j}$ face.

    d. The children$_i$ cleaned their$_{i/j}$ faces.

This property can be explained if we take into consideration a semantic/pragmatic requirement which is imposed on BPN nouns. There is another case where BPNs and non-BPNs show a contrast with respect to number marking. As the examples in (23) show, whether or not singular reference by bare plurals can be tolerated differs between BPNs ((23a)) and non-BPNs ((23b)). Most adult native speakers judge (23a) unnatural, but they accept (23b) and (23c) without any question and it is felicitous for them to answer 'Yes, one' to the question (23b) or to raise their hand for (23c) even if they have only one child. There is no doubt that our knowledge about head nouns plays a role in our judgment on these sentences and that BPNs make us sensitive to the number morphology on them when we judge the appropriateness of the sentences.

(23) a. #Does a dog have tails?   (Sauerland et al. (2005))

    b. Does your office have windows?   (Sauerland et al. (2005))

    c. Who has children?   (Roeper (2007))

Sauerland et al. (2005) argue that singular reference by plural-marked nouns is allowed when the speaker is not sure about the number of entities which are potentially referred to by the object and he/she utters the sentences as true information-seeking questions. It is natural for the speaker not to know the number of windows the office has or the number of children the hearers have and to ask the question in (23b) / (23c). In contrast, our pragmatic knowledge tells us that it is unnatural for the speaker not to know the number of tails a dog has, so (23a) sounds awkward.

Behind this judgment is implicature computation associated with number interpretation (Sauerland (2003, 2005), Spector (2007)). The extension of a plural NP includes atomic individuals and the interpretation of an indefinite plural induces a computation of implicature. Under this view, [+singular] is associated with an "exactly one" interpretation and [−singular] (or [+plural] in Sauerland's terminology) is associated with the interpretation which does not exclude singularity. The extension of a singular form has atomic individuals and the extension of a plural form also has atomic individuals as well as groups made up of the individuals. For example, the extension of a plural form of 'book' is like (24).

(24) [[books]] = {a+b+c, a+b, a+c, b+c, a, b, c}

Under this view, the plural form is potentially ambiguous between singular and plural interpretations. When it is used in its bare form, its interpretation always induces an implicature. For example, (23a) is not felicitous because the alternative form "a tail" should be used in this case, where the speaker should know the number of tails a dog has. In other words, when a bare plural form is used, a scalar alternative with a singular form is given in mental computation, and there should be a good reason to avoid the use of the singular alternative.[11] Borrowing their terminology, we can say that the plural form is semantically less marked than the singular form. The singular form should be used whenever its use is more felicitous, because it has a more specific meaning, "exactly one."

The same is true for the judgment behind (22a) and (22c). Our pragmatic knowledge tells us that it is unnatural for the speaker not to know the number of faces a person has. There is no specific reason to avoid the use of a singular-marked noun in (22a) and that of a plural-marked noun in (22c), so they are judged as infelicitous under an inalienable interpretation.

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[11] Spector (2007) discusses how the computation proceeds in detail. See Spector (2007).

3.3.2 Other Logically Possible Explanations

The modified NIA proposed in the previous section attributes φ-feature agreement between antecedents and possessive pronouns to a syntactic operation, and number agreement between possessive pronouns and head nouns to a felicity computed in the semantic/pragmatic component. In this section, let us make a brief mention of other logical possibilities.

As already introduced, the theory of binding under the Minimalist Program allows three ways to encode referential dependency. In addition to a syntactic operation Agree, logical binding at the C-I Interface can also be the source of a bound interpretation. This is an option which Reinhart (2006) and Reuland (2011) pursue in order to derive a bound interpretation of a possessive pronoun. At the C-I interface, pronouns can be mapped onto either bound- or free-variables, which correspond to bound or free-variable interpretations of the pronouns. In this case, we do not need to assume two pronouns. English has only one type of possessive pronoun which comes in a derivation with a full φ-feature specification from the beginning. Even if we take this option, something has to be said to ensure that no bound interpretation between the subject and a possessive pronoun derives from the following sentence.

(25) John cleaned her face.

If a possessive pronoun were blindly mapped onto either a bound or a free variable, (25) would be mapped onto either (26a) or (26b).

(26) a. [λx. x cleaned x's face] (John)

    b. [λx. x cleaned y's face] (John)

Some mechanism to block the mapping of (25) to (26a) is necessary, and it is not clear that such a mechanism has to be assumed as an operation independent of Agree in narrow syntax.

An alternative explanation would also be possible of number agreement between a possessive pronoun and a head noun as in (27). It could be a result of a narrow syntactic operation Agree within DP.

(27) a. John cleaned his face/#faces.

    b. The children cleaned their faces/??face.

A similar but stricter requirement is imposed between a demonstrative pronoun and a head noun. As shown in (28), they obligatorily agree in number. When the noun *book* is used in the singular, the singular demonstrative *this* must be used ((28a)) and when it is used in the plural, the plural form *these* is required ((28b)).

(28) a. John bought this/*these book.

    b. John bought *this/these books.

It would be natural to analyze the number agreement between a demonstrative pronoun and a head noun as a result of Agree between a head and its Spec in narrow syntax. If so, the same operation might be applicable to the number agreement between a possessive pronoun and a head noun. The only thing left unexplained under this analysis is that the number agreement is not obligatory with a possessive pronoun and some additional assumptions are necessary to explain the fact that such an agreement shows up only with a limited class of head nouns.[12] Here again, it becomes unclear that the explanation with such additional assumptions is different from the one proposed in the previous section.

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[12] There is still another possibility for taking the number agreement as a result of Agree in narrow syntax, which is pursued in Nakato-Miyashita (2014). This is also consistent with the NIA, but it requires a few more additional assumptions and makes our theory a little more complex. For this reason, this thesis does not take this option.

3.4 Summary

In this chapter, we paid closer attention to the English BPN-object construction. The English BPN-object construction differs from the Japanese one in that in order to give an inalienable interpretation, it requires a possessive phrase to occur within a BPN object phrase. In other words, it does not allow an external possessor and requires person, gender, and number information about its possessor to be realized within the object, which is encoded in the form of possessive pronouns. We showed that possessive pronoun phrases in English show similar morpho-syntactic properties with reflexive pronouns, especially when they are used with BPNs. In addition to the requirement on person, gender, and number agreement between antecedents and pronominals, number agreement between pronominals and head nouns was observed. Based on this observation, the NIA proposed in Chapter 2 was modified. It was claimed that the first difference between Japanese and English is explained in terms of a parameter related to morpho-phonological realization of the edge of a nominal projection. With respect to the second difference, it was argued that number agreement results from the computation of implicature associated with the interpretation of indefinite plurals.

Part II

<center>Chapter 4</center>

<center>**Economy Principles**</center>

4.1 Introduction

Chapter 2 and Chapter 3 investigated the syntactic and semantic properties of the BPN object construction in adult Japanese and adult English. Based on the investigation, these chapters considered the principles which derive the syntactic and semantic properties of the BPN object construction and the parameters which yield variation across languages in adult grammar. This chapter considers a theoretical issue related to the computational system and/or the language acquisition device: What kind of principles need to be included in the LAD in order to ensure successful acquisition of the BPN object construction by English and Japanese children? In this chapter, two principles of economy will be introduced: Economy of Encoding and Economy of Representation. The former is about the choice of the most economical derivation in adult grammar and the latter concerns the initial state of projections in child grammar. Based on the experimental results to be introduced in subsequent chapters, it will be argued that these two principles are available in the LAD as principles which help children acquire their target grammar: Economy of Encoding, as well as Economy of Representation, is at work in child grammar as well as in adult grammar.

4.2 Economy of Encoding

4.2.1   Economy of Encoding: Reuland (2011)

As already introduced so far, Reuland (2001, 2010a, b, 2011) argues that language has three ways of encoding referential dependency, schematically illustrated in (1). There are three types of objects, which correspond to three distinct levels of representation: syntactic objects, which result from the computation in narrow syntax, C-I objects, which are part of the λ-formula at the C-I interface, and discourse storage, which is an actual value assigned to nominal expressions. Referential dependency is encoded as any one of the following "binding"

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relationships. The first one is syntactic binding ((1c)); two syntactic objects form a CHAIN through Agree in narrow syntax and they are treated as a single object at the C-I interface. A referent is assigned to the variable, which results in a coreferential interpretation of two syntactically distinct nominal expressions. The second one is logical binding ((1b)); two syntactic objects are mapped onto the same variable at the C-I interface, and they are bound by the same operator. To this variable, a referent is assigned in the discourse component and as a result two nominal expressions receive a coreferential interpretation. The last one is discourse binding ((1a)); two syntactic objects are mapped onto distinct variables at the C-I interface and given a referent independently of each other through a discourse. In a strict sense, there is no "binding" relationship between the objects. They happen to be assigned the same referent, and this corresponds to "accidental coreference" in Reinhart (1983).

(1)   a. | b. | c.

Discourse storage   a   a | a | a
(values) | 4 | 3 | | 3 | | 2
C-I objects x_1 x_2 | $x_1 \Leftarrow x$ | x_1
(variables) | 2 | 1 | | 2 | 1 | | 1
Syntactic objects C_1 C_2 | C_1 C_2 | $C_1 \Leftarrow C_2$
(CHAINs)
Basic expressions $\alpha \ldots$ β | $\alpha \ldots$ β | $\alpha \ldots$ β

(Reuland (2011: 128))

Under this theory, cross-modular steps incur a cost. The referent assignments (1a), (1b) and (1c) have four, three, and two cross-modular steps, respectively. Adopting the basic tenet of the Minimalist Program (Chomsky (1995) and others) and introducing the notion of economy, Reuland argues that these three types of "binding" are hierarchically ordered as in (2) (Reuland (2011: 125)): The "binding" in narrow syntax is the most economical and that in the discourse component is the least. The former includes the fewest cross-modular steps (two)

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and the latter the most (four).

(2) narrow syntax < logical syntax (C-I interface) < discourse

This economy principle works in adult grammar as follows. It blocks the bound interpretation of the Dutch pronoun *hem* in (3a), because the alternative, *zich*, is available as in (3b). In (3b) *zich* forms a CHAIN with the subject, which is more economical than the derivation with the pronoun. Consequently, the pronoun cannot be mapped onto a bound variable at the C-I interface.

(3)　a. Oscar$_i$　　　Voelde　hem$_{*i}$　　　Weggilijden.

　　b. Oscar$_i$　　　Voelde　zich$_{*i}$　　　Weggilijden

　　　Oscar　　　　felt　　him/ZICH　slide away

　　　'Oscar felt himself slide away.'　　　　(Reuland (2011:133) with my translation)

4.2.2　Reinterpretation of the Results of Previous Acquisition Studies on the Binding Principles

Now that the theory of binding is reformulated in terms of the notion of economy, it is possible to reinterpret what the acquisition research has found so far with respect to the classic Binding Principles A and B (Chomsky (1981) among others): the early obedience to Principle A and the apparent lack of Principle B. Since the late 1980s, many acquisition studies have been conducted on the acquisition of anaphors and pronouns in English as well as other languages. In the center of the discussion has long been the acquisition of English anaphors and pronouns (Grimshaw and Rosen (1990), McDaniel et al. (1990), Chien and Wexler (1990), Grodzinsky and Reinhart (1993), Thornton and Wexler (1999), Verbuck and Roeper (2010) among others). The well-known observation is as follows: English children do not have a problem with Principle A, but they do have one with Principle B, especially when pronouns take referential antecedents. If we assume that the economy principle is at work in

child grammar, these findings can be reinterpreted as in (4).

(4) a. Early obedience to Principle A (Grimshaw and Rosen (1990), McDaniel et al. (1990)): The "binding" relationship between an anaphor and its antecedent is reformulated as a CHAIN-relation encoded as a result of the syntactic operation Agree (Reuland (2001), Gallego (2010)). There is no more economical way to "reflexively mark" a predicate. If children obey the principle of economy, it is a natural consequence that children have no difficulty in acquiring the use of anaphors.

b. Apparent lack of Principle B (Chien and Wexler (1990), Grodzinsky and Reinhart (1993), Thornton and Wexler (1999), Verbuck and Roeper (2010)): The apparent lack of the knowledge of Principle B is observed only with referential antecedents, where the adequacy of the referent assignment through a discourse component ((1a)) has to be compared with other possible derivations/referent assignments. If children obey the principle of economy, the result can be taken as an indication that the more cross-modular computation a referent-assignment requires, the more difficulty children have.

If it is true that cross-modular steps incur costs and different ways of referent assignment in human language are ordered in accordance with their costs, the findings of the previous studies suggest that Economy of Encoding is at work in child grammar as a guiding principle: Children have less difficulty in acquiring more economical ways of establishing referential dependency. The acquisition of anaphoric expressions in a particular grammar starts with the most economical referential dependency, and then proceeds to the next one, and it takes a long time before children finally acquire the least economical referential dependency in their target grammar.

4.3 Economy of Representation

4.3.1   Economy of Representation: Pérez-Leroux and Roeper (1999)

The proposal that an economy principle for representation is at work in child grammar is

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originally made by Pérez-Leroux and Roeper (1999) from the viewpoint of the acquisition of nominal projections. The principle is roughly stated as follows.

(5) a. The initial state reflects an economic representation (e.g. NP).

b. Non-economic representation carries language particular information (e.g. DP).

(6) a. Defaults represent economic representation.

b. Default economic representations are universal.

(Pérez-Leroux and Roeper (1999:940))

The default representation, here NP, can be projected without any triggering information. It emerges very early in child grammar universally. In other words, irrespective of which language a child acquires, the properties related to minimal projections show up in every child grammar, putting aside the acquisition of idiosyncratic information on each lexical item. Children, who start with the minimal projection, NP, extend functional projections above it, using (directly) morpho-phonological information and (indirectly) semantic information available around them.

As sometimes analyzed as a DP-less language, or an NP-language, Japanese is a language with less (or least) inflection. Neither number nor gender information needs to be encoded on a head noun or on a functional item within DP. Rather, such information is provided by a context, and in that sense, Japanese is a highly context-dependent language. In contrast, English is a language with rather rich inflection. Both number and gender information are morpho-phonologically encoded within DP: a head noun inflects with respect to number and a possessive pronoun inflects with respect to number and gender. The information about (in)definiteness is also morpho-phonologically encoded within functional projections above NP. This means that English children have to set a parameter associated with functional items, including those associated with definiteness, number and gender.

In order to see how English children acquire an adult-like nominal structure, Pérez-Leroux and Roeper (1999) investigated bare nominals and nominals with possessive pronouns in

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child English, using examples like (7).[1]

(7) John went home/his home.

Bare singulars are allowed in English in "idiomatic" or conventional expressions. The peculiar property of bare singulars is that they require a bound-interpretation of their (null) possessors, and the dependency follows a syntactic restriction similar to anaphoric binding: the antecedent NP has to be in the local domain and c-command the bare noun. Consider the examples in (8). Bare singulars can take only a local and c-commanding noun phrase as the antecedent of their null possessors as shown in (8a-b). They contrast with nouns with possessive pronouns as in (8c). When these nouns are used with possessive pronouns, they allow an unbound interpretation, in addition to both local and long-distance bound interpretations.

(8)   a. John says Peter likes cooking at home.   (= only Peter's home)

      b. Peter's fiancée went home.   (= Peter's fiancee's home, not Peter's)

      c. John says Peter likes cooking at his home.   (= either Peter's or John's home)

                                                  (Pérez-Leroux and Roeper (1999: 933))

   Focusing on the difference between bare singulars and possessive pronouns, Pérez-Leroux and Roeper (1999) compared the comprehension of these two types of nominals in child English. Examples of stories and target sentences are given in (9).

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[1] A very limited class of nouns can be used in these expressions. In their experiment, they used *home*, *work*, and *bed*. These nouns are not purely nominal, and thus are sometimes analyzed adverbs. This thesis does not go further into this issue, but it would be worth considering if there is any difference in the acquisition of such adverb-like nominals and pure nominals.

(9)   Distributive-Collective Ambiguity

Story: The sheep lives in the barn, the dog lives in the doghouse and the chickens in the chicken coup. Grover lives in the house, and he loves to play with his animal friends. Some days they play outside, other days they play at Grover's house. Today they played outside until it started to rain. Grover said: 'let's play at my house for a little longer.'

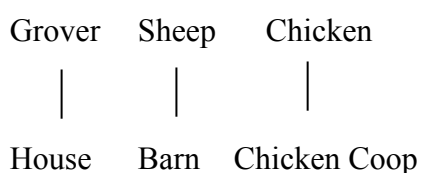Target sentences:a. Everybody went home.

b. Everybody went to his home.

Prompt: Can you show me?

(Pérez-Leroux and Roeper (1999: 944-945))

(9a) has a bare singular noun in object position and (9b) has a noun with a possessive pronoun. In adult grammar, (9a) allows only a bound interpretation and the object noun is interpreted distributively. (9b), on the other hand, allows both bound and non-bound interpretations and the object noun can be interpreted distributively or collectively. Only the distributive response in (10a) is possible for (9a), but the collective response in (10b) is also possible for (9b).

(10) Possible Responses to (9)

a. Distributive Response

Grover   Sheep   Chicken

| | |

House   Barn   Chicken Coop

b. Collective Response

Grover   Sheep   Chicken

House   Barn   Chicken Coop
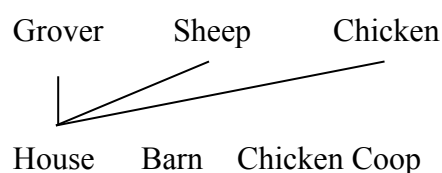
(Pérez-Leroux and Roeper (1999: 945))

Thirty-six children and thirty-three adults participated in their experiment. The children were divided into three groups; the younger preschoolers, whose ages ranged from 3;7 to 4;8, the older preschoolers from 4;8 to 5;2, and the kindergarten children from 5;8 to 6;7. The overall percentages of distributive responses are given in Table 4_1 (cf. Pérez-Leroux and Roeper (1999: 950-951)).

Table 4_1: Percentages of Distributive Responses

	Bare N	Poss N
3- to 4-year-olds	72.2	33.3
4- to 5-year-olds	66.7	22.2
5- to 6-year-olds	88.9	33.3
Adults	93.8	46.9

Their results show that the English children tended to give a distributive interpretation to the object noun in (9a), but not in (9b). This suggests that they did not give a bound-variable interpretation to a possessive pronoun in (9b).

Pérez-Leroux and Roeper explain these facts in terms of Economy of Representation in (5) and (6). English children, who start with a minimal nominal projection, have only NP but not DP. Because their grammar is different from that of adults in this respect, they assign a non-adultlike syntactic representations to (9b), while their syntactic representation of (9a) is not different from adults'. Bare nominals have NP, not DP, even in adult grammar. Both children and adults assign the structure (11) to (9a). In contrast, nouns with possessive pronouns are supposed to have DP in adult grammar. Adults assign the structure (12) to (9b). However, children cannot assign the same structure because their grammar has only NP. Instead, (9b) is represented as in (13) in child grammar. In adult representation in (12), the DP is a governing category for a possessive pronoun.[2] The bound interpretation of the pronoun is grammatical because the antecedent (the subject) is outside of its governing category. In child representation in (13), on the other hand, no DP is projected. In this representation, a possessive pronoun is within the same governing category as the subject. It is ungrammatical if the pronoun is bound from the antecedent.

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[2] Their study is based on the argument-centered theory of binding. For the definition of the governing category, see footnote 7 in Chapter 1.

(11) Everybody went [$_{NP}$ home].

(12) Everybody$_i$ went to [$_{DP}$ his$_i$ home].

(13) Everybody$_i$ went to [$_{NP}$ his$_{*i}$ home].

Because the syntactic representation with NP is assigned to a sentence with a possessive pronoun, English children avoid a bound-variable interpretation of the pronoun. Its bound interpretation is ungrammatical in their grammar, and only after DP is projected do they assign this interpretation within this context.

4.3.2   Studies on Number Interpretation in Child English

Nakato-Miyashita (2013) and Nakato-Miyashita and Roeper (2014) developed this idea and considered whether the same principle is applicable more generally on the acquisition of nominal properties in English. A series of experiments was conducted in order to investigate how children interpret indefinite singulars/plurals and definite plurals. The following two sections will review these experiments, whose results show that the acquisition of morpho-syntactic and semantic properties within a nominal projection proceeds stepwise and basically follows Economy of Representation.

4.3.2.1 Children's Interpretation of Singular Nouns[3]

Nakato-Miyashita (2013) investigated when children start to interpret an indefinite singular object in an adult-like way based on number information within DP.

4.3.2.1.1 Participants, Procedure and Experimental Conditions

Participants

Thirty monolingual English-speaking children participated in this experiment, but the data from four of them was not included for the following reasons: one seemed to have difficulty in understanding words used in the experiment; two others had a problem with two or three

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[3] This subsection is based on Nakato-Miyashita (2011b, 2011d).

out of six filler items; the other one did not pass a practice session, which was intended to familiarize the children with their task. The data from the remaining twenty-six children, whose age-range was from 3 to 6 (six 3-year-olds, seven 4-year-olds, eight 5-year-olds, and five 6-year-olds), were included in the results.[4] Three adult native speakers also participated in this experiment.

Procedure

This experiment was individually conducted in a quiet room at a nursery/elementary school. One of the experimenters, who was a native speaker of English, told stories and asked questions to children. Children's responses were written down by the other experimenter and video-taped if permission was given. The adult native speakers were informally asked to do the same task as the children. They were asked to read stories and questions written on a sheet and to write down their responses on their answer sheet.

Experimental Conditions

This experiment had the following two conditions: a many-to-one condition, which was the main target of the experiment, and a one-to-one condition, which was included as a comparison group. They are exemplified in (14).

(14) a. Many-to-one Condition:

Description: Three boys are playing in the yard. One has shoes on, another has a shoe, and the other has no shoes. Someone needs **a shoe**.

Question: Who needs a shoe?

Type 2   Type 1   Type 0
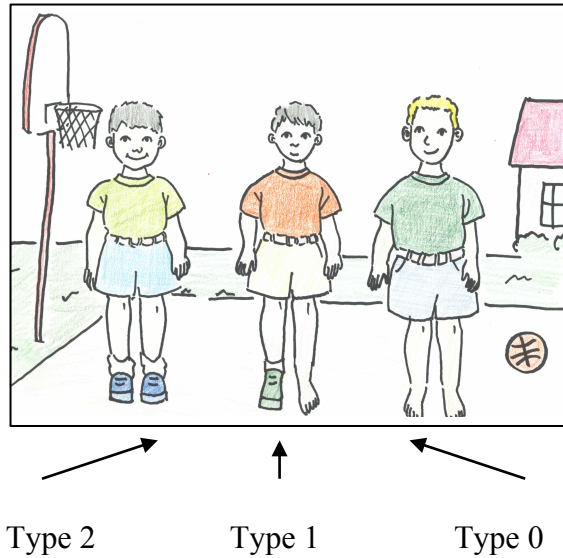
b. One-to-one Condition:

Description: Three girls are dressing up for a party and putting on jewels. One has necklaces, another has a necklace, and the other has no necklaces. Someone needs **a necklace**.

Question: Who needs a necklace?

Type 2   Type 0   Type 1
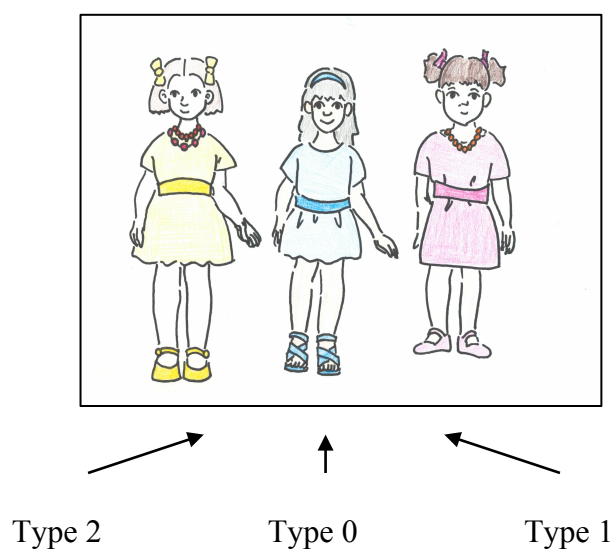
In the many-to-one condition, nouns biased toward the "plural" interpretation are included as the object. For example, in (14a) the noun 'shoe' is used. Our knowledge about 'shoe' tells us that people normally wear a pair of shoes and the word itself is normally used in its plural form. In the one-to-one condition, nouns which do not have such a bias are included. For example, in (14b) the noun 'necklace' is used. Our knowledge about 'necklace' doesn't presuppose that it has to be used in a pair, although it is possible for a person to wear more than one necklace. In this experiment, children were shown a picture with three people. The people differ in the number of items they wear. For example, in (14a) the leftmost boy has a pair of shoes, the middle one has one shoe, and the rightmost one has no shoes. After listening to a description about the picture, children were asked to answer the question with an indefinite singular noun, "Who needs *a* …?," by pointing to the person/people. Pointing to the person who wears only one item under the many-to-one condition is considered strong evidence for the singular interpretation, because in order to give that response, one has to consciously assign "exactly one" interpretations to indefinite singulars. Adults have a better way to say, for example, if they intend to refer to the person without any shoes: "Who needs (a pair of) shoes?" The use of an indefinite singular has a strong implication that the speaker uses that form in order to specify the person who has only one shoe.

Two different predictions are given in (15): (15a) is consistent with Economy of Representation, while (15b) is not. If initial child grammar lacks functional projections and only has a lexical projection, NP, it is expected that English children cannot use number information on nominals in a fully adult-like manner at earlier stages. In order to make full use of morphological and semantic information associated with number on nominals in English, functional projections such as NumP and DP have to be projected and the parameters related to these projections have to be set. Furthermore, they have to compute an implicature associated with DP.[5] It is possible for them to take a long time before setting all of the parameters and learning the implicature computation, and then it is expected that the initial child grammar of English is different from the adult grammar of English with respect to

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[5] For the implicature computation associated with number interpretation in English, see Chapter 3.

number interpretation.

(15) a. If children *do not* make the singular-plural distinction based on number information within DP, the absence of a plural suffix does not tell anything about the interpretation of the DP. In addition, if 'a' does not mean 'one' in their grammar, their answer may vary for the many-to-one condition. They might choose a person with only one item (type 1 response), a person without any item (type 0 response), or both (type 0 & type 1).

b. If children *do* make the singular-plural distinction based on number information within DP, they can use the absence of a plural suffix as indicating that the DP does not give a plural interpretation. If children associate the absence of the suffix and the presence of the indefinite determiner 'a' with a singular interpretation, they will choose a person who wears only one item (type 1 response) for the many-to-one condition.

Three items per condition were given, and in total six target items were given. 'Ski pole' and 'glove' were used for the many-to-one condition and 'bracelet' and 'ring' were used for the one-to-one condition.

4.3.2.1.2 Results and Discussion

The percentages of each response-type by the children and adults are given in Figures 4_1 and 4_2. No children or adults gave type 2 responses to either condition. The adults consistently gave type 0 responses to the one-to-one condition and type 1 responses to the many-to-one condition. The children gave more consistent responses to the one-to-one condition than to the many-to-one condition (see Figure 4_1). As expected, most of them gave only type 0 responses. Only a few gave type 1 responses (8 out of 78 responses). No one gave multiple choices (type 0 & type 1). The rate at which they gave only type 0 responses reached a peak of 100% at the age of 5. Children's responses to the many-to-one condition were not as consistent as the one-to-one condition (see Figure 4_2). Children gave type 1 and type 0 &

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type 1 responses more often under this condition. The percentage of type 1 responses stayed lower than that of type 0 until the age of 5, and at that age it reached its lowest point. As we observed in the one-to-one condition, the percentage of the children who gave type 0 responses reached a peak at the age of 5.

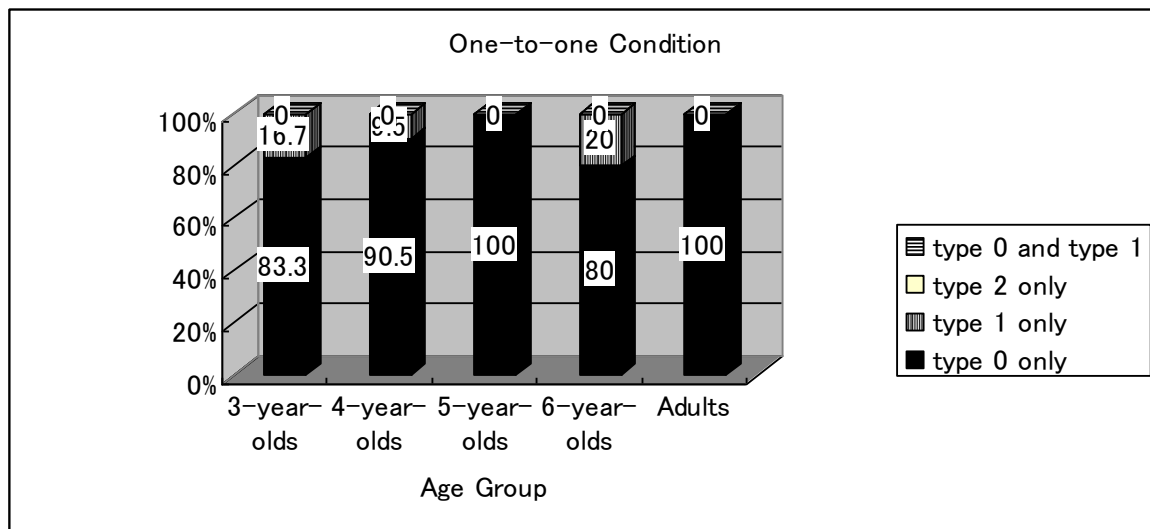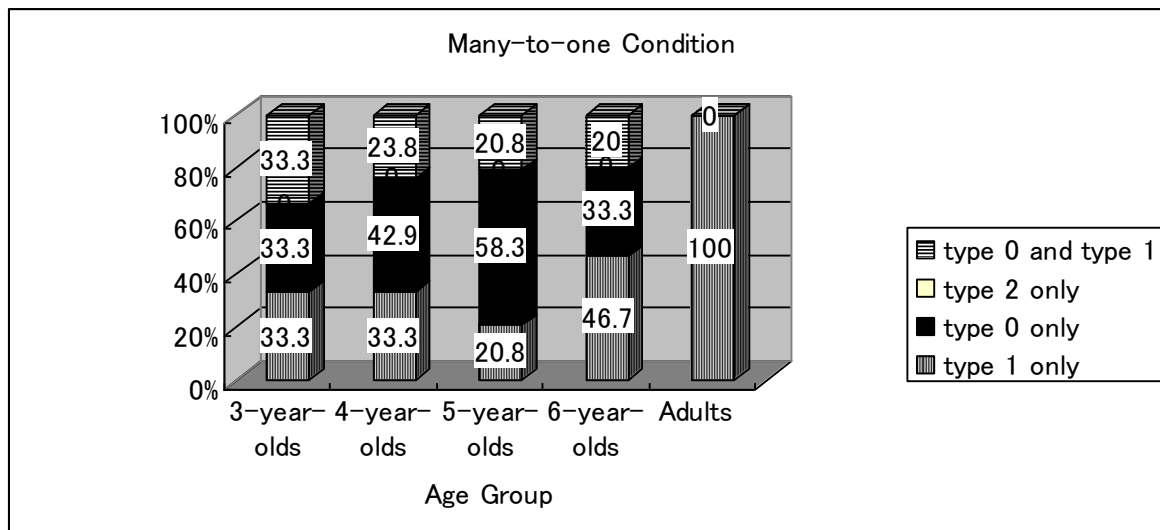**Figure 4_1: Percentages of Each Response Type: The One-to-one Condition**

Figure 4_2: Percentages of Each Response Type: The Many-to-one Condition

Our overall results seem to confirm the prediction in (15a), which suggests that children do

not make the singular-plural distinction based on the number information within DP.[6] (15a)

expects children to go with type 0 or type 0 & type 1 responses, while (15b) predicts that

children would go with type 1 responses for the many-to-one condition. The conclusion we

can draw from this experiment is that children have difficulty in interpreting indefinite

singulars in an adult-like manner even at the age of six. This is consistent with what Economy

of Representation predicts: Initial child grammar of English lacks functional projections. As a

consequence, English children cannot use number information on nominals in an adult-like

manner at early stages.[7]

4.3.2.2 Further Investigation into Children's Knowledge about Number Morphology[8]

Based on the results of the experiment presented in the previous section,

Nakato-Miyashita and Roeper (2014) further investigated children's knowledge about number

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[6] We need to ask if there is any possibility that children just overlooked the number markers (the presence of the indefinite article and the absence of number morphology on N) and responded randomly. Brown (1973) observed that 2-year-old children started to use the plural suffix. Kouider et al. (2006) and Wood et al. (2009) observed that younger children had difficulty in distinguishing a singleton set and a set with multiple entities when the singular-plural distinction was marked only by nominals. In their experiments, children younger than three could select a singleton set or a set with multiple entities when they were given multiple markers such as verbal morphology and quantifiers (there *are/is* and *some/a*). However, they could not do so when they were given only nominal morphology (the *blicket/blickets*). At the age of three, they started to make the distinction solely based on nominal morphology. Our target items lacked linguistic number markers on verbs, but had them as a quantifier (*a*) and on nouns (lack of -*s*). We cannot exclude the possibility that some of the children could not recognize the markers, but our children were older than three so it would not be tenable that all of them just gave random responses.

[7] The conclusion drawn from the results of this experiment does not necessarily mean that the functional projection associated with number (NumP) is completely lacking in the grammar of the child participants. Barner et al. (2009) observed that English children associate an "exactly one" interpretation to "one," but not to "a," around the age of three. Their results suggest that children can understand the notion of number and begin to project NumP above NP around this age. This thesis claims that an implicature has to be computed to interpret a singular/plural indefinite NP and that the computation is made at the DP level and that only after attaining fully adult-like functional projections with features specified can children compute the implicature associated with number in a fully adult-like manner. It should be noted that our claim is not inconsistent with Barner et al.'s results. It should also be noted that a reinterpretation of our results might be necessary if children are found to assign a "more than one" interpretation to the indefinite determiner "a." Only type 0 responses to the many-to-one condition should be considered to indicate children's inability to make the singular-plural distinction. I would like to consider this possibility in future research. I am grateful to Akira Watanabe for suggesting this possibility to me.

[8] This section is based on Nakato-Miyashita and Roeper (2014).

interpretation, targeting children older than six. In order to see when children start to give plural interpretation and to make a semantic distinction between definite and bare plurals, two experiments were conducted. These two experiments used different target sentences. In the first experiment a single DP was used as the object as in (16) and in the second one coordinated DPs were used as in (17).

(16) a. Did the man buy onions?

   b. Did the man buy the onions?

(17) a. Did the man buy peppers and onions?

   b. Did the man buy **the** peppers and onions?

In adult English definite plurals and bare plurals are semantically distinguished in terms of maximality: The interpretation of definite plurals presupposes maximality, while that of bare plurals does not. The definite determiner *the* is defined as an operator associated with maximality (Sharvy (1980), Link (1983), Chierchia (1998)). Its semantic function is defined as in (18).

(18) ι X = the largest member of X if there is one (else, undefined)   (Chierchia (1998: 346))

When it is combined with a plural noun, it returns the largest number of entities in a given set. Because of the maximality presupposition resulting from the function of *the*, a sentence including a definite noun becomes false when such a presupposition is not satisfied. Consequently, definite plurals do not allow a singular reference. Bare plurals, on the other hand, do allow a singular reference. The semantic computation yields a multiple membered set for a bare plural but a single membered set for a definite plural. For example, suppose that five onions are on the table and a man bought one of them. The set for the bare plural in (16a) consists of each atomic entity, every possible combination available from five entities, and the total sum of five entities as in (19a). In contrast, the set for the definite plural in (16b)

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includes only the sum of five entities as in (19b) due to the maximality associated with the definite determiner.

(19) a. [onions] = {o1, o2, o3, o4, o5, o1+o2, o2+o3, …., o1+o2+o3+o4+o5}

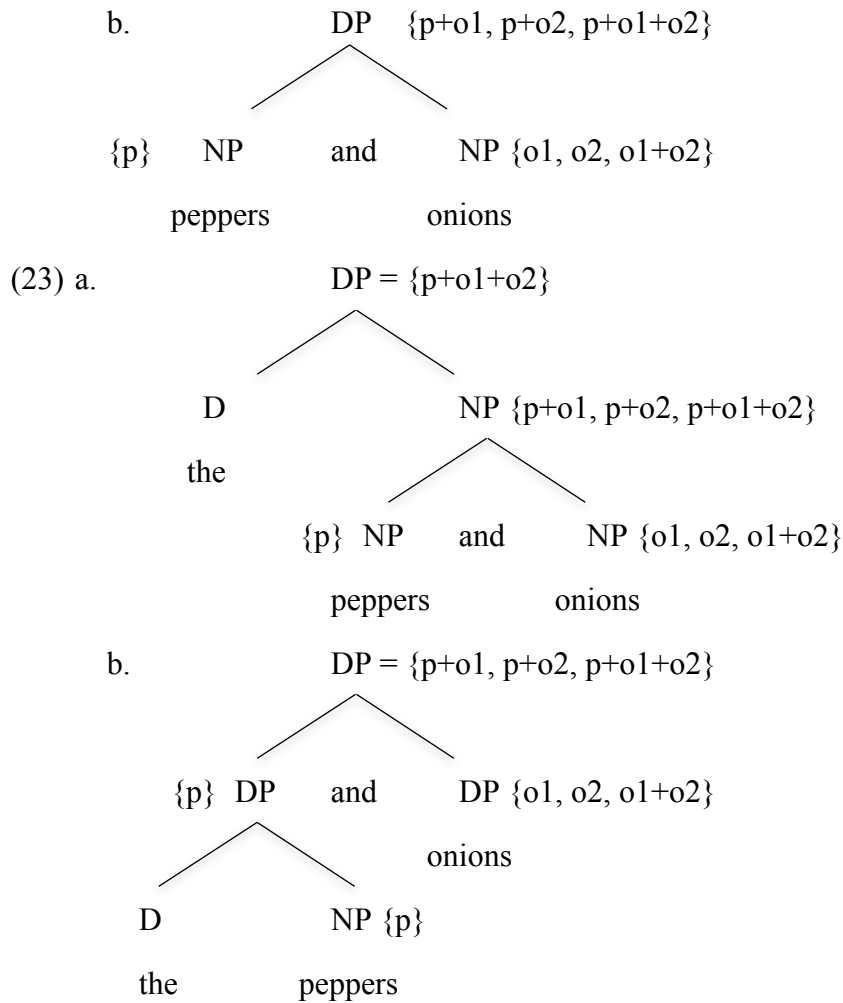   b. [the [onions]] = {o1+o2+o3+o4+o5}

As a consequence, a "yes" response is permissible to the question in (16a) but not to the question in (16b) under the situation presented. It is presupposed that the definite plural refers to all the five onions, but with such an interpretation the question in (16b) has to be answered "no."

   This difference leads to an interesting ambiguity in adult grammar when two plurals are coordinated. Both of the sentences in (17) are structurally ambiguous: (17a) and (17b) can be assigned the two structures in (20a-b) and (21a-b) respectively. This ambiguity results in semantic ambiguity in (17b) not in (17a).

(20) a. Did the man buy [$_{DP}$ [$_{DP}$ peppers] and [$_{DP}$ onions]]?

   b. Did the man buy [$_{DP}$ [$_{NP}$ peppers] and [$_{NP}$ onions]]?

(21) a. Did the man buy [$_{DP}$ the [$_{NP}$ peppers] and [$_{NP}$ onions]]?

   b. Did the man buy [$_{DP}$ the [$_{NP}$ peppers]] and [$_{DP}$ onions]?

Suppose that one pepper and two onions are on the table and a man bought them. The result of semantic computation is illustrated as in (22) and (23).

(22) a.   DP = {p+o1, p+o2, p+o1+o2}

         {p}   DP   and   DP {o1, o2, o1+o2}

             peppers   onions

b. DP {p+o1, p+o2, p+o1+o2}

{p} NP and NP {o1, o2, o1+o2}

peppers onions

(23) a. DP = {p+o1+o2}

D NP {p+o1, p+o2, p+o1+o2}

the

{p} NP and NP {o1, o2, o1+o2}

peppers onions

b. DP = {p+o1, p+o2, p+o1+o2}

{p} DP and DP {o1, o2, o1+o2}

onions

D NP {p}

the peppers

(Nakato-Miyashita and Roeper (2014:368))

A "yes" response is permissible to the question with a bare plural in (17a) because no conflict arises between semantics and pragmatics: bare plurals allow singular reference, and in fact, the set of one pepper and two onions is in the result of semantic computation in (22a-b). The resulting sets are not different whether the sentence is given the structure in (20a) or the one in (20b). On the other hand, a conflict between semantics and pragmatics arises when the sentence in (17b) is assigned the structure in (23b). At the level of the entire DP, the presupposition of maximality seems to be satisfied. The set resulting from the semantic computation includes the sum of a pepper and two onions (p+o1+o2), which is a maximal entity in a given discourse. However, at the level of the lower first DP, there is a conflict between pragmatics and semantics. It is expected that the definite plural, *the peppers*, refers to

plural entities, but this is not the case. There is only one pepper and so there is a more natural way to express the situation, *the pepper*. A singular reference should therefore be blocked and the hearer should say "no" to the question in (17b) under the situation. However, differing from (16b), a 100% "no" response is not expected because there is another structure which tolerates a singular reference, (23a). In this structure, two bare plurals are conjoined first, and then they are combined with a definite determiner. At the lower level of NPs, singular reference is possible and this saves the sentence (17b) under this situation.

As illustrated in the examples in (16) and (17), the plural interpretation in English is not so straightforward and easy. It includes complicated semantic and pragmatic computations. Then, it seems not easy for children to acquire the interpretation. In order to attain fully adult-like interpretation of number, children have to learn the semantics associated with a plural suffix *–s*, the maximal interpretation associated with the definite determiner *the*, and the implicature associated with the entire DP. This being so, it would be no wonder that English children take a long time before acquiring number interpretation in their target grammar.

Nakato-Miyashita and Roeper argue that Economy of Representation predicts that at least English children go through four stages in (24) before they reach adult English.

(24)   a. 1st stage: Grammar without "DP": Number Neutral: Children can reject singular reference for neither definite nor bare plurals.

b. 2nd stage: Grammar with non-maximal version of definiteness: Children can reject singular reference for neither definite nor bare plurals.

c. 3rd stage: Grammar with DP and maximal version of definiteness, but without implicatures: Children can reject singular reference for definite plurals but not for bare plurals.

d. 4th stage: Grammar with DP, maximal version of definiteness, and implicatures: Children can reject singular reference for both definite and bare plurals, but cannot do so when two NPs are conjoined below the DP level just as

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adults.[9]

In order to see if this prediction is borne out or not, the following two experiments were conducted.

4.3.2.2.1 Participants, Procedure and Experimental Conditions

Participants

Fifty-two children participated in the first experiment, with ages ranging from 6;01 to 8;08 (16 6-year-olds, 19 7-year-olds, and 17 8-year-olds). They all spoke English as their native language. They were tested individually in a quiet room at an elementary school. One experimenter, a native speaker of English, gave the instructions and the questions, and the other experimenter kept records.

Among the fifty-two children, thirty-one children were asked to participate in the second experiment. The children were divided into two groups depending on their response patterns in the first experiment: those who tended to accept singular reference of plurals and those who could deny it. Most of the 6- and 7-year-olds gave "yes" responses to the plural items, and so the children who could say "no" to one of the four plural items were classified as No-group children. The 8-year-olds were classified in the same way, but most of the No-group children were able to say "no" to the plurals. The Y(es)-Group had three 6-year-olds, six 7-year-olds, and three 8-year-olds: The N(o)-Group had two 6-year-olds, nine 7-year-olds, and eight 8-year-olds. Twenty-four adults also participated.

Procedure

In both experiments, children were shown two pictures sequentially and asked a simple *yes-no* question. While the first picture was presented on the screen of a lap-top computer, an

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[9] Nakato-Miyashita and Roeper (2014) argue that adults do not compute implicature below the DP level. See our experimental results for nominal compounds.

instruction about the picture was given. Then, the second picture showed up, and a question about the picture was given.
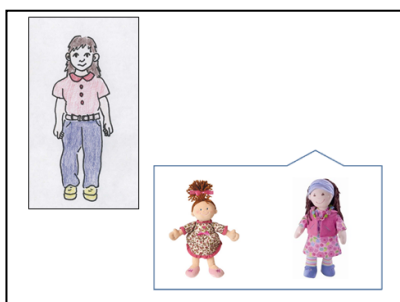
Experimental Conditions

    The first experiment had three test conditions: the indefinite singular condition, the bare plural condition, and the definite plural condition. As shown in (25), after being given an instruction about the first picture, the second picture showed up, and a question about the second picture was given. The question included any one of the following: an indefinite singular, a bare plural, or a definite plural object as in (25b).

(25) a. This is Suzi.   b. Did Suzi take {a doll/dolls/ the dolls}?

       She is looking at dolls that she likes.

       And…
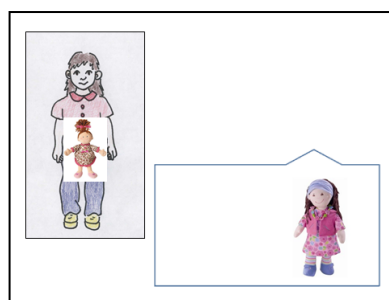
(Nakato-Miyashita and Roeper (2014:369))

In all the second pictures, the person was holding one of the two items given (for example, in (25b), Suzi is holding one of the two dolls). Thus, the expected response should be "yes" in the indefinite singular condition, but "no" in the bare plural and definite plural conditions.[10] Each condition had two items, and the test items amounted to six in total.

    The second experiment had two conditions: the conjoined bare plural condition and the

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[10] With respect to permissible responses to the bare plural condition, individual differences were observed even among adult native speakers, because bare plurals potentially allow singular reference. In fact, some adult native speakers said that they were not sure about their responses to this condition. For them, both "yes"- and "no"-responses were permissible.

conjoined definite plural condition. While a picture (26a) was presented on a screen, instructions about the picture were given. Then, the second picture (26b) showed up, and a question about the picture was given. The question included etiher one of the following object DPs: the conjoined bare plural object or the conjoined definite plural object.

(26) Instruction 1 (for Picture 1): John likes only green peppers and any kind of onions. Suzi likes any kind of vegetables but not meat.

Instruction 2 (for Picture 2): Mom went shopping and got one green pepper, onions, but not meat.
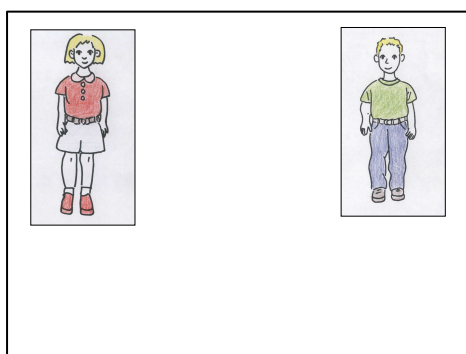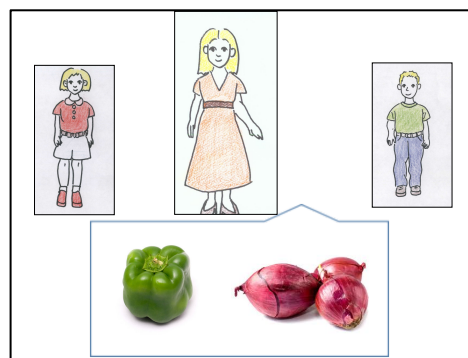
Picture 1   Picture 2

Test Sentences:

i. Suzi said, "Oh good, you got peppers and onions but not meat!" Is that right?

ii. John said, "Oh good, you got the peppers and onions!" Is that right?

(Nakato-Miyashita and Roeper (2014:369))

All the second pictures included a mismatch in the number of items presented. The sentence had two plural nouns, but the picture did not have two plural items. One showed up in singular but the other in plural (for example, Picture 2 in (26) has only one pepper but three onions). The expected response could be "yes" or "no" for both conditions, both sentences can be assigned a structure which allows singular reference of one of the conjoined plurals (see (22) and (23)). Each condition had two items, so the target items were four in total.

4.3.2.2.2 Results and Discussion

The results for the first and the second experiments are summarized in Figure 4_3 and Figure 4_4, respectively (Nakato-Miyashita and Roeper (2014:369-370)).

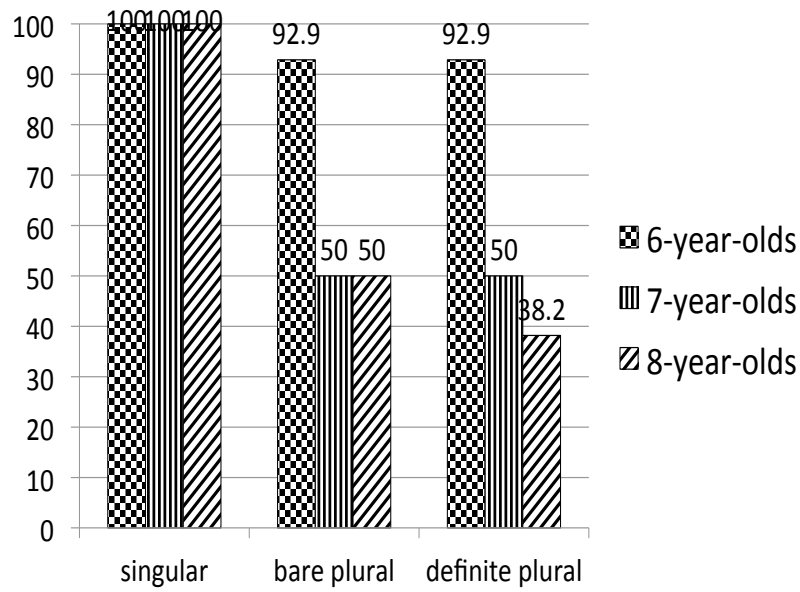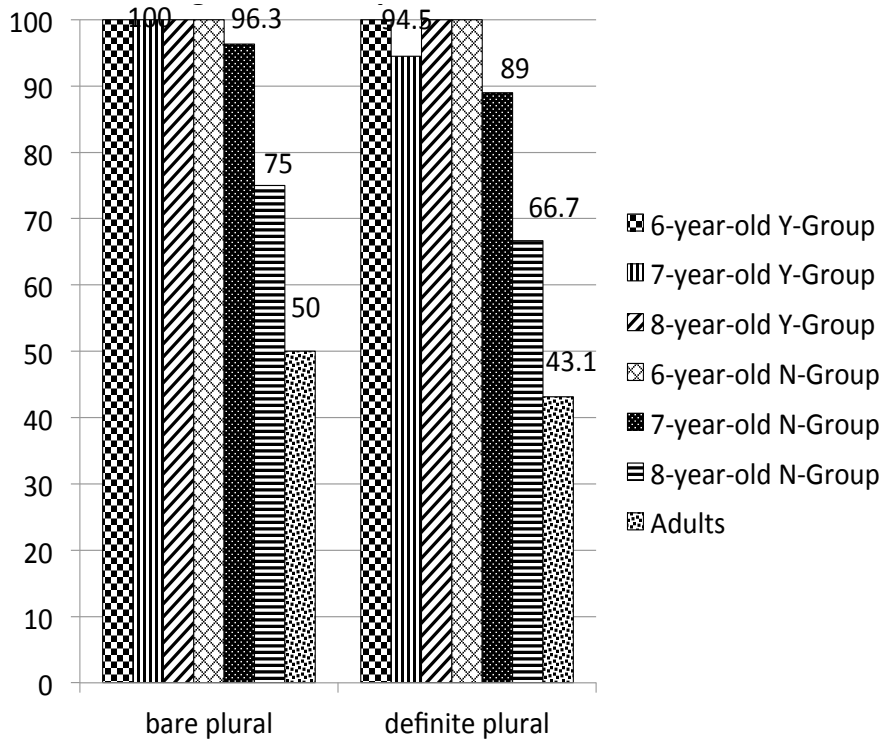**Figure 4_3: Percentages of "Yes"-Responses: The First Experiment**

Figure 4_4: Percentages of "Yes"-Responses: The Second Experiment

What stands out in Figure 4_3 is the 38% acceptance, or 62% rejection of the plural only among the 8-year-olds (N=19). The youngest group of children (14 6-year-olds) did not distinguish among indefinite singulars, bare plurals, and definite plurals. They accept singular reference for all of them (100% for indefinite singulars, 92.9% for bare and definite plurals). The 7-year-old children (N=17) started to make a distinction between singular and plural, but still they could not find the difference between bare and definite plurals. The acceptance rates for bare and definite plurals reached around the chance-level (50% for both). Around 8 years of age, they began to give different interpretations to bare and definite plurals. They could reject singular reference for definite plurals above the chance-level (38.2% of acceptance means 61.8% of rejection), but still did not reject bare plurals so often (50%).

As expected, it seems hard for the children to reject a singular reference for conjoined plurals even if they made a singular-plural distinction in the first experiment. As shown in Figure 4_4, the acceptance rates for singular reference remained near 100% in the Y-Group children at all ages and in the N-Group children at 6 and 7 years old. Only the 8-year-old N-Group children made a distinction between definite and bare plurals. The acceptance rate was lower for the definite plural items (66.7%) than for the bare plural items (75%), which suggests that the children were aware of the impact of *the* for conjoined plurals. The acceptance rates for the adults were also lower for the definite plural items (43.1%) than the bare plural items (50%). They remained still around the chance-level, which suggests that adults resist computing implicatures below the DP.

The results in Nakato-Miyashita (2013) and Nakato-Miyashita and Roeper (2014) show that the acquisition of number by English children is relatively late, especially when the information is available only on nominals: They do not give an "exactly one" interpretation to a singular indefinite even around the age of six, and they do not make a distinction between bare and definite plurals even around the age of seven. Our conclusion from these studies is that Economy of Representation guides children to start with a minimal projection, NP, and to extend functional projections above it, not vice versa: it is not the case that children start from a full-fledged DP and eliminate functional projections unnecessary to their target grammar.

Furthermore, we have argued that in order to acquire a fully adult-like semantics of number in English, the projection DP is necessary, where definiteness and implicature are computed. Children gradually set parameters associated with functional projections by learning morphological and semantic information related to them, and it takes longer for them to set these parameters based on properties of a particular grammar.

4.4 Summary

This chapter considered a theoretical issue related to language acquisition: How do children successfully choose their target grammar among possible options given by UG? This chapter claimed that two economy principles are provided in the LAD as guiding principles: Economy of Encoding and Economy of Representation. The former was originally proposed as a principle which is responsible for the choice of alternative anaphoric forms in adult grammar. This chapter argued that if Economy of Encoding works in child grammar as well as in adult grammar, it is possible to reinterpret the results of previous acquisition studies on the Binding Principles in terms of the notion of economy. The latter was proposed as a principle which determines the initial state of child grammar and possible developmental paths to an adult grammar of a particular language. Experimental results of previous studies were provided which showed that the acquisition of nominal projections in child English follow Economy of Representation.

Based on previous studies, Part I (Chapter 2 and Chapter 3) and Part II (Chapter 4) developed a theory of adult grammar and the LAD, a theory which this thesis considered to be necessary in order to investigate the acquisition of the BPN object construction. The theoretical consideration in these chapters provided us with the following view of the LAD which children are born with. In addition to Agree as a syntactic operation, and a mechanism which allows mapping of a syntactic derivation onto a semantic representation and computation of an implicature at / after the C-I interface, it contains principles for licensing reflexivity of predicates at the C-I interface as UG principles (Reflexivity Conditions), a parameter associated with the A-P Interface (the Requirement of Obligatory

Morpho-phonological Realization of the Edge of a Nominal Projection), and inventories of syntactic, semantic and phonological features whose assembling defines a lexical projection (NP) and functional projections (NumP, DP) related to that projection. Furthermore, it also includes two economy principles (Economy of Encoding and Economy of Representation). These principles guide children to start with an economical derivation or representation: A derivation resulting from a narrow syntactic operation Agree or a representation with a lexical projection is economical and universal, and thus the properties related to such a derivation or representation are expected to be acquired at earlier stages of language acquisition. Guided by these principles and setting values of parameters associated with functional projections or items, children acquire an adult grammar of a particular language.

Part III

Chapter 5

The Acquisition of the BPN Object Construction in Japanese

5.1 Introduction

Based on the analyses of adult grammar given in Part I (Chapter 2 and Chapter 3) and the two economy principles introduced in Part II (Chapter 4), Part III investigates the acquisition of the BPN object construction and consider the questions raised in Chapter 1 (see (53) in Chapter 1). As a first step, this chapter explores children's comprehension of the BPN object construction in Japanese. In order to answer the initial questions, the following more specific questions will be discussed: Given the analysis of adult grammar of Japanese, what do we predict with respect to the acquisition of the inalienable-alienable ambiguity of the BPN object construction? Do Japanese children start with either one of the possible interpretations of the construction? Is there any difference observed between adult grammar and child grammar? If there is, how is such a difference explained?

This chapter presents an experimental result which verifies the prediction made by the NIA and Economy of Encoding. Based on the result of Japanese children's comprehension of a construction with the BPN/non-BPN object, it will be argued that Economy of Encoding is operative from the early stages of language acquisition, and that children show knowledge of the syntactic/semantic distinction between BPNs and non-BPNs.

5.2 A Prediction Based on the NIA and Economy of Encoding

The NIA, together with Economy of Encoding, provides us with a specific prediction about the acquisition of the alienable-inalienable ambiguity. Under the NIA, the BPN object construction is potentially associated with two structures, which are considered to be the source of the ambiguity: one with a full-fledged DP and the other with a projection smaller than DP (NumP or NP). The structure with DP results in the alienable interpretation, and the structure with a projection smaller than DP results in the inalienable interpretation. Under this

proposal, the sentence in (1a) is potentially associated with the two structures in (1b) and (1c).[1]

(1) a. Taro-ga   kao-o   arat-ta.

         Taro-Nom   face-Acc wash-Past

         'Taro washed his face.'

     b. [IP Taro-ga   [vP [NP *poss*   [N kao]]-o   arat-] ta]

     c. [IP Taro-ga   [vP [DP *poss*   [N kao]   D]-o   arat-] ta]

In the structure in (1b), the possessor argument has not been saturated. The BPN is covertly incorporated into the verb and forms a complex predicate with the verb as in (2).

(2) [IP Taro-ga   [vP [NP *poss*   [N   t$_{kao}$]]-o   kao-arat-] ta]

After the incorporation, the possessor argument of the BPN is left behind in the object position and bound to the subject. At the C-I interface, this structure is mapped onto the following representation.[2]

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[1] Lin (2011) also assumes that relational nouns take an implicit argument and adopts the NP-DP distinction to explain the inalienable-alienable ambiguity. He provides supporting evidence for his hypothesis from adult sentence processing.

[2] If we make more precise the mapping between the syntactic structure and the representation at the C-I interface, the structure should be first mapped onto the following representation, which Nakato (2009b: 67) adopts. In (i), the first variable corresponds to the trace in the subject position and the second variable to the possessor argument left in the object position after the noun incorporation (see (43) in Chapter 2).

(i) [λx. x face-wash x] (Taro)

Alternatively, if we take the two theta-identified arguments to be mapped onto a single variable, the interface representation would be like (ii).

(ii) [λx. x face-wash] (Taro)

(3) [λx. x wash x's face] (Taro)

The possessor argument is mapped onto a bound variable (henceforth a BV), and hence the inalienable interpretation is derived.

In the structure in (1c), on the other hand, the argument-taking property of the BPN is satisfied. It projects onto DP, and it is interpreted independently of the subject.[3] The possessor argument which remains unbound is interpreted as a free variable (henceforth an FV) at the C-I interface and hence the structure in (1c) is mapped onto the representation in (4).

(4) [λx. x wash y's face] (Taro)

The FV *y* is assigned a referent from the discourse and this representation results in the alienable interpretation.[4]

The correspondence between the structures (DP and NP) and the interpretations (alienable and inalienable) is summarized in (5).

(5) a. the structure with a projection smaller than DP (i.e. (1b)) → the possessor argument is assigned a referent through a binding relationship with the subject → the inalienable interpretation

b. the structure with DP (i.e. (1c)) → the possessor argument is assigned a referent through the discourse → the alienable interpretation

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[3] In this structure, the BPN cannot be incorporated into the verb because the head D intervenes between the verb and the BPN (Head-Movement Constraint/Intervention Effect).

[4] The referent assigned to this variable might coincide with the referent assigned to the subject (accidental coreference (Reinhart (1983))), and in this case, some relation with the same referential effects as a true "binding" relation can be established between the subject and the possessor of the BPN.

Under this proposal, the distinction between the inalienable and alienable interpretations is subsumed under the distinction between BV and FV interpretations of the possessor argument. The inalienable interpretation is derived as a result of syntactic and semantic operations/computations: head-movement in syntax and variable binding at the C-I interface. All the operations themselves and the constraints which evaluate legitimacy of the operations or resulting representations (Head-movement Constraint, (modified) Binding Principles etc.)[5] are given in UG, so children do not have to learn anything except for the semantic properties of each lexical item; they only have to learn the form-meaning association between nouns and their denotations. The derivation of the alienable interpretation, on the other hand, requires more computation in the discourse component.

The NIA, together with Economy of Encoding, gives the following testable prediction with respect to the acquisition of the Japanese BPN construction.

(6) Japanese children acquire a BV interpretation of the possessor argument earlier than the other interpretations, because the interpretation through Agree/logical binding is less costly than the one derived through a discourse reference assignment. The inalienable interpretation of the BPN-object construction is much easier for children than the alienable interpretation, because the former is more economical than the latter.

Borrowing the terminology from Reuland (2001, 2010a, b), a BV interpretation is more economical than a FV interpretation because the former requires two/three cross-modular steps, while the latter needs four. As shown in (3) and (4), the possessor argument is mapped onto a BV in the inalienable interpretation ((3)), but onto a FV in the alienable interpretation ((4)). The FV has to be assigned a referent independently of the subject through discourse, which causes extra steps. To test our prediction, we investigated Japanese children's

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[5] As presented in Chapter 2, the NIA assumes the predicate-centered theory of binding (Reinhart and Reuland (1993)), where reflexivity of a predicate is licensed at the C-I interface, and the BPN in Japanese can "syntactically reflexive-mark" a predicate, which results in the inalienable interpretation.

comprehension of sentences with BPNs.

5.3 Experiment: Do Semantic Properties of Head Nouns Affect Children's Interpretation of the BPN Object Construction?

5.3.1 Participants, Procedure and Experimental Conditions

Participants

Twenty monolingual Japanese children were recruited in this experiment. They were asked to participate in a practice session in order to introduce them to the experimental task and to see if they understood it. Seven out of the twenty children seemed not to understand the task, and so they were not asked to participate in the test session. The age range of the thirteen children was 5;5 to 6;6, with a mean age of 5;11. Five Japanese adults also participated in the test session as a control group.

Procedure

A three-choice picture identification task was employed in this experiment; the children were given a sentence and three pictures and were asked to point to the pictures which matched the situation described by the sentence. The experiment was divided into two sessions (a brief practice session and a test session), because the task seemed to be slightly complicated for their age: the children were allowed to choose any number of pictures among the three pictures if they thought the pictures matched a given sentence. The brief practice session used simple transitive sentences. In order to make the task more engaging for the children, the experimenter manipulated a puppet, which was supposed to be learning Japanese, and the children were asked to teach Japanese to the puppet. The experiment on the children was conducted individually in a quiet room at a nursery school. Their responses were tape-recorded and written down by the experimenter.

The adults were given the same experimental materials as the children. They were tested individually or in groups of two. The adults were asked to write down their choices.

Experimental Conditions

This experiment had the following target and control conditions: the BPN-condition and the non-BPN condition. The target sentences had a BPN in the object position as in (7).

(7) Pinku-tyan-to   Kiiro-tyan-ga   te-o   age-te-iru-yo

Pink-TYAN-and Yellow-TYAN-Nom   hand-Acc   raise-Pres.Prog-Part

'Pink and Yellow are raising (their/the) hand(s).'

Each target sentence had a corresponding control sentence which minimally differed in the semantic property of the object nouns. For example, the target sentence in (7) had the corresponding control sentence in (8). The BPN *te* in (7) is replaced by the non-BPN *hata* 'FLAG' in (8).

(8) Pinku-tyan-to   Kiiro-tyan-ga   hata-o   age-te-iru-yo

Pink-TYAN-and Yellow-TYAN-Nom   flag-Acc   raise-Pres.Prog-Part

'Pink and Yellow are raising (their/the) flag(s).'

In addition to *ageru* 'raise,' the predicates *arau* 'wash,' and *migaku* 'brush' were used in the target and control sentences.[6] As BPNs, *karada* 'BODY' and *ha* 'TEETH' were used, and *kutu* 'SHOE' was used as a non-BPN.

The pictures presented with the sentences (7) and (8) are given in (9) and (10), respectively. The pictures for the target sentences were divided into the following three types. In the first

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[6] The test session had four filler sentences, which included two sentences with intransitive verbs as in (i) and two sentences with the verb *tataku* 'hit' as in (ii).

(i) Orenzi-kun-to   Murasaki-kun-ga   saken-de-iru-yo
     Orange-KUN-and   Purple-KUN-Nom   shout-Pres.Prog-Part
     'Orenzi-kun and Murasaki-kun are shouting.'
(ii) Ao-kun-to   Midori-kun-ga   taiko-o   tatai-te-iru-yo
     Blue-KUN-and   Green-KUN-Nom   drum-Acc   hit-Pres.Prog-Part
     'Ao-kun and Midori-kun are playing the drum(s).'

type ((9a)), both of the entities denoted by the subject were acting on themselves (the reflexive situation), in the second type ((9b)), one of the entities was acting on himself/herself and, at the same time, was being acted on by the other entity (the non-reflexive situation), and in the third type ((9c)), only one of the entities was doing the action denoted by the predicate (the non-exhaustive situation).[7]
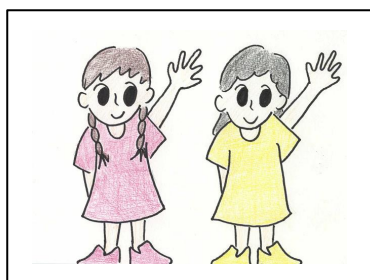
(9) a.   b.   c.

The pictures for the control sentences were divided into the following three types.   In the first type ((10a)), the entities denoted by the subject were separately doing the action denoted by the predicate (the distributive situation), in the second type ((10b)), the entities were together doing the action (the collective situation), and in the third type ((10c)), only one entity was doing the action (the non-exhaustive situation).

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[7] For expository purposes, I adopt the definition of reflexivity and nonreflexivity in Partee et al. (1990: 39-40) here.

(i) Reflexivity: Given a set A and a relation R in A, R is reflexive if and only if all the ordered pairs of the form <x, x> are in R for every x in A.
(ii) Nonreflexivity: A relation which fails to be reflexive is called nonreflexive.

I use the terminology assuming that complex predicates can also introduce the relation R. For example, in (7), R should be taken as 'raise-hand' and the ordered pair as consisting of entities who raise a hand and entities whose hand is raised. In some case, such a complex predicate shows up as a single word in Japanese. For example, the verb *kyo-syu-suru* is morphologically divided into three parts. *Kyo*, which means 'raise,' *syu*, which means 'hand,' and *suru*, which means 'do'. This word can be used instead of *te-o ageru* without any changes in meaning.

(10) a.   b.   c.

Ten items in total (three items each as the target and control conditions and four items as the filler condition) were ordered randomly. In order to make sure that the order did not affect children's responses, the children were divided into two groups, and these groups were given the sentences in different orders. The orientation of the three pictures was arranged so that the picture(s) which could be true was(were) distributed evenly.

5.3.2 Prediction under Each Experimental Condition: Expected Contrast between the BPN Condition and the non-BPN Condition

Since the operation/computation behind the comprehension of plural subject sentences is not so straightforward as singular subject sentences, let us take a closer look at our item-specific predictions. Our prediction on the target items (e.g. (7) and (9)) is given in (11).

(11) BPNs presuppose a possessive relationship. Children should choose the reflexive situation more often than the non-reflexive situation, because the BV interpretation is less costly (or more economical) than other interpretations.

Given the sentence in (7), children should choose (9a) much more often than (9b), because the reference assignment to the possessors in (9b) imposes more cost to children than that in (9a). In (9a), both of the entities denoted by the subject are raising their own hand, and this corresponds to the BV interpretation of the possessors. The C-I interface representation which underlies this interpretation is presented in (12a). The referent should be assigned to the

variables x and y, but not independently to the possessor arguments. In (9b), on the other hand, one entity is raising its own hand, while the other entity is not. This corresponds to the interpretation where discourse bound and FV interpretations are mixed. The C-I interface representation which underlies this interpretation should be the one presented in (12b). The two FVs *y* and *t* should be independently given referents from the discourse which happen to be identical for the three variables, *x*, *y*, and *t*.

(12) a. λx [x raise x's hand] (Pinku-tyan) and λy [y raise y's hand] (Kiiro-tyan)

   b. λx [x raise y's hand] (Pinku-tyan) and λs [s raise t's hand] (Kiiro-tyan)

We expect that no children should choose (9c), because under this interpretation the predicate does not exhaustively apply to the subject.

   Our prediction on the control items (e.g. (8) and (10)) is given in (13).

(13) Non-BPNs do not presuppose any possessive relationship. Children should equally choose the distributive and collective situations, because there is no difference in their computational costs.

In contrast to the BPN, the non-BPN does not presuppose any possessive relationship. Then, children should equally choose (10a) and (10b) because no "binding" relationship is established either in narrow syntax or in logical syntax, and no difference arises in computational cost. For the same reason as (9c), we expect that no children should choose (10c).

5.3.3   Results and Discussion

   Children's responses to the control and filler items (seven items in total) were used to see whether or not they kept their concentration on the task during the test session. None of the thirteen children chose the false/non-exhaustive situations in more than one of the seven items,

so the responses of all thirteen children were included in the results. None of the five adults chose the false/non-exhaustive situations in more than one of the seven items either, and the responses of all five adults were included in the results.

The rates at which each type of situation was chosen are given in Table 5_1.

Table 5_1: Acceptance Rates of Each Type of Situation

	Adults		Children	
	(9) BPN	(10) non-BPN	(9) BPN	(10) non-BPN
a. reflexive / distributive	100	100	97.4	84.6
b. non-reflexive / collective	13.3	93.3	12.8	33.3
c. non-exhaustive	13.3	6.7	2.6	15.4

With respect to the target items, the following results were obtained. All the adult-subjects chose the reflexive-situation for the sentences with the BPN object (100%). Three of them chose only the reflexive-situation for all target items. The remaining two also chose the non-reflexive situations for one item (13.3%) and out of these two adults, one chose the non-exhaustive situation for the remaining two items (13.3%). Almost all the child-subjects chose the reflexive-situation for all items, but one child did not do so for one item (97.4% of acceptance in total). Ten of the thirteen children chose only the reflexive-situation through all items. Among the remaining three, one chose only the non-exhaustive situation for one item, another one chose both the reflexive and non-reflexive situations for two items, and the other one chose both the reflexive and non-reflexive situations for two items and all the situations for the remaining one item. In total, the acceptance rates of the non-reflexive and non-exhaustive situations were 12.8% and 2.6% respectively.

With respect to the control items, all the adult-subjects chose the distributive situation for all items (100%). In contrast to the test items, however, the adult-subjects showed a tendency to choose both the distributive and collective situations. Three chose both for all items. The

remaining two did so for two items, and one of them chose only the distributive one for one item and the other chose all three situations for one item. The acceptance rates for the collective situation and the non-exhaustive situation were 93.3% and 6.7% respectively.

The child-subjects gave a wider variety of responses to the control-items than to the target items. Their responses were divided into seven types. (I) Among the thirteen child-subjects, two consistently chose only the distributive situation. (II) Another two consistently chose both the collective and distributive situations. (III) Three chose only the distributive situation for two items and only the non-exhaustive situation for one item. (IV) Another two chose only the distributive situation for two items and both the collective and non-exhaustive situations for one item. (V) Still another two also chose only the distributive situation for two items and chose both the collective and distributive situations for one item. (VI) One gave sporadic responses for the three items: he chose the distributive situation for one item, the non-exhaustive situation for another item, and both the distributive and collective situations for the other item. (VII) The last one chose both the distributive and collective situations for two items and the distributive situation for one item. In total, the acceptance rates for the distributive, collective, and non-exhaustive situations were 84.6%, 33.3%, and 15.4% respectively.

Our predictions in (11) and (13) seem to be only partially confirmed by these results. The children showed a strong preference for the inalienable (distributive) interpretations with the BPN objects, which confirms our prediction in (11). However, they also showed a preference for the distributive interpretations in the sentences with the non-BPN objects, which is contrary to our prediction in (13). The distributive answers for the target items did not significantly differ from those for the control items ($F(1, 12) = 4.5$, $p = .05$, $\eta^2 = .27$).

A superficial analysis of our results might seem to suggest that our hypothesis is not on the right track, but further statistical analysis shows two interesting significant differences with respect to the children's responses to the non-reflexive and collective interpretations. First, the rate at which the children assigned the non-reflexive interpretation to the BPNs (12.8%) was much lower than the rate at which they assigned the collective interpretation to the non-BPNs

(33.3%) (F (1,12) = 11.6, p = .005 (< .05), η^2 = .49).

Second, a significant difference was observed between the children and adults with respect to the control items in (10b) (F(1,16) = 12.65, p = .003 (<.05) , η^2 = .44). Children's non-adultlike responses were observed only with the collective interpretations in the sentences with the non-BPN objects (93.3% for adults vs. 33.3% for children). Then, the question we should ask is why it is difficult only for children to give a collective interpretation to a non-BPN object. Some prior acquisition studies observed that although children can give both distributive and collective interpretations to a sentence with a plural subject, they tend to show a preference for the distributive interpretation (Nakato (2004), Syrett and Musolino (2010) among others).[8] Admitting children's preference for the distributive interpretations, we can conclude from our results that the children's responses to the collective interpretations clearly show their knowledge about the grammatical principles under discussion and that their non-adultlike responses can be attributed to their lack of ability to make up an appropriate context: If grammar says nothing about the choice between distributive and collective interpretations, children need a specific context which is strong enough to override their preference for distributive interpretations. Given a sentence with a BPN (e.g. (7)), child grammar tells them to choose the most economical option, that is, the reflexive/distributive interpretation ((9a)). They have a good reason not to choose the non-reflexive/collective interpretation ((9b)), and then they can give the adult-like responses. Given the sentence with the non-BPN ((8)), on the other hand, their grammar says nothing about the choice between the two interpretations ((10a-b)). Then, children, who are biased toward the distributive interpretation, have to consider if there is any good reason to choose the collective interpretation. It should be easy for adults to make up a context which makes the sentence felicitous under the collective interpretation; for example, the girls are in competition with other girls and they are supposed to collaboratively work on one flag. Children, who cannot easily make up such a context, are left with the indeterminacy about the

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[8] For the opposite observation, see Avrutin and Thornton (1994).

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choice between two interpretations. As a result, the acceptance rate of the collective interpretations with the non-BPNs becomes higher than that with the BPNs in child grammar, but children do not accept that interpretation as easily as adults.[9,10]

5.4 Summary

In this chapter, we investigated children's interpretation of the BPN object construction in Japanese to test the prediction of the NIA. As expected, children give a bound-variable interpretation to a null possessive pronoun and the tendency is strongly observed with the BPN-object construction. These results suggest that children do make a distinction between BPNs and non-BPNs and that the operations/principles necessary to derive the inalienable possessive interpretation of the BPN object construction, such as noun-incorporation, licensing conditions at the C-I Interface, and syntactic/logical binding, are available from the early stages of language acquisition. Furthermore, it implies that the language acquisition is guided by economy principles, one of which is Economy of Encoding. Among the possible interpretations derived from the three possible ways to encode referential dependency, children have no difficulty giving an interpretation derived from more economical ones. The dependency encoded in narrow syntax is easier for them or acquired at earlier stages of language acquisition.

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[9] Partee and Borshev (1998) inspired me to think about an alternative explanation, which I did not take into consideration when I conducted the experiment. Under the theory which does not take BPNs as inherently relational nouns, the fact that the inalienable interpretation is most salient with relational nouns is explained under the notion of coercion. If we assumed that BPNs were not relational nouns and that their inalienable interpretations were the result of coercion, we could take our results as suggesting that children knew the rule of coercion itself and any other supplementary rules governing the application of coercion. It is not clear at this moment how such supplementary rules work in the absence of overt possessive phrases, or what evidence can be decisive to support either one of the analyses, so the issue is left for future research.

[10] In addition, there seems to be a possibility that the picture (10b) does not appropriately depict the situation described by the sentence and this causes the lower acceptance rate of the collective situation. In this picture, the position of the flag is not high enough and the flag cannot be taken as being raised. In fact, in the follow-up study to be presented in Chapter 7, some children described the situation as 'two girls are *holding* a flag.'

Our experimental findings are informative about child grammar of Japanese, but the experimental design itself is still not immune to problems. First, the internal structure of the subjects in the experimental sentences might support a bias toward distributive interpretations: it is observed that children show a preference for distributive interpretations when coordinated plural subjects are used (Roeper (2007)). To reach a firm conclusion, we need to compare the interpretation of coordinated plural subjects and group-denoting plural subjects. Second, the task itself (three-choice picture identification) might be difficult for children, and we could not do the same experiment on children younger than five years old. Therefore, we need to devise an effective method to investigate younger children's knowledge about this construction.

Chapter 6

The Acquisition of the BPN Object Construction in English

6.1 Introduction

This chapter investigates the acquisition of the BPN object construction in English to consider whether English children exhibit a similar acquisition pattern to Japanese children and how language particular properties are acquired. More specifically, the following questions will be considered in turn: (I) Is early sensitivity to the distinction between BPNs and non-BPNs observed in English children, too? (II) Is the acquisition of the BPN-object construction in English also guided by Economy of Encoding? (III) How do English children learn the properties related to number and gender? When do they start to use number information on head nouns and gender information of possessive pronouns? Is there any principle that governs the acquisition of these properties?

Although some previous studies investigated children's interpretation of English possessive pronouns (Roeper et al. (1985), Pérez-Leroux and Roeper (1999), Pérez-Leroux et al. (2002), Foley et al. (2003)), their results were not consistent and the inalienable-alienable ambiguity was focused on only in a few of them. Furthermore, no experimental studies have been carried out with respect to children's knowledge about number agreement within a BPN object phrase and gender agreement between a possessive pronoun and its antecedent. In order to collect additional data, new experiments were conducted. After summarizing the experimental findings of the previous studies, this chapter presents the results from our own experiments.

6.2 Previous Studies on Children's Interpretation of Possessive Pronouns

6.2.1   Roeper et al. (1985)

Roeper et al. (1985) investigated children's interpretation of possessive pronouns and found that children tend to prefer an FV interpretation to a BV interpretation. Their main concern was not solely on the interpretation of possessive pronouns but on a BV interpretation of

pronouns in general (i.e. pronouns, possessive pronouns and reflexive anaphors). They tested several constructions including pronouns and reflexive anaphors in seven experiments. The data which specifically show children's interpretation of possessive pronouns are not available from all the children they tested, but what they basically found was the same through all the seven experiments. The data on possessive pronouns are available from one experiment. In this experiment, the children were given a picture and a question as follows:

(1) Picture: There are two Sesame Street characters, each lifting their own hats, and one person lifting Big Bird's hat.

Tell me who is lifting his hat.
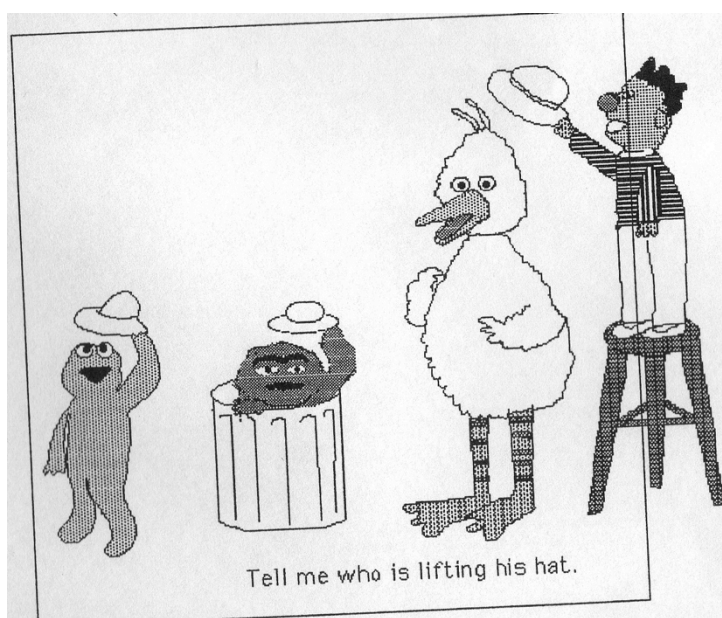
(Roeper and de Villers 1993: 116)

Question: Who is lifting his hat?

The possessive pronoun in the question can be interpreted to be bound to the subject "who" or to be free and refer to some entity given in the discourse. If children point to the two characters that are lifting their own hats, it is taken as an indication that they give the BV interpretation. If children point to Ernie, it indicates that they give the FV interpretation.

Twenty-two children participated in this experiment, whose age ranged from 6 to 15 (five 6-year-olds, twelve 7-year-olds, three 8-year-olds, and two 15-year-olds). They gave BV

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responses to possessive pronouns 36.9% of the time, which was surprisingly low compared to their BV responses to reflexive anaphors (100%).

6.2.2   Pérez-Leroux and Roeper (1999)

Children's preference for an unbound interpretation of possessive pronouns was replicated in Pérez-Leroux and Roeper (1999). As already reviewed in Chapter 4, they examined children's interpretation of bare singular nouns and nouns with possessive pronouns, using examples like (2).

(2) Distributive-Collective Ambiguity
     a. Everybody went home.
     b. Everybody went to his home.   (Pérez-Leroux and Roeper (1999: 944-945))

The results are repeated in Table 6_1.

Table 6_1: Percentages of Distributive Responses (=Table 4_1)

	Bare N	Poss N
3- to 4-year-olds	72.2	33.3
4- to 5-year-olds	66.7	22.2
5- to 6-year-olds	88.9	33.3
Adults	93.8	46.9

Relevant to our discussion are the results for the items with a possessive pronoun (Poss N in Table 6_1). Children's distributive responses (BV responses) were fewer than their collective/single responses (FV responses) across all the conditions and ages, except for the 4- to 5-year old children's responses for the locality condition: The rates of distributive responses are 33.3% (3- to 4-year-olds), 22.2% (4- to 5-year-olds), and 33.3% (5- to 6-year-

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olds). Their results suggest that children tend to give a non-bound (FV) interpretation to possessive pronouns.

6.2.3   Pérez-Leroux et al. (2002)

Pérez-Leroux et al. (2002) conducted a cross-linguistic investigation into the development of inalienable possession. Their experiment was intended to see if English children go through a stage at which their grammar is like Spanish, where the construction with a definite BPN allows the inalienable interpretation (see Chapter 1): a BPN in the object position can be interpreted to be in a part-whole relation with the subject. They used an act-out task, in which children were given a set of dolls and toy body-parts. After a story, a stimulus sentence was given and children were asked to show what the sentence meant. (3) exemplifies the items used in their experiment.

(3) Story: This time Frog got a leg, some noses, an arm and two heads. He gave Bear an
              arm. He gave Joey a head. He gave Suzy a leg. He gave Mary another head.
              The noses, he didn't give to anyone.
       a. Singular-singular
          i. Suzy put the leg on the table.   (alienable)
          ii. Suzy put her leg on the table.   (inalienable preferred)
       b. Plural-plural
          i. Joey and Mary covered the heads.   (alienable distributed)
          ii. Joey and Mary covered their heads.   (ambiguous)
       c. Plural-singular
          i. Joey and Mary kissed the arm.   (alienable)
          ii. Joey and Mary kissed his arm.   (single toy or body-part of Joey)
                                               (Pérez-Leroux et al. (2002:207-208))

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They set up three conditions, which differ in number of the subject and the object. The singular-singular condition ((3a)) has a singular subject and a singular object, the plural-plural condition ((3b)) has a plural subject and a plural object, and the plural-singular condition ((3c)) has a plural subject and a singular object. In order to see if children give inalienable interpretations to a sentence with a definite determiner, both a sentence with a definite determiner and a sentence with a possessive pronoun were included in their test sentences.

Seventeen English children participated in the experiment. Their experimental results show that children show a strong preference for the inalienable interpretation in the plural-singular and plural-plural conditions. The preference is observed both for sentences with a definite determiner and for sentences with a possessive pronoun.

6.2.4   Foley et al. (2003)

Foley et al. (2003) investigated children's interpretation of possessive pronouns in the VP-ellipsis context. They used two different tasks: an act-out task and a truth-value judgment task. They found the opposite results from Roeper et al. (1985) and Pérez-Leroux and Roeper (1999): children show preference for BV interpretations of possessive pronouns.

In the elliptical context, the English possessive pronoun construction allows more than two interpretations. Given the possibility that possessive pronoun can be interpreted as a BV or an FV, eight logically possible interpretations arise as in (4a-i). Among these possibilities only four are grammatical in adult grammar.

(4) Oscar bites his apple and Bert does too.

    a. Oscar bites Oscar's apple and Bert bites Bert's apple.

    b. Oscar bites Oscar's apple and Bert bites Oscar's apple.

    c. Oscar bites Bert's apple and Bert bites Bert's apple.

    d. Oscar bites Ernie's apple and Bert bites Ernie's apple.

    e. *Oscar bites Oscar's apple and Bert bites Ernie's apple.

    f. *Oscar bites Bert's apple and Bert bites Oscar's apple.

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g. *Oscar bites Bert's apple and Bert bites Ernie's apple.

h. *Oscar bites Ernie's apple and Bert bites Oscar's apple.

i. *Oscar bites Ernie's apple and Bert bites Bert's apple.   (Foley et al. (2003: 53))

The informally stated principle, which governs adult's judgment on the ellipsis in (4), is that the pronouns have to be interpreted in one of the following permissible ways. The possessive pronouns have to be interpreted as a BV in both conjuncts (a sloppy reading) or have to get the same value in both conjuncts (a strict reading). Under the sloppy reading in (4a), the sentence has the logical structure in (5a). The possessive pronoun is mapped onto a BV, and the logical structure in the first conjunct is copied into the second conjunct. Under the strict readings in (4b-d), on the other hand, the sentence has the logical structure in (5b). The possessive pronoun is mapped onto an FV and referents assigned to the variables are invariant in both conjuncts.

(5) a. Oscar [$_{VP}$ λx (x bites x's apple)] and Bert does [$_{VP}$ λx (x bites x's apple)]

b. Oscar [$_{VP}$ λx (x bites y's apple)] and Bert does [$_{VP}$ λx (x bites y's apple)]

In order to see if children give both BV and FV interpretations to possessive pronouns, Foley et al. (2003) use sentences with VP-ellipsis as target items. Their target items are divided into two types in accordance with a semantic relation between entities denoted by head nouns and their possessors: one type yields an "inalienable" possessive interpretation as in (6) and the other yields an alienable possessive interpretation as in (7).[1]

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[1] The word "inalienable" was put in quotation marks in order to emphasize that Foley et. al. use the term "inalienable possession" in a different sense from ours. Picture nouns are sometimes analyzed as involving an inalienable possession. Although it is true in the sense that the picture and the entity in that picture cannot be separated, there is a clear difference between picture nouns and BPNs. In the case of picture nouns, it is the picture itself that is a whole of the inalienable possessive relation and the entity referred to by a possessive pronoun is its sub-part. In the case of BPNs, it is the entity that is a whole and the body-part is a part, which is inseparable from the entity.

(6) Inalienable possession

    i. With a self-oriented predicate

    a. BB scratches his arm and E does too.

    b. FB rubs his foot and O does too.

    ii. With a non-self-oriented predicate

    c. BB moves his picture and E does too.

    d. B touches his picture and O does too.

(7) Alienable possession

    i. With a self-oriented predicate

    a. BB licks his ice cream and S does too.

    b. O bites his banana and B does too.
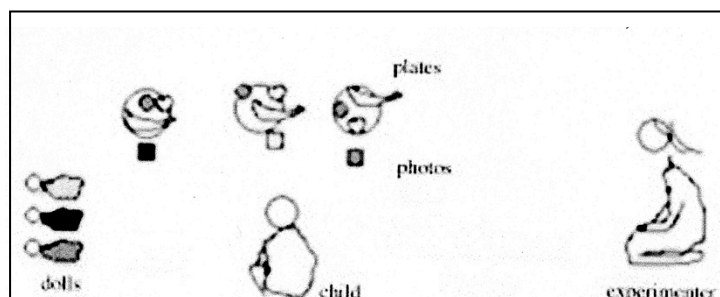
    ii. With a non-self-oriented predicate

    a. S moves his penny and E does too.

    b. FB rolls his orange and B does too.   (Foley et. al. (2003: 61))

    In their act out task, they asked children to manipulate dolls and objects provided in front of them and to show what each sentence means. Figure 6_1 shows their experimental set-up.

Figure 6_1: Experimental Set-up in Foley et al. (2003)

Children were given three dolls and three plates. In front of the three plates, a photo of each doll was put so that children could understand the possessive relationship between the dolls and the plates. Eighty-six children participated in their experiment, with ages ranging from

3;0 to 7;11 and a mean age of 4;7. Most of the child responses (77%) were "correct" ones that fully corresponded to one of the readings in (4a-d). The percentages of participants who gave only a sloppy reading, only a strict reading, or both are summarized in Table 6_2 (cf. Foley et al. (2003: 67)).

Table 6_2: Results for Foley et al.'s Act-out Task

	Sloppy only	Strict only	Both
3-year olds	50	18	25
4-year olds	60	4	36
5-year olds	76	0	24
6- and 7-year olds	38	0	62

Their results show that sloppy readings were dominant in all age groups, although strict readings were also observed.[2]

The comparison between the alienable non-self-oriented condition (7i) and the inalienable self-oriented condition (6i) is of particular interest to us. It shows that their children were sensitive to semantic properties of predicates and head nouns. The children gave the largest number of strict readings under the alienable non-self-oriented condition, and there was a sharp contrast between the two conditions. However, the semantic/pragmatic effect was not so strong that it made the children choose strict readings more often than sloppy readings.

6.2.5   Summary and Remaining Problems

The previous sections have briefly surveyed the experiments conducted in previous studies and their results. (8) briefly summarizes what has been found so far.

(8)   a. The results for the interpretation of possessive pronouns are not consistent in the

         previous studies. Roeper et al. (1985) and Pérez-Leroux and Roeper (1999) observed

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[2] A detailed analysis of the data for the truth-value judgment task is not provided. The results for the truth-value judgment task show that children who gave "correct" responses accepted both sloppy and strict readings.

that children prefer an FV interpretation to a BV interpretation, while Pérez-Leroux et al. (2002) and Foley et al. (2003) showed the opposite: Children tend to give a BV interpretation.

b. Pérez-Leroux et al. (2002) and Foley et al. (2003) focused on the semantic properties of head nouns: They used BPNs as the object. Their experimental results suggested that children show the strongest preference for a BV interpretation when the BPN object is used. However, the semantic effect is not so strong that the non-BPN object forces children to give an FV interpretation more often than a BV interpretation.

c. Pérez-Leroux and Roeper (1999) showed that children tend to give a "bound"-interpretation quite often to a bare noun. Pérez-Leroux et al. (2002) observed the same tendency even with a definite noun.

The findings in (8b) are almost consistent with our findings in Japanese: the strongest preference for a BV is observed when a sentence has a BPN in the object position, but the semantic effect is not strong enough to cause a reverse effect: Children tend to give a BV interpretation more often than an FV interpretation even if a sentence has a non-BPN as its object. In other words, a BPN gives a bias toward a BV interpretation, but a non-BPN does not make an FV interpretation equally available or salient for children.

Although English and Japanese children seem to follow similar acquisition paths, several problems remain to be addressed. The first problem is how the inconsistent results obtained in the previous studies can be explained. As Foley et al. (2003) note, children's preference for a distributive/BV interpretation is observed even when a possessive pronoun is used with a non-BPN, which is not consistent with the results of Roeper et al. (1985) and Pérez-Leroux and Roeper (1999): The latter two observed children's preference for an FV interpretation. As is often the case with acquisition studies, there is a possibility that their inconsistency comes from the difference in their experimental methodologies and materials. For example, both the experiments in Roeper et al. (1985) and in Pérez-Leroux and Roeper (1999) have problems with the experimental materials, which might bias children toward an FV interpretation. In

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Roeper et al. (1985), the children's task was to answer an indirect wh-question like 'Tell me who is lifting his hat.' As we can see in picture (1), they were given multiple choices: two (Elmo and Oscar) are lifting their own hats and one (Ernie) is lifting another entity's (Big Bird's) hat. There is inequality in the number of answers for each interpretation: There are two answers (Elmo and Oscar) for a BV interpretation and only one (Ernie) for an FV interpretation. In order to give a BV response, the children had to give an exhaustive answer to the wh-question, which might be difficult for them.[3] In addition, the lexical choice of target sentences might be inappropriate in Pérez-Leroux and Roeper (1999). The distributive (i.e. BV) interpretation might be more easily obtained if *went* was replaced by *went back* in (2b).[4]

The second is whether it is appropriate to say English and Japanese children follow the same acquisition path even if the experimental materials used in these two languages are not so close. The experiments conducted in the previous studies are different from the one in Chapter 5 of this thesis, both in the methodologies and in the syntactic conditions of stimulus sentences.

The third is that little information is available about the acquisition of morpho-syntactic properties of the BPN object construction in English. English children have to learn the properties related to gender and number within BPN object phrases, in addition to their two possible interpretations. Since the interest of most of the previous studies was on the acquisition of interpretive possibilities of English possessive pronouns, almost no attention was paid to the effect of gender or number information within BPN object phrases on the interpretation of the BPN object construction. Further investigation is necessary to consider a possible developmental path which English children may take before they attain adult grammar of English.

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[3] English children seem to be able to give an exhaustive answer around the age of six (see note 6 in this chapter). If this is true, the problem for the children is not the ability to provide an exhaustive answer itself. However, there still remains a possibility that the inequality of the number of possible answers makes them biased toward an FV interpretation.

[4] I would like to thank Akira Watanabe (p.c.) for pointing out this possibility.

In order to obtain further information about child grammar of English, the following three experiments were conducted. Experiment 1 investigated children's interpretation of possessive pronouns, using a picture identification task. This experiment focuses on the effect of semantic properties of object nouns: Children's interpretation of the BPN object construction is compared with a construction with a non-BPN object. Experiment 2 explored children's knowledge about number morphology on nominals and its effect on the interpretation of the BPN object construction, using a truth-value judgment task. Experiment 3 looked into children's knowledge about gender agreement between a possessive pronoun and its antecedent, using a truth-value judgment task. This experiment also reinvestigated the semantic effect of head nouns with a different methodology from Experiment 1. The design and results of each experiment will be provided in the following sections in turn.

6.3 Experiment 1: Do Semantic Properties of Head Nouns Affect Children's Interpretation of Possessive Pronouns?

This section presents the results of our first experiment, which investigated whether children's interpretation of possessive pronouns is affected by semantic properties of head nouns.

6.3.1   Experimental Design and Predictions

As shown in Chapter 3, semantic properties of head nouns have some morpho-syntactic effects in adult English. Our analysis and an alternative explanation provide different predictions on the semantic effect. The modified NIA predicts that the effect is observed, while the alternative one does not. These predictions are provided in (9).

(9) a. Modified NIA: Children's preference for BV interpretations should be observed when possessive pronouns are used with BPNs. BPNs are potentially reflexive licensers and possessive pronouns can be in an Agree relation with the subject NP in narrow syntax.

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b. Alternative Explanation: There would be no impact of semantic properties of head nouns on children's preference for BV or FV interpretations. Possessive pronouns can be mapped onto either a BV or an FV at the C-I interface and both are equally available irrespective of semantic properties of head nouns.

In order to verify these predictions, an experiment was conducted with a picture identification task. In this experiment, a short story about three people in a picture was told and a question about the picture was given. Two types of sentences were used: one with a BPN object (the BPN condition) and the other with a non-BPN object (the non-BPN condition). Examples of the stories and questions are given in (10).

(10) a. The BPN condition:

Story: Some children were having a party at a house. A mother came in and said "Anyone who needs cookies, raise your hand." Sara wanted cookies and raised her hand. Maria was too shy and didn't like to raise her hand, but she knew that her little sister wanted cookies, so she helped the little sister raise her hand.

Question: Who raised her hand? (BV = Sara, FV = Maria, LS = little sister)
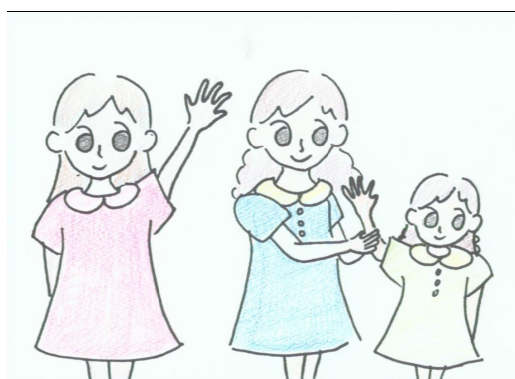
b. The non-BPN condition:

Story: Some children were playing in the snow. It was freezing cold and a father came out and told them to go back into the house. He said "Take off your hat when you come into the house." Maggy took off her hat and went into the house. Jane wanted to keep staying outside and didn't want to take off her hat. But she knew that her little sister wanted to go into the house, so she helped the little sister take off her hat.

Question: Who took off her hat? (BV = Maggy, FV = Jane, LS = little sister)
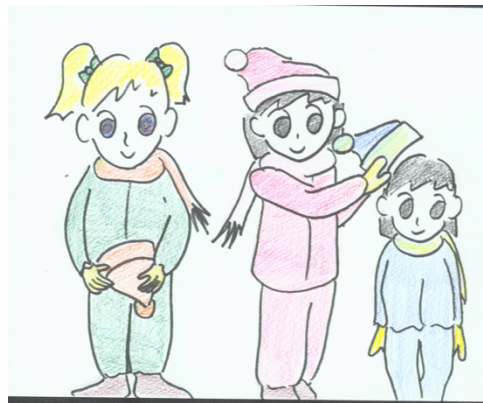
Each story was made up so that both FV and BV interpretations could be true in the context and that each question could be made potentially ambiguous between these interpretations; the possessive pronoun can be bound to the subject or can pick up an entity from the discourse. For example, the question in (10a) can mean 'Who raised her own hand?' or 'Who raised the person's (the little sister's) hand?' Accordingly, there are two possible answers to the question: Sara raised her own hand (the BV interpretation) and Maria raised her little sister's hand (the FV interpretation).

6.3.2   Participants, Procedure and Experimental Conditions

Participants

Fifty-two 6- to 8-year-old children signed up for this experiment.[5] They were all native speakers of English. They were asked to participate in a practice session before the test session in order to see if they could give adult-like responses to base-line questions and understand their task.[6] All of them passed the practice session, but the responses from two children were not included in the results: One could not point to his choice clearly and the other was reluctant to answer one of the target questions. The age range of the remaining fifty children was from 6;01 to 8;08 (sixteen 6-year-olds, seventeen 7-year-olds, and seventeen 8-year-olds).

Procedure

The experiment on the children was conducted individually in a quiet room at a preschool or a kindergarten. Stories and target sentences were given by an adult native speaker of English.[7] Children's responses were written down by an experimenter and video-taped if permission was given.

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[5] Our previous experiment on the singular-plural distinction in child English revealed that children around the age of six still had a problem in interpreting number morphology in an adult-like manner (see Section 4.3.2) and our pilot study with fifteen children under the age of 6 suggested that children younger than five sometimes had difficulty giving exhaustive answers to wh-questions (see footnote 6). For these two reasons, children older than six were recruited.

[6] In the practice session, we checked if children could give a multiple answer to a wh-question. We presented a picture of two boys with a hat and asked the question "Who wears a hat?" Almost all the children could answer "both" to this question, which suggested that children could give multiple answers to wh-questions at the age of six.

[7] I would like to express my gratitude to Laura Catanach, Alida Livingston, and Barbara Pearson for their help as experimenters.

Experimental Conditions

As already exemplified in (10), this experiment had two experimental conditions: the BPN object condition and the non-BPN object construction. In order to control the effect of the orders in which possible interpretations were given, two sets of stimulus sentences were used.[8] In Set 1, possible interpretations were given in the order in (10a-b); a BV interpretation for one entity (Sarah in (10a), for example) made true first. After that, a BV interpretation for another entity (Maria in (10a)) was denied, and then an FV interpretation was made true. In Set 2, the order was reversed in two of the three items. (11a) and (11b) are examples of stories in Set 2.

(11) a. Some children were having a party at a house. A mother came in and said "Anyone who needs cookies, raise your hand." Maria was too shy and didn't like to raise her hand, but she knew that her little sister wanted cookies, so she helped the little sister raise her hand. Sara wanted cookies and raised her hand.

b. Some children were playing in the snow. It was freezing cold and a father came out and told them to go back into the house. He said "Take off your hat when you come into the house." Jane wanted to keep staying outside and didn't want to take off her hat. But she knew that her little sister wanted to go into the house, so she helped the little sister take off her hat. Maggy took off her hat and went into the house.

In either story in (11), a BV interpretation for one entity was denied first. After that, an FV interpretation was made true, and then a BV interpretation for the other entity was made true. Half of the children (eight 6-year-olds, nine 7-year-olds, and eight 8-year-olds) were given Set

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[8] In a pilot study which we had on children under the age of six, we replicated the results of previous studies. They showed a preference for FV interpretations, although some of them allowed BV interpretations. In this pilot study, the sentences were given in the order shown in (10). We were not sure if these children's responses were biased by the order, so we modified the experimental design.

1 and the other half (eight 6-year-olds, eight 7-year-olds, and nine 8-year-olds) were given Set 2.

Each condition had three items; in addition to *raise her hand* in (10a) and (11a), *clean his face* and *brush his teeth* were used in the BPN condition and in addition to *take off her hat* in (10b) and (11b), *bring his box home* and *clean her shoes* were used in the non-BPN condition. The total number of target items was six. In addition to these six items, six items were included to investigate children's interpretation of (in)definite singulars/plurals and six filler items were also given.[9]

6.3.3   Results and Discussion

The rates at which the children gave each type of responses are given in Tables 6_3 and 6_4. Tables 6_5 and 6_6 summarize the results group-by-group.

Table 6_3: Percentages of Each Response Type: The BPN Condition[10]

	BPN		
	BV interpretation	FV interpretation	LB/LS Interpretation
6-year-olds (N = 16)	50	50	29
7-year-olds (N = 17)	60	50	33
8-year-olds (N = 17)	50	50	22

Table 6_4: Percentages of Each Response Type: The Non-BPN Condition

	Non-BPN		
	BV interpretation	FV interpretation	LB/LS Interpretation
6-year-olds (N = 16)	46	65	13
7-year-olds (N = 17)	47	67	12
8-year-olds (N = 17)	43	67	10

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[9] The items for (in)definite singulars/plurals are presented in Chapter 4 (see Section 4.3.2.1).

[10] In this experiment, the children were asked to answer wh-questions. Some of the children gave a multiple response, so the total percentage of the responses is not 100.

Table 6_5: Percentages of Each Response Type: The BPN Condition (Set1/Set2 Group Analysis)

	BPN		
	BV interpretation	FV interpretation	LB/LS Interpretation
6-year-olds (N = 8) / Set 1	54	58	21
6-year-olds (N = 8) / Set 2	46	50	38
7-year-olds (N = 9) / Set 1	37	67	19
7-year-olds (N = 8) / Set 2	79	33	50
8-year-olds (N = 8) / Set 1	30	70	17
8-year-olds (N = 9) / Set 2	74	37	26

Table 6_6: Percentages of Each Response Type: The Non-BPN Condition (Set1/Set2 Group Analysis)

	Non-BPN		
	BV interpretation	FV interpretation	LB/LS Interpretation
6-year-olds (N = 8) / Set 1	42	67	21
6-year-olds (N = 8) / Set 2	50	63	4
7-year-olds (N = 9) / Set 1	15	78	7
7-year-olds (N = 8) / Set 2	83	54	17
8-year-olds (N = 8) / Set 1	33	75	13
8-year-olds (N = 9) / Set 2	52	59	7

As the results in Table 6_3 and Table 6_4 show, the effect of semantic properties of head nouns was not clearly observed: The children gave the FV interpretation under the non-BPN condition, but the effect was not so strong. Rather, as the results in Table 6_5 and Table 6_6 show, the children seemed to be affected by the order of the sentences: A clear order-effect was observed in the 7- and 8-year-old children but not in the 6-year-old children. Nine 7-year-old children, who were given Set 1, were biased toward FV interpretations under both the BPN and non-BPN conditions. The remaining eight 7-year-old children, who were given Set 2, were biased toward the BV interpretation under both conditions. The semantic properties of head nouns did affect the interpretation in 7-year-olds, although the impact was not strong enough to cancel out the order-effect. The FV interpretation bias observed among the children who were given Set 1 was weaker under the BPN condition than under the non-BPN condition. Conversely, the BV interpretation bias observed among the children who were

given Set 2 was weaker under the non-BPN condition than under the BPN condition: these children still gave FV interpretations 54% of the time. A similar order effect was observed with the 8-year-old children, except for the non-BPN condition in Set 2. Eight 8-year-old children, who were given Set 1, were biased toward FV interpretations under both the BPN and non-BPN conditions. The remaining nine 8-year-old children, who were given Set 2, were biased toward BV interpretations under the BPN condition, but not under the non-BPN condition. The semantic properties of head nouns seemed not to have an impact.

Our results suggest that both BV and FV interpretations are available for children. The semantic effect was observed, but no strong preference for BV interpretations was observed under the BPN condition. This seems to confirm the prediction in (9b), not the one in (9a), repeated here.

(9)   a. Modified NIA: Children's preference for BV interpretations should be observed when possessive pronouns are used with BPNs. BPNs are potentially reflexive licensers and possessive pronouns can be in an Agree relation with the subject NP in narrow syntax.
        b. Alternative Explanation: There would be no impact of semantic properties of head nouns on children's preference for BV or FV interpretations. Possessive pronouns can be mapped onto either a BV or an FV at the C-I interface and both are equally available irrespective of semantic properties of head nouns.

However, one thing should be noted about the interpretation of children's responses: Some children gave responses which are possible but require careful consideration for adults to get; they chose the entity that was not actually performing the action (the little sister/the little brother). This type of answer was observed more often under the BPN condition than the non-BPN condition. Before concluding that the prediction in (9a) is not borne out, let us be a little more careful about the implications the LB/LS interpretations have for our analysis. This interpretation is possible if a predicate loses its agentive interpretation and the subject is

interpreted as an experiencer or if we take the last sentences in the stories in (10a) and (10b) as implying that the entity performed the action indirectly. Then, multiple answers like "Sarah and the LS" for (10a) can be considered to be instances of BV interpretations, and those like "Maria and the LS" can be considered to be instances of FV interpretations. Taking these possibilities into consideration, let us pay closer attention to our results based on answer types. Combining the two values ("yes" and "no") for each of the three entities, we have eight logically possible responses as in (12).[11] For expository purposes, we will continue using the terminology BV, FV, LS/LB to refer to each answer type.

(12) a. BV only   (= Sarah only in (10a))

   b. FV only   (=Maria only in (10a))

   c. LS/LB   (= LS only in (10a))

   d. BV & LS/LB

       (=Sarah and LS in (10a)): multiple BV responses/distributive

   e. FV & LS/LB

       (=Maria and LS in (10a)): multiple FV responses/collective

   f. BV & FV   (=Sarah and Maria in (10a)): mixed responses

   g. ALL   (=Sarah, Maria, and LS in (10a)): mixed responses

   h. NONE

Tables 6_7_1 and 6_8_1 summarize the rates of each response type given by each group and Tables 6_7_2 and 8_8_2 show the data where the rates of the same type of responses (single or multiple BV/FV) are added up.

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[11] I would like to express my gratitude for Christopher Tancredi for his suggestion on the interpretation/analysis of the data.

Table 6_7_1: Percentages (and Numbers) of Each Response Type: The BPN Condition (Set1/Set2 Group Analysis)

	(a) BV	(b) FV	(c) LS	(d) BV & LS	(e) FV & LS	(f) BV& FV	(g) ALL	(h) NONE	Total
6-year-olds Set 1 (N = 8)	20.8 (5)	45.8 (11)	0 (0)	20.8 (5)	0 (0)	12.5 (3)	0 (0)	0 (0)	99.9 (24)
6-year-olds Set 2 (N = 8)	12.5 (3)	50 (12)	0 (0)	37.5 (9)	0 (0)	0 (0)	0 (0)	0 (0)	100 (24)
7-year-olds Set 1 (N = 9)	14.8 (4)	59.3 (16)	3.7 (1)	14.8 (4)	0 (0)	7.4 (2)	0 (0)	0 (0)	100 (27)
7-year-olds Set 2 (N = 8)	16.7 (4)	16.7 (4)	4.2 (1)	45.8 (11)	0 (0)	16.7 (4)	0 (0)	0 (0)	100.1 (24)
8-year-olds Set 1 (N = 8)	12.5 (3)	54.2 (13)	8.3 (2)	8.3 (2)	0 (0)	12.5 (3)	0 (0)	4.2 (1)	100 (24)
8-year-olds Set 2 (N = 9)	37.0 (10)	25.9 (7)	0 (0)	25.9 (7)	0 (0)	11.1 (3)	0 (0)	0 (0)	99.9 (27)

Table 6_7_2: Percentages (and Numbers) of Each Response Type: The BPN Condition (Set1/Set2 Group Analysis)

	(a) + (d) BV + BV & LS	(b) + (e) FV + FV & LS	(c) LS	(f) BV& FV	(g) ALL	(h) NONE	Total
6-year-olds Set 1 (N = 8)	41.6 (10)	45.8 (11)	0 (0)	12.5 (3)	0 (0)	0 (0)	99.9 (24)
6-year-olds Set 2 (N = 8)	50 (12)	50 (12)	0 (0)	0 (0)	0 (0)	0 (0)	100 (24)
7-year-olds Set 1 (N = 9)	29.6 (8)	59.3 (16)	3.7 (1)	7.4 (2)	0 (0)	0 (0)	100 (27)
7-year-olds Set 2 (N = 8)	62.5 (15)	16.7 (4)	4.2 (1)	16.7 (4)	0 (0)	0 (0)	100.1 (24)
8-year-olds Set 1 (N = 8)	20.8 (5)	54.2 (13)	8.3 (2)	12.5 (3)	0 (0)	4.2 (1)	100 (24)
8-year-olds Set 2 (N = 9)	62.9 (17)	25.9 (7)	0 (0)	11.1 (3)	0 (0)	0 (0)	99.9 (27)
Total	44.7 (67)	42 (63)	2.7 (4)	10 (15)	0 (0)	0.7 (1)	100.1 (150)

Table 6_8_1: Percentages (and Numbers) of Each Response Type: The Non-BPN Condition (Set1/Set2 Group Analysis)

	(a) BV	(b) FV	(c) LS	(d) BV & LS	(e) FV & LS	(f) BV& FV	(g) ALL	(h) NONE	Total
6-year-olds Set 1 (N = 8)	12.5 (3)	54.2 (13)	4.2 (1)	16.7 (4)	0 (0)	12.5 (3)	0 (0)	0 (0)	100.1 (24)
6-year-olds Set 2 (N = 8)	33.3 (8)	50 (12)	0 (0)	4.2 (1)	0 (0)	12.5 (3)	0 (0)	0 (0)	100 (24)
7-year-olds Set 1 (N = 9)	14.8 (4)	77.8 (21)	7.4 (2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	100 (27)
7-year-olds Set 2 (N = 8)	33.3 (8)	16.7 (4)	0 (0)	12.5 (3)	0 (0)	33.3 (8)	4.2 (1)	0 (0)	100 (24)
8-year-olds Set 1 (N = 8)	16.7 (4)	58.3 (14)	4.2 (1)	4.2 (1)	4.2 (1)	12.5 (3)	0 (0)	0 (0)	100.1 (24)
8-year-olds Set 2 (N = 9)	34.6 (9)	38.5 (10)	0 (0)	3.8 (1)	7.7 (2)	15.3 (4)	0 (0)	0 (0)	99.9 (26)

Table 6_8_2: Percentages (and Numbers) of Each Response Type: The Non-BPN Condition (Set1/Set2 Group Analysis)

	(a) + (d) BV + BV & LS	(b) + (e) FV + FV & LS	(c) LS	(f) BV& FV	(g) ALL	(h) NONE	Total
6-year-olds Set 1 (N = 8)	29.2 (7)	54.2 (13)	4.2 (1)	12.5 (3)	0 (0)	0 (0)	100.1 (24)
6-year-olds Set 2 (N = 8)	37.5 (9)	50 (12)	0 (0)	12.5 (3)	0 (0)	0 (0)	100 (24)
7-year-olds Set 1 (N = 9)	14.8 (4)	77.8 (21)	7.4 (2)	0 (0)	0 (0)	0 (0)	100 (27)
7-year-olds Set 2 (N = 8)	45.8 (11)	16.7 (4)	0 (0)	33.3 (8)	4.2 (1)	0 (0)	100 (24)
8-year-olds Set 1 (N = 8)	20.9 (5)	62.5 (15)	4.2 (1)	12.5 (3)	0 (0)	0 (0)	100.1 (24)
8-year-olds Set 2 (N = 9)	38.4 (10)	46.2 (12)	0 (0)	15.3 (4)	0 (0)	0 (0)	99.9 (26)
Total	32.6 (46)	54.6 (77)	2.8 (4)	9.2 (13)	0.7 (1)	0 (0)	99.9 (141)

The sums of the responses from all the children are at the bottom in Table 6_7_2 and Table 6_8_2. The results of a paired t-test based on the sums indicate the semantic effect of head nouns. With respect to the BV responses in (a)+(d), there was a significant difference in scores for the BPN condition (M = 1.34, SD = 1.26) and the non-BPN condition (M = 0.94,

SD = 1.10; t = 2.99, p < 0.05). With respect to the FV responses in (b)+(e), there was no significant difference in scores for the BPN condition (M = .00, SD = .00) and the non-BPN condition (M = .06, SD = .03; t = -1.76, p > 0.05). There was a tendency for BV responses under the BPN condition in children's responses as a whole, but such a tendency was not clearly observed in every group. In contrast, the order effect was more clearly observed. The interpretation was affected by the order in the 7-year-old and 8-year-old children: Irrespective of the semantic types of head nouns, a preference for an FV interpretation was observed in the Set 1 group and a preference for a BV interpretation was observed in the Set 2 group. No order effect was observed in the 6-year-old children. They chose both readings almost equally.

The findings of Experiment 1 are summarized in (13).

(13) a. The 6-year-old children showed different response patterns from the 7-year-old and 8-year-old children.

b. The semantic effect was observed in the 6-year-old children, but it was not as strong as expected. It did not make the children choose a BV interpretation more often than an FV interpretation under the BPN condition. Rather, the effect was observed in a different way from the previous findings. The children's preference for a BV interpretation was overridden and they tended to choose an FV interpretation more often under the non-BPN condition.

c. The semantic effect was also observed in the 7-year-old and 8-year-old children, but it was not strong enough to cancel out the order effect. In most of the 7-year-old and 8-year-old children, the order effect was observed.

Our experimental results seem to be closer to the prediction in (9b), not to the one in (9a). This is not consistent with our results of the experiment on Japanese children. If the properties of the English BPN object construction are to be explained by the same principles, it is expected that Japanese and English children follow similar acquisition paths. Under our analysis, namely the NIA, the relevant principles such as Agree, licensing conditions of

reflexivity of predicates at the C-I Interface, the argument-taking property of BPNs, and Economy of Encoding are provided in UG: These should be equally available for every child, irrespective of the language they are acquiring. Then, we would expect children to give a BV interpretation more often to a sentence with a BPN than to a sentence with a non-BPN. This was only partially but not perfectly confirmed from our results of the experiment on English children.

However, there are two important differences between the experiment we conducted on Japanese children and the one we conducted on English children: the difference in the task itself and the difference in morpho-phonological properties of elements in a possessor position. In the experiment on Japanese children, a three-choice picture identification task was employed but in the experiment on English children, a multiple-choice task with a single picture was used. Although both of them are similar in that they allow multiple choices of answers, the tasks for the children are not identical. In the Japanese experiment, the children's task was to choose pictures which appropriately depict the situation described by the sentence. In the English experiment, on the other hand, the task was to choose people who are doing the action asked by the question. The second difference is the morpho-phonological properties within BPN phrases. In the Japanese experiment, a sentence without an overt possessive pronoun was used, while in the English experiment, a sentence with an overt possessive pronoun was used. These were used because they are the most natural ways to describe the events depicted in the pictures in each language.

Taking these differences into consideration, two explanations might be possible for the difference in the results with Japanese and English children. One possibility would be that the results were just an experimental artifact, which is due to the choice of experimental methods.[12] The other possibility would be that the morpho-phonological properties of English

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[12] There is another difference between the Japanese experiment and the English experiment with respect to the agentivity of the possessor of the thing denoted by the object. Compare, for example, the picture in (9b) in Chapter 5 and the one in (10a) in this chapter. In (9b), the agentive reading of Pinku-tyan might be readily available because no explanation about the picture was provided. In (10a), on the other hand, the agentive reading of the little sister might not be strong because of the story provided

possessive pronouns biased children toward an FV interpretation, a bias missing in Japanese: English possessive pronouns inflect for gender and number, and in most of the cases, they have an interpretive effect. Only in the BV interpretation do they make no contribution. Then, it might be that children who started to learn the morpho-phonological inflection of pronouns depended on the features of possessive pronouns to determine their interpretation. In order to see the effects of these factors, we conducted another experiment, which is presented in Section 6.4.

6.4 Experiment 2: Can Children Detect Number Mismatch between Possessive Pronouns and Head Nouns?

As already introduced, one of the morpho-syntactic differences between English and Japanese is in number marking on nominals. The singular-plural distinction is morphologically realized on nominal heads in English, and the marking affects the interpretation of the BPN-object construction in adult grammar in English: When a BPN which presupposes a one-to-one correspondence between a body-part and its possessor is used as the object and it is interpreted in an inalienable possessive relation with the subject, adults prefer its number morphology to match that of the subject. As already mentioned in Chapter 3, this is referred to as number agreement between a possessive pronoun and the head noun without taking a stand on whether this agreement is syntactic in nature. To illustrate, consider the examples in (14a) and (14b) (see also (27) in Section 3.3.2). In (14a), the possessive pronoun can be interpreted as either bound to the subject or independent of the subject when the head noun has singular morphology. If it is bound, the sentence yields the inalienable interpretation. If it is not, the sentence yields the alienable interpretation. In contrast, when the head noun has plural morphology, the inalienable interpretation is no longer available. In (14b), the possessive pronoun can be interpreted as being bound to the subject or being independent of the subject, but the plural form of the head noun is preferred under the

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with the picture. This difference might also affect the experimental results. I would like to express my gratitude to Tetsuya Sano for his comments related to this issue.

inalienable interpretation.

(14) a. John cleaned his face/#faces.

　　　b. The boys cleaned their faces/??face.

　　To my knowledge, no study has raised the issues of why adult English native speakers can make such judgment and when and how English children obtain the adult restriction. The aim of this section is to provide a new set of data on the acquisition of the possessive pronoun construction in English, focusing on the effect of number marking on head nouns. Based on the data, this section argues that semantic/pragmatic computation, not a syntactic operation such as Agree (Chomsky (1995, afterward)), is responsible for the choice of appropriate forms. After a brief summary of the two possible explanations of adult grammar and their predictions on the acquisition of that property, the results of our second experiment are presented.

6.4.1 Brief Summary of Two Explanations and Their Predictions

　　As discussed in Chapter 3, we have two options to explain the number agreement between possessive pronouns and head nouns observed in (14). These options are summarized in (15).

(15) a. Modified NIA: The agreement between possessive pronouns and head nouns results from semantic/pragmatic computation. Implicature has to be computed in order to judge if the use of a singular/plural form of a noun is felicitous in a particular utterance.

　　 b. Alternative Explanation: The agreement between possessive pronouns and head nouns results from the syntactic operation Agree.

　　The modified NIA attributes the agreement to semantic/pragmatic computation: It follows from our world knowledge about BPNs and the implicature computation. As already

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mentioned, the contrast between BPNs and non-BPNs in the acceptability is observed not only in the possessive pronoun construction but also in the bare plural object construction as in (16) (see (23) in Section 3.3.1).

(16) a. #Does a dog have tails?   (Sauerland et al. (2005))

    b. Does your office have windows?   (Sauerland et al. (2005))

    c. Who has children?   (Roeper (2007))

Most adult native speakers judge sentence (16a) unnatural, but they accept sentences (16b) and (16c) without any question and it is felicitous for them to answer "Yes, one" to question (16b) or to raise their hands for (16c) even if they have only one child. According to the semantic literature (Sauerland (2003) for example), bare plurals allow singular reference and this availability is contextually determined. Our knowledge tells us that dogs have only one tail and this makes it infelicitous for adult speakers to ask a question like (16a) (Sauerland et al. (2005)). Implicature is computed and if there is an alternative form more appropriate in a given context, adult speakers consider the utterance infelicitous. The same reasoning applies to the case under consideration. Our knowledge tells us that human beings have only one face. This makes the singular form of the BPN preferable under the inalienable interpretation as in (14d) ((6a-b) in Section 3.2).

Under the alternative explanation, on the other hand, the number agreement between possessive pronouns and head nouns is attributed to the narrow syntactic operation Agree. A similar agreement pattern is observed between a demonstrative pronoun and a head noun as in (17): When the noun *book* is used in its singular form, the singular demonstrative *this* must be used ((17a)) and when it is used in its plural form, the plural demonstrative *these* is required ((17b)).

(17) a. John bought this/*these book.

b. John bought *this/these books.

A plausible analysis of the number agreement between a demonstrative pronoun and a head noun would be that it follows as a result of Agree between a head and its Spec in narrow syntax. Then, the same operation might be applicable to the number agreement between a possessive pronoun and a head noun under discussion.

These two explanations provide different predictions on the acquisition of the number agreement between possessive pronouns and head nouns as in (18).

(18) a. Modified NIA: Children should not show sensitivity to number agreement between possessive pronouns and head nouns even if they have learned number morphology on nominal expressions.

b. Alternative Explanation: Children should show sensitivity to number agreement between possessive pronouns and head nouns as soon as they have learned number morphology on nominal expressions.

Under the modified NIA, the agreement does not follow from a syntactic operation. Rather, the requirement is imposed by semantics/pragmatics, whose rules have to be learned on the basis of language specific evidence. More specifically, the requirement results from the implicature computation associated with number interpretation in English. Then, it should be no wonder that it takes longer for children to attain adult-like knowledge about the requirement. In other words, no correlation should be expected between the acquisition of the requirement and that of number morphology on nominals. Under the alternative explanation, the agreement follows as a result of a syntactic operation Agree. The operation is given in UG and available from the onset of language acquisition. Children do not have to learn any language-specific or construction-specific rules except for the number morphology in their target language. Hence, a correlation between the acquisition of the requirement and that of

number morphology on nominals would be expected. English children would show fully adult-like knowledge about the agreement as soon as they learn number morphology on nominals and the basic semantics associated with it in English.

6.4.2 Participants, Procedure and Experimental Conditions[13]

Participants

Based on the results of the experiment presented in Section 4.3.2.2, thirty-five children were asked to participate in this experiment. Four of them could not complete the experiment and thirty-one children completed the experiment. These children were divided into two groups (a N(o)-group and a Y(es)-group) in accordance with their response pattern in the previous experiment.[14] Seven 7-year-olds and five 8-year-olds were grouped as the N-group, five 6-year-olds, eight 7-year-olds and six 8-year-olds were grouped as the Y-group. The ages of these children range from 6;05 to 8;08 (five 6-year-olds, fifteen 7-year-olds, and eleven 8-year-olds, with the mean age of 7;08). Twelve adults were also asked to participate in the experiment.[15]

Procedure

In this experiment, children were given a picture in which two people were doing some action and were asked a *yes-no* question about the picture. The experiment on the children was conducted individually. One experimenter, a native speaker of English, gave a question and the other kept records.

The experiment on the adults was not conducted individually but as a group in a classroom. The adults were not given all the items used for the children, but one item for each condition. They were given a paper with the pictures and questions and asked to write down their responses.

Experimental Conditions

This experiment had eight test items and they were divided into two types: four were target items which were intended to induce *"no"*-responses from children and four were control items which were biased toward *"yes"*-responses. The target items had singular marking on potential antecedents, verbs, and possessive pronouns (the singular condition) and the control items had plural marking on them (the plural condition). All eight questions had BPNs as head nouns, but they were divided into two sub-types by the semantic properties (or pragmatic presuppositions) associated with the head nouns: four of them had BPNs which human beings have one of (the non-pair condition) and the remaining four had those which human beings have two of (the pair condition). Examples of our target and control items are given in (19). As shown in (19), all the entities depicted in the pictures are doing the actions denoted by the predicates. In the singular conditions in (19a) and (19b), the subjects, verbs and possessive pronouns have singular morphology. In order to make singular marking felicitous, the distributive quantifier *each* is used. Only the head nouns have plural morphology, which is not permissible in adult grammar. In the plural conditions in (19c) and (19d), all the subjects, verbs, possessive pronouns, and head nouns have plural morphology, which is perfectly fine in adult grammar. In the non-pair condition ((19a) and (19c)), BPNs

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which presuppose a one-to-one correspondence between body-parts and individuals are used. In the pair condition ((19b) and (19d)), those which presuppose a two-to-one correspondence are used.

(19) Target Items: Singular Condition

a. Non-pair Condition;   b. Pair Condition;

Is each boy touching his heads?   Is each boy pulling his ears?

Control Items: Plural Condition

c. Non-pair Condition;   d. Pair Condition;

Are the boys cleaning their faces?   Are the girls touching their eyes?

The experiment had two items for each condition (the singular/non-pair, singular/pair, plural/non-pair, plural/pair conditions), which accounted for the eight items in total. This experiment consisted of two sessions and each session had one item for each condition. In these two sessions, the four questions were given in different orders so that children would

not be biased by the order.

6.4.3   Results and Discussion

The percentages of adult-like responses ("no" to the singular condition and "yes" to the plural condition) are summarized in Table 6_9 and Table 6_10. The children were asked to say "yes" or "no" to the questions, but some of them gave additional comments after their *"yes"*-responses. For example, one child from the 8-year-old group gave the comment in (20a) after giving a *"yes"*-response to the question in (19c). Another child from the 7-year-old group gave the comment in (20b) after giving a "yes"-response to the question in (19b).

(20)   a. Yes, … but a person has only one face.

        b. Yes, … his ear.

These seem to indicate that the children wanted to reject the sentences. The responses with these comments are subtracted from the *"yes"*-responses in the plural condition and added to the *"no"*-responses in the singular condition.

Table 6_9: Percentages of "Yes"-Responses

	Plural Condition	Singular Condition
N-Group (N = 12)	89.6	52.1
7-year-olds (N = 7)	96.4	60.7
8-year-olds (N = 5)	80	40
Y-Group (N = 19)	92.1	75
6-year-olds (N = 5)	90	75
7-year-olds (N = 8)	93.8	68.7
8-year-olds (N = 6)	91.7	83.3
Adults	100	0

Table 6_10: Percentages of "Yes"-Responses

	Plural Condition		Singular Condition	
	Pair	Non-Pair	Pair	Non-Pair
N-Group (N = 12)	95.8	83.3	50	54.2
7-year-olds (N = 7)	100	92.9	42.9	64.3
8-year-olds (N = 5)	90	70	40	40
Y-Group (N = 19)	92.1	92.1	84.2	65.8
6-year-olds (N = 5)	90	90	80	70
7-year-olds (N = 8)	93.8	93.8	75	62.5
8-year-olds (N = 6)	91.7	91.7	100	66.7
Adults	100	100	0	0

As shown in Table 6_9, all the groups of children could give "yes"-responses to the plural conditions highly above the chance-level (50% in this case). However, they had difficulty giving *"no"*-responses to the singular conditions even at the age of eight. A slight difference was observed between the N-group and the Y-group. The children in the N-group gave many more *"no"*-responses (47.9%) than those in the Y-group (25%). However, statistical analyses revealed that there was no correlation between the Y-/N-group and their response pattern to the singular conditions. ANOVA was used to test for differences among the groups.

According to the results of two-factor factorial ANOVAs, the main effect of the morphological factor (plural-marking vs. singular-marking) was significant ($F(1,38) = 165$, $p < .0001$, $\eta^2 = .81$) and there was significant interaction between the morphological factor and the age factor (children vs. adults) ($F(2,38) = 37.4$, $p < .0001$, $\eta^2 = .66$). Both child groups differed from the adults ($p = .04$ for the difference between the N-group and the adults; $p < .0001$ for the difference between the Y-group and the adults), but no difference was observed between the two child groups ($p = .133$).

These results suggest that children cannot use number information on head nouns in an adult-like manner even if they have learned number morphology. They cannot detect a number mismatch between possessive pronouns and head nouns even though they seem to be aware of number morphology on head nouns. This finding is consistent with the prediction of the NIA in (18a).

With respect to the semantic effect of head nouns, no difference was observed between the pair condition and the non-pair condition both in the children and the adults, although the Y-group children gave "yes"-responses slightly more often to the singular/pair condition (see Table 6_10). This might be taken as counter-evidence for the NIA, because it explains number agreement in terms of an implicature computation where our world knowledge is considered to play a crucial role. If the computation is induced by our pragmatic knowledge about human body-parts, fewer "yes"-responses should be expected under the singular/pair condition than the singular/non-pair condition. It is true that if questions such as "Does a dog have tail?" are asked in an out-of-the-blue context. An implicature is computed based on our world knowledge. However, the pictures in our experimental materials set up the context which should be used to choose an appropriate form. For example, both in the pictures in (19b) and in (19d), only one of the paired body-parts (ears, eyes) was acted on by each possessor. Implicatures are computed based on the pictures and the plural forms are judged unacceptable under these situations. Thus, it is no wonder that no difference was observed between the pair condition and the non-pair condition.

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6.5 Experiment 3: Do Children Use Gender Information of Possessive Pronouns?

The two experiments presented so far examined the effect of semantic properties of head nouns and that of number morphology on children's interpretation of the BPN object construction. Experiment 1 found that although the semantic effect is observed it is not so strong as expected. Experiment 2 showed that children cannot detect number mismatch even if they seem to be aware of number morphology on nominals. However, as pointed out in Section 6.3.3, the results of Experiment 1 might be an experimental artifact. Experiment 3 was designed to partially solve the problems with Experiment 1. Employing an improved experimental methodology, this experiment reinvestigated the semantic effect of head nouns in child grammar. In addition, it focused on the effect of gender information of possessive pronouns on the interpretation.

6.5.1   Brief Summary of Two Explanations and Their Predictions

Gender agreement as well as number agreement is one of the properties which makes English different from Japanese. Chapter 3 discussed that two explanations are possible for the agreement, which can be briefly summarized in (21).

(21) a. Modified NIA: The agreement between possessive pronouns and their antecedents
          results from the syntactic operation an Agree when head nouns are BPNs. BPNs are
          potential reflexive licensers and they can be incorporated into verbs. As a consequence,
          their possessor arguments can be in Agree relation with the subject NP in narrow
          syntax.
      b. Alternative Explanation: The agreement between possessive pronouns and their
          antecedents does not result from the syntactic operation Agree. The bound interpretation
          of a possessive pronoun derives as a result of logical binding at the C-I interface.

The modified NIA assumes that English has two types of possessive pronouns, one of which

occurs in a projection lower than DP. This pronoun corresponds to a null possessive pronoun in Japanese. In this structure, the BPN object is incorporated into a verb and reflexively marks a predicate. After that, a possessor argument of the BPN is in an Agree relation with the subject NP, which results in the syntactic binding. A difference between English and Japanese is that the parameter which requires the morpho-phonological realization of the left edge of every nominal phrase is set positive in English. Because of this requirement, phonological features have to be inserted at the A-P component after Spell-Out/Transfer. This makes the derivation which starts with a null possessive pronoun morpho-phonologically identical to the one which has a possessive pronoun with a full ϕ- and phonological-feature specification. The alternative explanation, on the other hand, does not assume two different types of possessive pronouns. Under this explanation, a derivation has a possessive pronoun with a full ϕ- and phonological-feature specification. It is mapped onto either a BV or an FV at the C-I interface, and its bound interpretation obtains as a result of the logical binding.

The modified NIA in (21a) makes the following prediction with respect to the effect of gender information on the interpretation of a possessive pronoun.

(22) Gender information of possessive pronouns should not have much impact in the initial child grammar of English. It might take a long time for children to set the parameter about the left edge of nominal phrases. Then, it is possible for English children to go through a stage at which their grammar does not require a null possessor to be phonetically realized.

This prediction is not inconsistent with the alternative explanation in (21b). However, these two explanations differ with respect to their predictions on the semantic effect of head nouns. The modified NIA expects the effect to be observed, while the alternative explanation does not.

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6.5.2 Participants, Procedure and Experimental Conditions

Participants

Twenty monolingual English children participated in this experiment and among these, nineteen completed the experiment. Eleven adults, who participated in Experiment 2, were also asked to participate in this experiment.

Procedure

This experiment employed a truth-value judgment task (Crain and Thornton (1998)). The task is considered to be preferable because children's responses are easier to understand with this task than with the picture identification task used in Experiment 1. In this experiment, a series of three pictures was presented with a simple introduction. After the introduction, a simple *yes-no* question was given. The task for children was to answer each question by saying "yes" or "no" and to explain why they say so, when their answer was "no." The experiment was divided into two sessions. Before the two sessions, seven sentences were given in order to make sure that the children understood the task. Examples of the sentences and pictures for the practice were given in (23).

(23) a. i. This is Orange. This is Purple. ii. Orange is smiling. iii. Is Purple smiling, too?
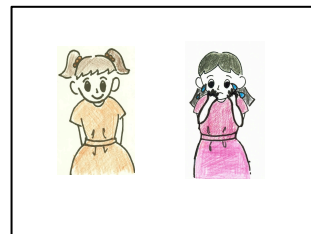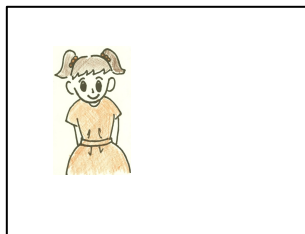
b. i. This is Green. This is Blue. ii. Green is smiling. iii. Is Blue smiling, too?
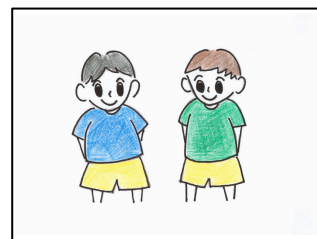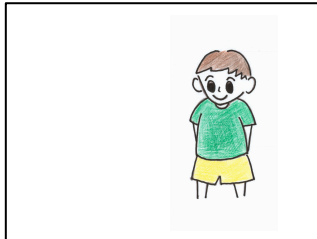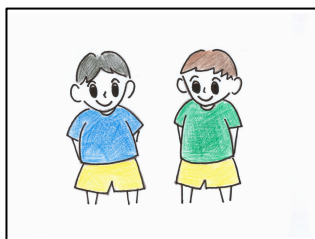
In (23a-b), two people are first introduced ((i)). Next, one of the two people shows up and a sentence is given to describe what she/he is doing ((ii)). Then, the other one also shows up and a question is given about what he/she is doing ((iii)). The adult-like response is "no" for (23a) but "yes" for (23b).

The experiment on children was conducted individually in a quiet room. A native speaker of English gave instructions and questions to the children.

The experiment on adults was conducted in a group. Pictures were given on a big screen in a classroom; instructions and questions were written on a paper distributed individually. The adults were asked to write down their responses.

Experimental Conditions

The target sentences were divided into the following two types depending on the semantic properties of the object: the BPN condition, where a BPN is used as the object, and the non-BPN condition, where a non-BPN is used as the object. Each type was further divided into two sub-types depending on the situation depicted in the last of the three pictures: the collective condition and the distributive condition. In the BPN-collective condition, both of the two people are doing an action on one of them (see (24a)), and in the BPN-distributive condition, each of them is doing an action on himself/herself (see (24b)).

(24) a. BPN-collective condition

This is Green. This is Blue.   Green is raising his hand.   Is Blue raising his hand, too?
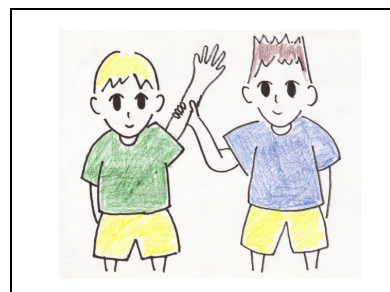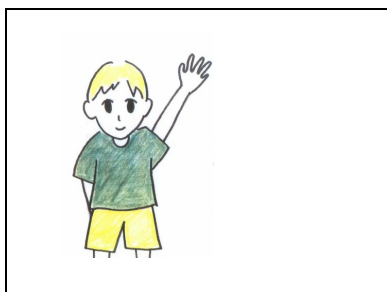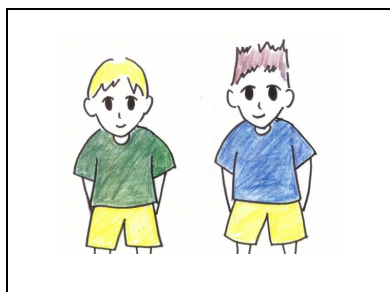
b. BPN-distributive condition

This is Pink. This is Yellow.   Pink is raising her hand.   Is Yellow raising her hand, too?
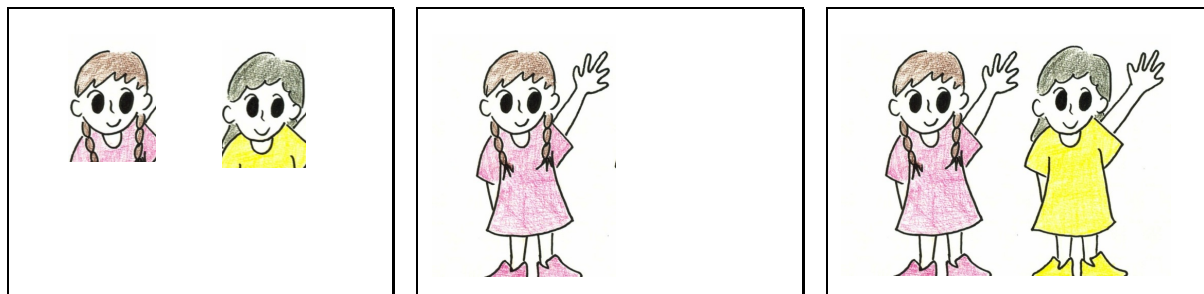
Responses to these two conditions should be interpreted differently. A "no"-response to (24a) indicates that a BV interpretation is assigned to the possessive pronoun in the question. It is interpreted as a denial of the statement "Blue is raising his (=Blue's) hand." Blue is raising Green's hand, and hence the statement becomes false under the situation depicted in the picture. A "yes"-response to (24a), on the other hand, indicates the assignment of an FV interpretation to the possessive pronoun. It is interpreted as an approval of the statement "Blue is raising his (=Green's) hand." Blue is actually raising Green's hand and the statement becomes true under the situation. A "no"-response to (24b) indicates an FV interpretation. It is interpreted as a denial of the statement "Yellow is raising Pink's hand." A "yes"-response to (24b), on the other hand, indicates a BV interpretation. It is interpreted as an approval of the statement "Yellow is raising Yellow's hand."

The BPN and non-BPN conditions were included in order to see if there is any semantic effect of head nouns: If they have any effect, a BV interpretation should be given more often to the items with a BPN than to those with a non-BPN; if not, there should be no difference between these two conditions. The collective and distributive conditions were included in order to see if children equally give both FV and BV interpretations. If "yes"-biases often observed with children are taken into consideration, "no"-responses have great importance because they can be taken as clear indication that these children are able to assign either one of the two interpretations.

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In addition to these two target items, items including a gender mismatch (GMM) between the subject and a possessive pronoun were also used (or a vehicle change (cf. Fiengo and May (1994)). These items were included in order to see if φ-features on a possessive pronoun and its phonetic realization have any impact on the interpretation: A gender mismatch would put a strong bias toward an FV interpretation if gender information on a possessive pronoun is used in an adult-like manner.

The following are examples of the items including a gender mismatch. (25a) and (25b) are minimally different from (24a) and (24b). They are different in the gender of the two people in the picture: One is female and the other is male in (25a) and (25b), while both are male in (24a) and female in (24b).

(25) a. GMM BPN-collective condition

This is Blue. This is Green.   Blue is pinching her nose.   Is Green pinching his nose, too?
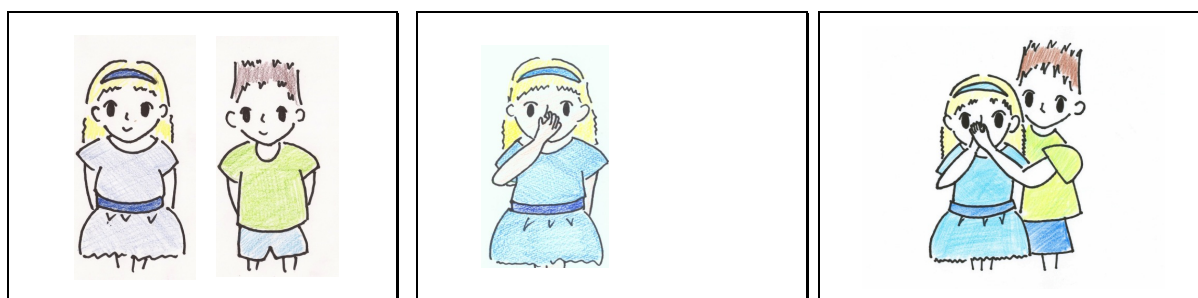
b. GMM BPN-distributive condition

This is Red. This is Blue.   Red is pulling her ear.   Is Blue pulling her ear, too?

Responses to each item can be interpreted as follows: A "no"-response to (25a) is ambiguous between a BV interpretation and an FV interpretation of a possessive pronoun. It indicates either one of the following two possibilities. One possibility is that a BV interpretation is forced by the gender information on the possessive pronoun in the target question, but the picture does not match the statement. It is interpreted as a denial of the statement "Green is pinching his (=Green's) nose." Green is pinching Blue's nose and the statement becomes false under the situation depicted in the picture. The other possibility is that an FV interpretation is forced by the picture, but the target question does not have an appropriate possessive pronoun. It is expected that the situation is described by a sentence with a feminine form of a possessive pronoun, but this expectation is not satisfied in the target question.[16] A "yes"-response to (25a), on the other hand, indicates the assignment of an FV interpretation in spite of the gender information on the possessive pronoun. It is interpreted as an approval of the statement "Green is pinching HER (=Blue's) nose." Green is pinching Blue's nose and the statement becomes true under the situation. Responses to (25b) are interpreted as follows: A "no"-response indicates an FV interpretation. It is interpreted as a denial of the statement "Blue is pulling Red's ear." A "yes"-response indicates a BV interpretation irrespective of the gender information. It is interpreted as an approval of the statement "Blue is pulling HIS(=Blue's) ear."

The combination of three factors (BPN vs. non-BPN, distributive vs. collective, Gender Match (GM) vs. Gender Mismatch (GMM)) gives eight experimental conditions in total. The following are examples of the non-BPN conditions: (26a-b) and (27a-b) are those of the GM conditions and the GMM conditions, respectively.

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[16] I would like to express my gratitude to Kinsuke Hasegawa and Takane Ito for their comments on the possible interpretation of response patterns for this condition.

(26) a. GM non-BPN-collective condition

This is Red. This is Blue.　　Red is raising his flag.　　Is Blue raising his flag, too?

b. GM non-BPN-distributive condition

This is Pink. This is Yellow.　Pink is raising her flag.　Is Yellow raising her flag, too?
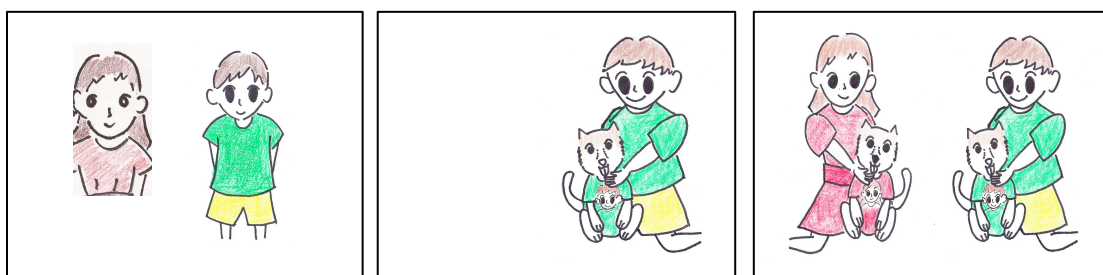

(27) a. GMM non-BPN-collective condition

This is Blue. This is Orange. Orange is making her rocket.　Is Blue making his rocket,

too?
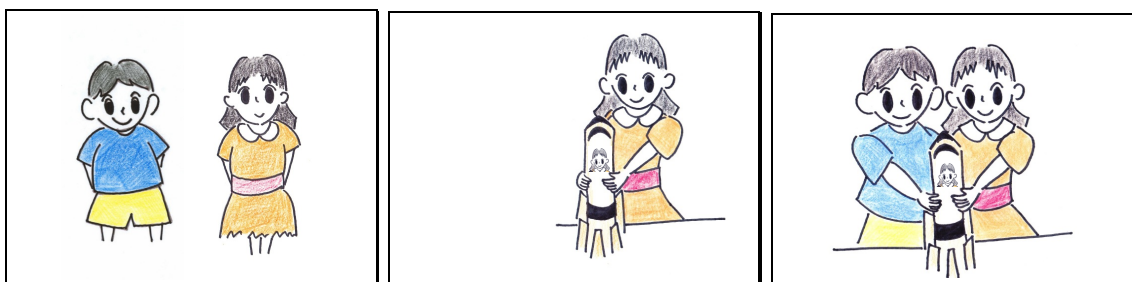
b. GMM non-BPN-distributive condition

This is Green. This is Red.   Green is petting his dog.   Is Red petting his dog, too?

What each response indicates for these target items is summarized in Table 6_11

Table 6_11: Correspondence between Response Patterns and Possible Interpretations

			YES-response	NO-response
GM	BPN	Collective (24a)	FV Interpretation	BV Interpretation
		Distributive (24b)	BV Interpretation	FV Interpretation
	non-BPN	Collective (26a)	FV Interpretation	BV Interpretation
		Distributive (26b)	BV Interpretation	FV Interpretation
GMM	BPN	Collective (25a)	FV Interpretation	BV Interpretation FV Interpretation
		Distributive (25b)	BV Interpretation	FV Interpretation
	non-BPN	Collective (27a)	FV Interpretation	BV Interpretation FV Interpretation
		Distributive (27b)	BV Interpretation	FV Interpretation

In addition to these target items, some filler items were also included in order to make sure that the children could give adult-like responses to simple sentences and that they were paying attention to what the experimenter said. The following are examples of filler items. An intransitive verb is used in (28a) and an indefinite noun is used as the object of a transitive verb in (28b).

(28) a. This is Green. This is Blue. Green is running. Is Blue running, too?

b. This is Green. This is Blue. Green is carrying a box. Is Blue carrying a box, too?

6.5.3   Results and Discussion

The data from the nineteen children, who completed the two sessions, were included in the results. All the children gave adult-like responses in the practice session and nearly 100% adult-like responses to the filler items.

The responses given to the target items were not as consistent as those to the filler items, which suggests that the interpretation of a possessive pronoun is difficult for children to learn. Tables 6_12 to 6_19 show the percentages of each response under each condition.

Table 6_12: Percentages of Each Response Type: The Gender-match (GM) BPN-distributive Condition (=(24b))

	BV responses (YES)	FV responses (NO)
3-year-olds (N=3)	100% (9/9)	0% (0/9)
4-year-olds (N=2)	100% (6/6)	0% (0/6)
5-year-olds (N=6)	100% (18/18)	0% (0/18)
6-year-olds (N=4)	100% (12/12)	0% (0/12)
7-year-olds (N=4)	100% (12/12)	0% (0/12)
Total (N=19)	100% (57/57)	0% (0/57)
Adults (N=11)	100% (11/11)	0% (0/11)

Table 6_13: Percentages of Each Response Type: The GM non-BPN-distributive Condition ((=(26b))

	BV responses (YES)	FV responses (NO)
3-year-olds (N=3)	100% (9/9)	0% (0/9)
4-year-olds (N=2)	100% (6/6)	0% (0/6)
5-year-olds (N=6)	100% (18/18)	0% (0/18)
6-year-olds (N=4)	100% (12/12)	0% (0/12)
7-year-olds (N=4)	91.7% (11/12)	8.3% (1/12)
Total (N=19)	98.2% (56/57)	1.8% (1/57)
Adults (N=11)	100% (11/11)	0% (0/11)

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Table 6_14: Percentages of Each Response Type: The Gender-mismatch (GMM) BPN-distributive Condition (=(25b))

	BV responses (YES)	FV responses (NO)
3-year-olds (N=3)	88.9% (8/9)	11.1% (1/9)
4-year-olds (N=2)	83.3% (5/6)	16.7% (1/6)
5-year-olds (N=6)	83.3% (15/18)	16.7% (3/18)
6-year-olds (N=4)	100% (12/12)	0% (0/12)
7-year-olds (N=4)	100% (12/12)	0% (0/12)
Total (N=19)	91.2% (52/57)	8.8% (5/57)
Adults (N=11)	9% (1/11)	91% (10/11)

Table 6_15: Percentages of Each Response Type: The GMM non-BPN-distributive Condition ((=(27b))

	BV responses (YES)	FV responses (NO)
3-year-olds (N=3)	100% (9/9)	0% (0/9)
4-year-olds (N=2)	83.3% (5/6)	16.7% (1/6)
5-year-olds (N=6)	83.3% (15/18)	16.7% (3/18)
6-year-olds (N=4)	100% (12/12)	0% (0/12)
7-year-olds (N=4)	75% (9/12)	25% (3/12)
Total (N=19)	87.7% (50/57)	12.3% (7/57)
Adults (N=11)	9% (1/11)	91% (10/11)

Table 6_16: Percentages of Each Response Type: The GM BPN-collective Condition ((=(24a))

	BV responses (NO)	FV responses (YES)
3-year-olds (N=3)	55.6% (5/9)	44.4% (4/9)
4-year-olds (N=2)	66.7% (4/6)	33.3% (2/6)
5-year-olds (N=6)	83.3% (15/18)	16.7% (3/18)
6-year-olds (N=4)	100% (12/12)	0% (0/12)
7-year-olds (N=4)	50% (6/12)	50% (6/12)
Total (N=19)	73.7% (42/57)	26.3% (15/57)
Adults (N=11)	45.4%(5/11)	54.6%(6/11)

Table 6_17: Percentages of Each Response Type: The GM non-BPN-collective Condition ((=26a))

	BV responses (NO)	FV responses (YES)
3-year-olds (N=3)	33.3% (3/9)	66.7% (6/9)
4-year-olds (N=2)	50% (3/6)	50% (3/6)
5-year-olds (N=6)	61.1% (11/18)	38.9% (7/18)
6-year-olds (N=4)	100% (12/12)	0% (0/12)
7-year-olds (N=4)	50% (6/12)	50% (6/12)
Total (N=19)	61.4% (35/57)	38.6 % (22/57)
Adults (N=11)	18.1%(2/11)	81.9%(9/11)

Table 6_18: Percentages of Each Response Type: The GMM BPN-collective Condition ((=(25a))

	BV / FV responses (NO)	FV responses (YES)
3-year-olds (N=3)	55.6% (5/9)	44.4% (4/9)
4-year-olds (N=2)	50% (3/6)	50% (3/6)
5-year-olds (N=6)	88.9% (16/18)	11.1% (2/18)
6-year-olds (N=4)	100% (12/12)	0% (0/12)
7-year-olds (N=4)	58.3% (7/12)	41.7% (5/12)
Total (N=19)	75.4% (43/57)	24.6%(14/57)
Adults (N=11)	100% (11/11)	0% (0/11)

Table 6_19: Percentages of Each Response Type: The GMM non-BPN-collective Condition ((=27a))

	BV / FV responses (NO)	FV responses (YES)
3-year-olds (N=3)	33.3% (3/9)	66.7% (6/9)
4-year-olds (N=2)	50% (3/6)	50% (3/6)
5-year-olds (N=6)	83.3% (15/18)	16.7% (3/18)
6-year-olds (N=4)	100% (12/12)	0% (0/12)
7-year-olds (N=4)	58.3% (7/12)	41.7% (5/12)
Total (N=19)	70.2% (40/57)	29.8% (17/57)
Adults (N=11)	91%(10/11)	9%(1/11)

These results show interesting facts with respect to the differences between adults and children as in (29).

(29) Differences between Children and Adults:

    i. Under the Distributive Condition (see Table 6_12-Table 6_15)

    A clear difference was observed between the children and the adults with respect to the GMM condition irrespective of the semantic types of head nouns.

    ii. Under the Collective Condition (see Table 6_16-Table 6_19)

    A clear difference was observed with respect to the GMM condition irrespective of the semantic types of head nouns, and with respect to the GM condition depending on the semantic types of head nouns.

Under the distributive condition, no difference was observed between the BPN condition and the non-BPN condition, but a clear difference was observed between the adults and the children under the GMM condition. Most of the children gave non-adultlike responses under this condition, while they gave adult-like responses almost 100% of the time under the GM condition: The children tended to give "yes"-responses, while, except for one, the adults consistently gave "no"-responses under the GMM condition (see Table 6_14 and Table 6_15); on the other hand, both the children and the adults almost consistently gave "yes"-responses under the GM condition (see Table 6_12 and Table 6_13).

According to the results of two-factor factorial ANOVAs, the main effect of the semantic factor (BPN vs. non-BPN) was not significant ($F(1, 28) = 0.126$, $p = .72$, $\eta^2 = .002$) and there was no significant interaction between the semantic factor and the age factor (children vs. adults) ($F(1, 28) = 0.126$, $p = .72$, $\eta^2 = .02$). In contrast, the main effect of the gender factor (GMM vs. GM) was very significant ($F(1, 28) = 241.9$, $p < .0001$, $\eta^2 = .89$) and a large significant interaction was observed between the gender factor and the age factor ($F(1, 28) = 241.9$, $p < .0001$, $\eta^2 = .85$). These values suggest that the children's response patterns were almost adult-like with respect to the semantic effect of head nouns, but non-adultlike with respect to the effect of gender information. The main effect of the gender factor was observed only in the adults, which means that the children did not use gender information in an adult-like manner.

Different response patterns were observed under the collective condition, especially with respect to the GM condition. Under the GMM collective condition, a similar response pattern to the GMM distributive condition was observed between the adults and the children: The children tended to give more "yes"-responses than the adults. The adults almost consistently gave "no"-responses (see Table 6_18 and Table 6_19). Differing from the distributive condition, however, the children gave more "no"-responses under the collective condition. This makes their response pattern seem more adult-like. For example, compare the GMM BPN-distributive condition and the GMM BPN-collective condition (see Table 6_14 and Table 6_18). Under the former condition, the children gave "yes"-responses almost 100% of the time, while they gave fewer "yes"-responses under the latter condition. Although they still gave more "yes"-responses than the adults, they gave more "no"-responses than "yes"-responses (see Table 6_18). The same is true for the GMM non-BPN-collective condition (see Table 6_19).

Under the GM collective condition, the effect of semantic properties of head nouns shows up. A clear difference between the children and the adults was observed under the non-BPN condition, while the difference was more obscure under the BPN condition: Under the non-BPN condition, the adults tended to give more "yes"-responses, while under the BPN condition, their responses were almost fifty-fifty (see Table 6_16 and Table 6_18). A similar pattern was observed with the children, although the effect is not so strong: the children tended to give more "yes"-responses in the non-BPN condition than in the BPN condition, although the rates were lower than for the adults' (see Table 6_16 and Table 6_18). The children tended to give more "no"-responses to the BPN condition than the adults (see Table 6_16).

According to the results of two-factor factorial ANOVAs, the main effect of the semantic factor was significant and the effect size was medium ($F(1, 28) = 14.3$, $p < .001$, $\eta^2 = .34$). There was little or no significant interaction between the semantic factor and the age factor ($F(1, 28) = 1.74$, $p = .2$, $\eta^2 = .06$). These values show that the semantic factor had a significant effect under the Collective Condition, and the effect was observed both in the children and in

the adults. The main effect of the gender factor was also significant and the effect size was medium, on the larger side of medium ($F(1, 28) = 29.8$, $p < .0001$, $\eta^2 = .52$). Also, there was a medium interaction between the gender factor and the age factor ($F(1, 28) = 21.4$, $p < .0001$, $\eta^2 = .43$). These values again suggest that the children's response patterns were almost adultlike with respect to the semantic effect, but non-adultlike with respect to the effect of gender information.

These results suggest the following with respect to child grammar of English.

(30) a. Child grammar of English is different from adult grammar of English in that a bias toward a BV interpretation is stronger in child grammar than in adult grammar.

b. Child grammar of English is similar to adult grammar of English in that the semantic distinction between BPNs and non-BPNs affects the interpretation of possessive pronouns. However, the semantic effect is not strong enough to make children biased toward an FV interpretation with non-BPNs.

c. Child grammar of English is greatly different from adult grammar of English in that gender information of possessive pronouns does not affect the interpretation of possessive pronouns in child grammar.

First, consistently observed in children's response pattern is that child grammar is biased toward a BV interpretation. With a few exceptions, the children's BV-responses were more frequent than FV-responses. [17]

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[17] It should be noted that the target sentence itself is biased toward a distributive interpretation because of the meaning of "too" and of the situation depicted in the second picture presented before the target sentence and the third picture. Consider, for example, the sentences and pictures in (26a). The description of the second picture has the possessive pronoun *his*. In this picture, Red is raising his own flag, which biases toward a BV interpretation of the possessive pronoun. If the structural parallelism required by "too" in the target sentence strongly biases hearers toward a BV interpretation, it would be difficult for them to map the possessive pronoun in the target sentence onto an FV. The effect of this bias on the experimental results should be taken into consideration. Such an effect might be avoidable if the second picture is biased toward an FV interpretation of a possessive pronoun. For example, if the second picture in (26a) is replaced by one in which Red is holding Blue's flag, it might be easy for

Second, children seem to make a distinction between BPNs and non-BPNs, but the semantic effect is not as strong as it is in adult grammar. As a whole, the children tended to give a BV interpretation to the items with a BPN slightly more often than to those with a non-BPN. However, the semantic effect is not strong enough to make an FV interpretation with a non-BPN more appropriate or salient in a given context than a BV interpretation (see Table 6_16 and Table 6_17). The adults gave more FV responses under the non-BPN condition than under the BPN condition when the sentence was truly ambiguous and it could be true under the given situation: They gave more "yes"-responses to (27a) than to (25a). On the other hand, the children gave more BV responses even under the non-BPN condition: They tended to give more "no"-responses to these two items.

Finally, child grammar of English is different from adult grammar of English in that gender information of possessive pronouns is not used in computing their interpretation in child grammar. The children's response pattern was not different between the GM and the GMM conditions, while the adults' response pattern was clearly different between these two conditions.

6.6 Summary

The previous three sections presented our experimental results on the acquisition of the English BPN object construction. The findings obtained through our experiments are briefly summarized as follows.

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hearers to map the possessive pronoun in the target sentence onto an FV. However, we have to be careful about what a "yes"-response to the target question implies in this situation: It is still ambiguously interpreted as a result of a BV interpretation or an FV interpretation of the possessive pronoun. Although a preference for a BV interpretation might be induced by the experimental design, my claim that the experimental results supported the NIA and Economy of Encoding still holds because the effect of semantic properties of head nouns was observed in children's responses: They assigned a BV interpretation more often to the BPN conditions than to the non-BPN conditions. I would like to design a new experiment in order to provide more convincing evidence for my claim. I would like to express my gratitude to Takane Ito for her comments on the experimental design.

(31) a. Both BV and FV (or discourse bound) interpretations of possessive pronouns seemed to be equally available for the children. The effect of semantic properties of head nouns was observed, but it was not strong. (Section 6.3)

b. The children did not use number information of head nouns in an adult-like manner even at the age of eight. Their correct performance on the singular condition (which had number mismatch) was below the chance-level even in the groups of children who could deny singular interpretation of (in)definite plurals (N-Group). These children seemed to have already learned the number morphology on nominals, but still accepted singular interpretation of plurals in the BPN object construction. (Section 6.4)

c. Children's strong preference for a BV interpretation was observed. The effect of semantic properties of head nouns was also observed, but it was not as strong as in adult grammar.

The children seemed to ignore gender information on possessive pronouns and tended to give a BV interpretation even if the context itself was strongly biased against that interpretation. (Section 6.5)

Although there still remains inconsistency between the results of Experiment 1 and Experiment 3 about the availability of an FV interpretation, these findings suggest that child grammar of English differs from adult grammar of English in the following three respects.

(32) a. Although children are sensitive to the semantic distinction between BPNs and non-BPNs, the effect of the semantic distinction is not strong. It cannot make an FV interpretation more appropriate or natural than a BV interpretation even if a given context is biased toward the former interpretation.

b. Children cannot use number information of head nouns in an adult-like manner, even if they are aware of number morphology.

c. Children are insensitive to gender information of a possessive pronoun.

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Given such differences, a question arises as to how English children attain an adult grammar of English. In order to answer this question, it is worth comparing child grammar of English with that of Japanese. The facts observed by the three experiments ((32a-c)) indicate that child grammar of English is quite similar to that of Japanese: Early sensitivity to the distinction between BPNs and non-BPNs is observed both in Japanese and English. However, the semantic effect is not as strong as in adult grammar in both languages; children cannot assign an FV interpretation to the non-BPN object construction as often as adults, because they cannot make up a context which makes an FV interpretation more appropriate than a BV interpretation. In other words, Economy of Encoding is at work both in child grammar of Japanese and in that of English. If so, what has to be explained is how English children, who start with a grammar similar to that of Japanese, attain an adult grammar of English. How much is given to them and how much should be learned based on language particular properties? What principles guide them to an appropriate adult grammar? The following chapters will consider these questions, based on further experimental evidence on Japanese children.

Chapter 7

The Acquisition of the BPN Object Construction in Japanese:

A Follow-up Study

7.1 Introduction

This chapter presents the results of a follow-up study conducted on Japanese children. As presented in Chapter 5 and Chapter 6, the predictions made by our analysis seem to be supported from the viewpoint of language acquisition: Children show early sensitivity to the distinction between BPNs and non-BPNs; Economy of Encoding is at work as a guiding principle in language acquisition. The data presented in Chapter 6 has shown that early child grammar of English is quite similar to that of Japanese. This leads us to the following question with respect to the similarity between child English and Japanese: Do English and Japanese children show the same response pattern irrespective of the presence/absence of morpho-phonological realization of number and gender marking? In order to answer this question, a follow-up study was conducted on Japanese children. In this study, the same experimental materials as those used in Experiment 3 were employed.[1]

7.2 A Follow-up Experiment: Does Non-linguistic Gender Information Affect Children's Interpretation of the BPN Object Construction?

This section provides new results from our experiment which investigated whether Japanese children's response pattern is similar to that of English children when the same experimental materials are used.

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[1] It would be ideal if we could see how Japanese children interpret number on bare nominals. However, it is hard to design an experiment which induces "no"-responses, because Japanese bare nominals allow both singular and plural interpretation. For these reasons, no follow-up study was conducted on Japanese children with the experimental materials used in Experiment 2.

7.2.1   Predictions

The experimental findings presented so far provide us with the following predictions with respect to Japanese children's response patterns.

(1) a. BV Interpretation vs. FV Interpretation

Children tend to prefer a distributive situation, which corresponds to a BV interpretation of a null possessor. Children should give more "yes"-responses than "no"-responses under each distributive condition and more "no"-responses than "yes"-responses under each collective condition.

b. BPN Object Condition vs. non-BPN Object Condition

Children tend to give a BV interpretation more often to the BPN object than to the non-BPN object. The same effect should be observed irrespective of the difference in experimental tasks and in languages used in the experiment.

c. GM Condition vs. GMM Condition

The target items in Japanese do not include any morpho-phonologically realized possessive pronoun. No gender information is available for children in the target sentences. Japanese children do not have to care about it, and hence no difference between the GM condition and the GMM condition should be expected.

If early child grammar of English children is similar to that of Japanese, it is expected that the preference for the BV interpretation with the BPN object is observed. Also, no difference should be expected between the GM condition and the GMM condition.

7.2.2   Participants, Procedure and Experimental Conditions

Participants

Sixteen children participated and among them, fifteen children completed the experiment (five 5-year-olds, five 4-year-olds, five 3-year-olds).

Procedure

This experiment was conducted following a similar procedure to Experiment 3. The experiment was divided into two sessions and before the two test sessions, all children participated in a brief practice session in order to make sure that they understood the task and could make adult-like judgments for simple *yes-no* questions. Examples of the sentences and pictures for the practice are as follows:

(2) a. Kimidori-kun-wa   kutu-o   hai-te-iru   ne.

     Pale-Green-KUN-Top shoes-ACC   wear-Pres.Prog   Part

     "Pale green is wearing shoes."

   b. Midori-kun-wa   kutu-o   hai-te-iru   kana?   I-nai   kana?

     Green-KUN-Top   shoes-Acc   wear-Pres.Prog   Q   Prog-Neg   Q

     "Is Green wearing shoes, or not?"
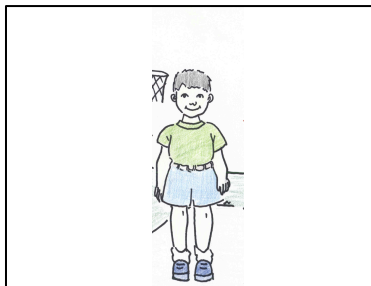
   a.   b.
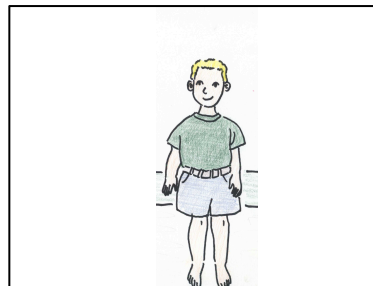
(3) a. Ao-tyan-wa   nekkuresu-o   si-te-nai   ne.

     Blue-TYAN-Top necklace-Acc   wear-Pres.Prog-Neg   Part

     "Blue isn't wearing a necklace."

   b. Pinku-tyan-wa   nekkuresu-o   si-te-iru   kana?   I-nai   kana?

     Pink-TYAN-Top necklace-Acc   wear-Pres.Prog   Q   Prog-Neg   Q

     "Is Pink wearing a necklace, or not?"
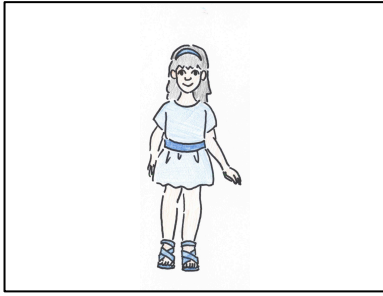
a.   b.
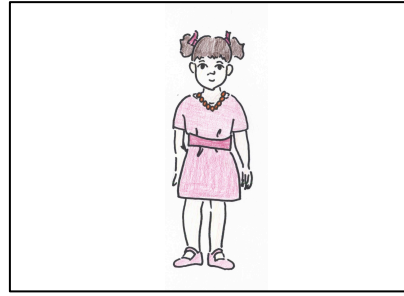
In addition, two practice items were given at the beginning of each session. The two practice items given in (4) and (5) correspond to those used in Experiment 3 (see (23) in Chapter 6).

(4) a.   Kono-ko-wa   Orenzi-tyan.   Kono-ko-wa   Murasaki-tyan   desu.

           This-child-Top   Orange-TYAN   This-child-Top   Purple-TYAN   is

           "This is Orange. This is Purple."

    b. Orenzi-tyan-wa   warat-te-iru   ne.

       Orange-TYAN-Top   smile-Pres.Prog   Part

       "Orange is smiling."

    c. Murasaki-tyan-mo warat-te-iru   kana?   I-nai   kana?

       Purple-TYAN-too smile-Pres.Prog   Q   Prog-Neg   Q

       "Is Purple smiling, too, or not?"
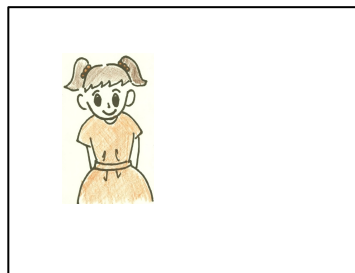
a.   b.   c.

(5) a.   Kono-ko-wa   Midori-kun.   Kono-ko-wa   Ao-kun   desu.

           This-child-Top   Green-KUN   This-child-Top   Blue-KUN   is

           "This is Green. This is Blue."

b. Midori-kun-wa   warat-te-iru   ne.

Green-KUN-Top smile-Pres.Prog   Part

"Green is smiling."

c. Ao-kun-mo   wara-te-iru   kana?   I-nai   kana?

Blue-KUN-too   smile-Pres.Prog   Q   Prog-Neg   Q

"Is Blue smiling, too, or not?"

a.   b.   c.
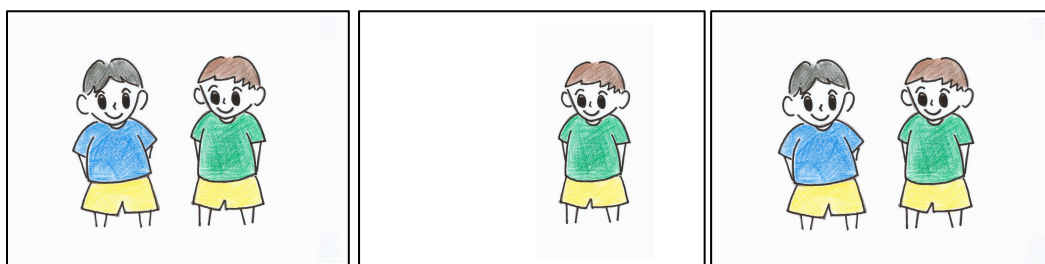
In addition to these target and practice items, four filler items were also included in order to make sure that the children could give adult-like responses to simple VP-ellipsis sentences and that they were paying attention to what the experimenter said. The following are examples of filler items. These filler items also correspond to those used in Experiment 3 (see (28) in Chapter 6).

(6) a. Kono-ko-wa   Midori-kun.   Kono-ko-wa   Ao-kun   desu.

This-child-Top Green-KUN   This-child-Top   Blue-KUN   is

"This is Green. This is Blue."

Midori-kun-wa   hasit-te-iru   ne.

Green-KUN-Top   run-Pres.Prog   Part

"Green is running."

Ao-kun-mo   hasit-te-iru   kana?   I-nai   kana?

Blue-KUN-too   run-Pres.Prog   Q   Prog-Neg   Q

"Is Blue running, too, or not?"

b. Kono-ko-wa   Midori-kun.   Kono-ko-wa   Ao-kun   desu.

   This-child-Top Green-KUN This-child-Top   Blue-KUN   is

  "This is Green. This is Blue."

   Midori-kun-wa   hako-o   mot-te-iru   ne.

   Green-KUN-Top   box-Acc   carry-Pres.Prog   Part

  "Green is carrying a box."

    Ao-kun-mo   hako-o   mot-te-iru   kana?   I-nai   kana?

    Blue-KUN-too   box-Acc   carry-Pres.Prog   Q   Prog-Neg   Q

   "Is Blue carrying a box, too, or not?"

  For the target items, a series of three pictures was presented with a simple introduction. After the introduction, a simple *yes-no* question was given. The task for children was to answer each question by saying "yes" or "no."

Experimental Conditions

   This experiment had the same experimental conditions as Experiment 3. The pictures presented to children were identical to those used in Experiment 3. However, the target sentences differ from those used in Experiment 3 in their morpho-syntactic properties. To illustrate, consider the following example.

(7) GM BPN-collective Condition

    a.   Kono-ko-wa   Midori-kun.   Kono-ko-wa   Ao-kun   desu.

       This-child-Top   Green-KUN.   This-child-Top   Blue-kun   is.

      "This is Green. This is Blue."

    b.   Midori-kun-wa   te-o   age-te-iru-ne.

       Green-KUN-Top hand-Acc   raise-Pres.Prog-Part

      "Green is raising his hand."

c. Ao-kun-mo   age-te-iru   kana?   I-nai   kana?

Blue-KUN-too   raise-Pres.Prog   Q   Prog-Neg   Q

"Is Blue raising his hand, too, or not?"
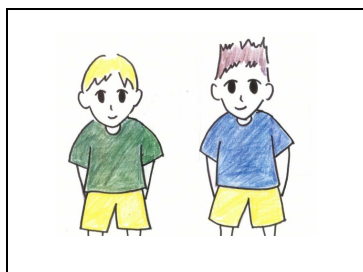
a.   b.   c.
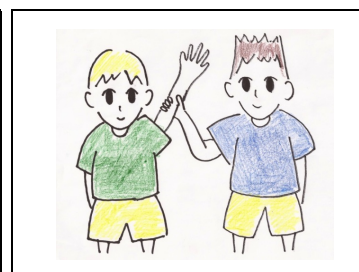
The materials used in Japanese were different from those used in English in the following two respects. The EPC was used in a description and a sentence with object drop was used as a target question. As already explained in Chapter 2, Japanese does not require a possessive form of a pronoun to be realized with a possessed noun. Although it is possible to describe the situation using a possessive form *kare-no* or *zibun-no* ('his'), it is more natural to omit such an expression. For this reason, in the description of the second picture, the possessed noun without any possessive expression was used as in (7b). Also, Japanese can easily omit any argument. It is possible to repeat the object noun, but it is more natural to omit it. Thus, a sentence with object drop was used in the target question as in (7c).

   Except for these morpho-syntactic differences, there was no difference in the experimental conditions between this experiment and Experiment 3. The following are examples and translations of the target items.

(8) GM BPN-distributive Condition

   a. Kono-ko-wa   Pinku-tyan.   Konoko-wa   Kiiro-tyan   desu.

   This-child-Top   Pink-TYAN   This-child-Top   Yellow-TYAN   is

   "This is Pink. This is Yellow."

b. Pinku-tyan-wa　　te-o　　　age-te-iru　　　ne.

Pink-TYAN-Top　　hand-Acc　　raise-Pres.Prog　　Part

"Pink is raising her hand."

c. Kiiro-tyan-mo　　te-o　　　age-te-iru　　kana?　I-nai　　kana?

Yellow-TYAN-too　hand-Acc　raise-Pres.Prog　Q　　Prog-Neg　Q

"Is Yellow raising her hand, too, or not?"

a.　　　　　　　　　b.　　　　　　　　c.
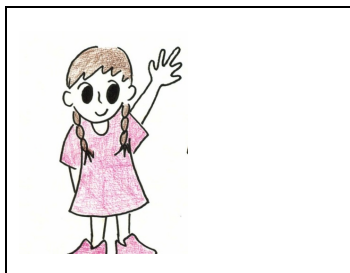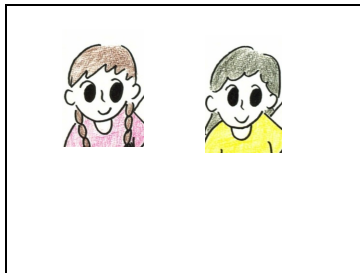
(9) GM non-BPN-collective Condition

a. Kono-ko-wa　　Aka-tyan.　　　Kono-ko-wa　　　Ao-tyan　　desu.

This-child-Top Red-TYAN　　This-child-Top　　Blue-TYAN　is

"This is Red. This is Blue."

b. Aka-tyan-wa　　　hata-o　　　age-te-iru　　　ne.

Red-TYAN-Top　　flag-Acc　　raise-Pres.Prog　　Part

"Red is raising his flag."

c. Ao-tyan-mo　　　age-te-iru　　kana?　I-nai　　　kana?

Blue-TYAN-too　　raise-Pres.Prog　Q　　Prog-Neg　Q

"Is Blue raising his flag, too, or not?"

a.　　　　　　　　　b.　　　　　　　　c.

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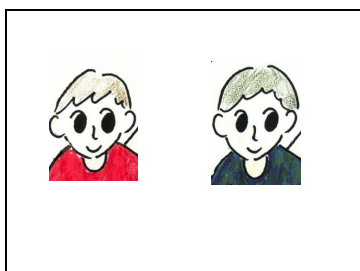
(10) GM non-BPN-distributive Condition

    a. Kono-ko-wa   Pinku-tyan.   Kono-ko-wa   Kiiro-tyan   desu.

       This-child-Top   Pink-TYAN   This-child-Top   Yellow-TYAN   is

       "This is Pink. This is Yellow."

    b. Pinku-tyan-wa   hata-o   age-te-iru   ne.

       Pink-TYAN-TOP flag-Acc   raise-Pres.Prog   Part

       "Pink is raising her flag."

    c. Kiiro-tyan-mo   age-te-iru   kana?   I-nai   kana?

       Yellow-TYAN-too raise-Pres.Prog   Q   Prog-Neg   Q

       "Is Yellow raising her flag, too, or not?"

  a.   b.   c.
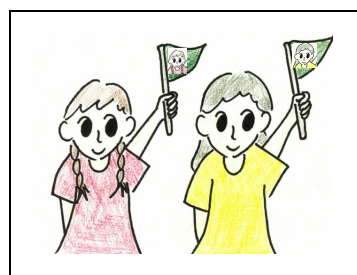
(11) GMM BPN-collective Condition

    a. Kono-ko-wa   Ao-tyan.   Kono-ko-wa   Midori-kun desu.

       This-child-Top   Blue-TYAN   This-child-Top   Green-KUN is

       "This is Blue. This is Green."

    b. Ao-tyan-wa   hana-o   tuman-de-iru ne.

       Blue-TYAN-TOP nose-ACC   pinch-Pres.Prog   Part

        "Blue is pinching her nose."

    c. Midori-kun-mo   tuman-de-iru   kana?   I-nai   kana?

       Green-KUN-too   pinch-Pres.Prog Q   Prog-Neg   Q

       "Is Green pinching *pro* nose, too, or not?"

203
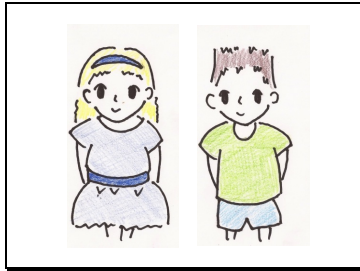
a.   b.   c.

(12) GMM BPN-distributive Condition

   a.   Kono-ko-wa   Aka-tyan.   Kono-ko-wa   Ao-kun-desu.

       This-child-Top   Red-TYAN This-child-Top   Blue-KUN-is

       "This is Red. This is Blue."

   b.   Ao-kun-wa   mimi-o sawat-te-iru   ne.

       Blue-KUN-Top   ear-Acc touch-Pres.Prog   Part

       "Blue is touching his ear."

   c.   Aka-tyan-mo   sawat-te-iru   kana?   I-nai   kana?

       Red-TYAN-too   touch-Pres.Prog   Q   Prog-Neg   Q

       "Is Red touching *pro* ear, too, or not?"
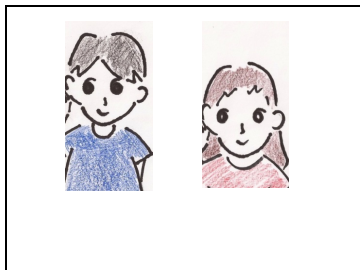
a.   b.   c.

(13) GMM non-BPN-collective Condition

   a.   Kono-ko-wa   Ao-kun.   Kono-ko-wa   Orenzi-tyan   desu.

       This-child-Top   Blue-KUN   This-child-Top   Orange-TYAN   is

       "This is Blue. This is Orange."

b. Orenzi-tyan-wa   roketto-o   tukut-te-iru   ne.

Orange-TYAN-Top   rocket-Acc   make-Pres.Prog   Part

"Orange is making her rocket."

c. Ao-kun-mo   tukut-te-iru   kana?   I-nai   kana?

Blue-KUN-too   make-Pres.Prog   Q   Prog-Neg   Q

"Is Blue making *pro* rocket, too, or not?"
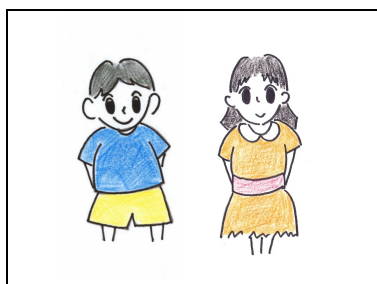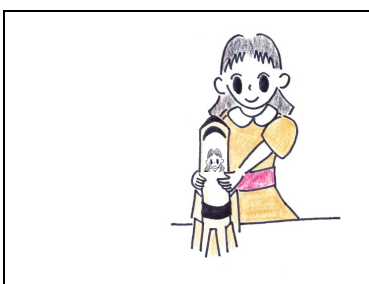
a.   b.   c.
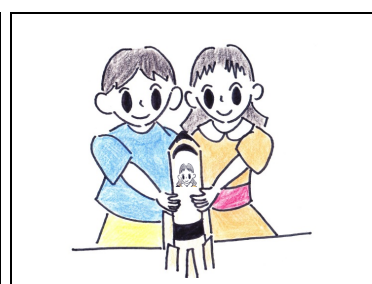
(14) GMM non-BPN-distributive Condition

a. Kono-ko-wa   Midori-kun.   Kono-ko-wa   Aka-tyan   desu.

This-child-Top   Green-KUN   This-child-Top   Red-TYAN   is

"This is Green. This is Red."

b. Midori-kun-wa   inu-o   nade-te-iru   ne.

Midori-KUN-Top   dog-Acc   pet-Pres.Prog   Part

"Green is petting his dog."

c. Aka-tyan-mo   nade-te-iru   kana?   I-nai   kana?

 Red-TYAN-too   pet-Pres.Prog   Q   Prog-Neg   Q

"Is Red petting *pro* dog, too, or not?"

a.   b.   c.

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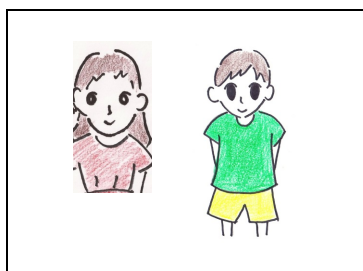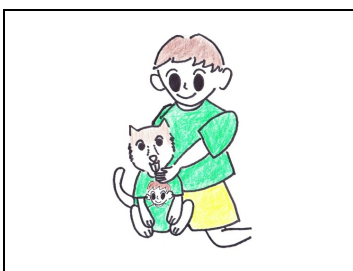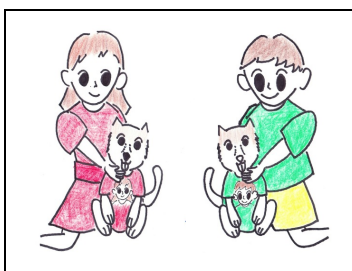
What each response indicates for these target items is summarized in Table 7_1.

Table 7_1: Correspondence between Response Patterns and Possible Interpretations

			YES-response	NO-response
GM	BPN	Collective (7c)	FV Interpretation	BV Interpretation
		Distributive (8c)	BV Interpretation	FV Interpretation
	non-BPN	Collective (9c)	FV Interpretation	BV Interpretation
		Distributive (10c)	BV Interpretation	FV Interpretation
GMM	BPN	Collective (11c)	FV Interpretation	BV Interpretation
		Distributive (12c)	BV Interpretation	FV Interpretation
	non-BPN	Collective (13c)	FV Interpretation	BV Interpretation
		Distributive (14c)	BV Interpretation	FV Interpretation

If we take into consideration the fact that children tend to give "yes"-responses when they are uncertain about their responses, children's "no"-responses are of special importance here. Their "no"-responses to each collective condition and each distributive condition positively show that they are assigning a BV interpretation and an FV interpretation, respectively, to a null possessor.

7.2.3   Results and Discussion

The data from the fifteen children, who completed the two sessions, were included in the results. All the children almost always gave 100% adult-like responses to the practice and the filler items.

Differing from the responses by English children, the responses given to the target items were much more consistent in the distributive condition, but not so consistent in the collective condition. Tables 7_2 to 7_9 show the percentages of each response under each condition.

Table 7_2: Percentages of Each Response Type: The GM BPN-distributive Condition (e.g. (8c))

	BV responses (YES)	FV responses (NO)
3-year-olds (N=5)	100% (15/15)	0% (0/15)
4-year-olds (N=5)	100% (15/15)	0% (0/15)
5-year-olds (N=5)	100% (15/15)	0% (0/15)
Total (N=15)	100% (45/45)	0% (0/45)

Table 7_3: Percentages of Each Response Type: The GMM BPN-distributive Condition (e.g. (12c))

	BV responses (YES)	FV responses (NO)
3-year-olds (N=5)	100% (15/15)	0% (0/15)
4-year-olds (N=5)	93.3% (14/15)	6.7% (1/15)
5-year-olds (N=5)	100% (15/15)	0% (0/15)
Total (N=15)	97.8% (44/45)	2.2% (1/45)

Table 7_4: Percentages of Each Response Type: The GM non-BPN-distributive Condition (e.g. (10c))

	BV responses (YES)	FV responses (NO)
3-year-olds (N=5)	100% (15/15)	0% (0/15)
4-year-olds (N=5)	100% (15/15)	0% (0/15)
5-year-olds (N=5)	100% (15/15)	0% (0/15)
Total (N=15)	100% (45/45)	0% (0/45)

Table 7_5: Percentages of Each Response Type: The GMM non-BPN-distributive Condition (e.g. (14c))

	BV responses (YES)	FV responses (NO)
3-year-olds (N=5)	100% (15/15)	0% (0/15)
4-year-olds (N=5)	100% (15/15)	0% (0/15)
5-year-olds (N=5)	100% (15/15)	0% (0/15)
Total (N=15)	100% (45/45)	0% (0/45)

Table 7_6: Percentages of Each Response Type: The GM BPN-collective Condition (e.g. (7c))

	BV responses (NO)	FV responses (YES)
3-year-olds (N=5)	60.0% (9/15)	40.0% (6/15)
4-year-olds (N=5)	86.7% (13/15)	13.3% (2/15)
5-year-olds (N=5)	40.0% (6/15)	60.0% (9/15)
Total (N=15)	62.2% (28/45)	37.8% (17/45)

Table 7_7: Percentages of Each Response Type: The GMM BPN-collective Condition (e.g. (11c))

	BV responses (NO)	FV responses (YES)
3-year-olds (N=5)	60.0% (9/15)	40.0% (6/15)
4-year-olds (N=5)	66.7% (10/15)	33.3% (5/15)
5-year-olds (N=5)	26.7% (4/15)	73.3% (11/15)
Total (N=15)	51.1% (23/45)	48.9% (22/45)

Table 7_8: Percentages of Each Response Type: The GM non-BPN-collective Condition (e.g. (9c))

	BV responses (NO)	FV responses (YES)
3-year-olds (N=5)	40.0% (6/15)	60.0% (9/15)
4-year-olds (N=5)	46.7% (7/15)	53.3% (8/15)
5-year-olds (N=5)	20.0% (3/15)	80.0% (12/15)
Total (N=15)	35.6% (16/45)	64.4% (29/45)

Table 7_9: Percentages of Each Response Type: The GMM non-BPN-collective Condition (e.g. (13c))

	BV responses (NO)	FV responses (YES)
3-year-olds (N=5)	33.3% (5/15)	66.7% (10/15)
4-year-olds (N=5)	26.7% (4/15)	73.3% (11/15)
5-year-olds (N=5)	13.3% (2/15)	86.7% (13/15)
Total (N=15)	24.4% (11/45)	75.6% (34/45)

One thing should be noted about the data before we analyze what the child responses tell us about child Japanese. Most of the children gave "yes"- or "no"-responses when they were asked the target questions, but some responded by saying *issyo(-ni)* or *hutari-de* ("together") instead of "yes" or "no." The following is an example of such a response.

(15) a. Kono-ko-wa   Midori-kun.   Kono-ko-wa   Ao-kun   desu.

      This-child-Top   Green-KUN   This-child-Top   Blue-KUN   is

      "This is Green. This is Blue."

   b. Midori-kun-wa   syasin-o   mot-te-iru   ne.

      Green-KUN-Top   picture-Acc   hold-Pres.Prog   Part

      "Green is holding his picture."

c.   Ao-kun-mo   syasin-o   mot-te-iru   kana?   I-nai   kana?

      Blue-KUN-too   picture-Acc hold-Pres.Prog   Q   Prog-Neg   Q

      "Is Blue holding *pro* picture, too, or not?

      CHILD 12 (4;09):   Issyo-ni si-te-ru

                       together do-Pres.Prog

                       "(They are) doing so together."

Two 4-year-old children gave this type of response often: CHILD 12 gave it to five out of twelve collective items and CHILD 13 did so to three. Although it is impossible to tell clearly what interpretation these children give to a null possessor, it is possible, at least, to infer that they were distinguishing the two situations, the distributive and the collective situations. They almost never gave additional comments nor "no"-responses to the target questions under the distributive condition, but they did so under the collective condition.[2] This can be taken as an indication of a denial of the target sentence under the situation depicted in the picture. These children, who might be tempted to assign a BV interpretation to a null possessor, thought some additional expression was necessary to make the sentence fit with the situation depicted in the picture. Considering that possibility, responses like (15a-c) were included as "no"-responses.

   We have the following results with respect to the predictions given in (1).

(16) a. BV Interpretation vs. FV Interpretation

    As a whole, the children tended to assign a BV interpretation. Almost all of the children consistently gave a "yes"-response to the distributive condition (see BV responses in Tables 7_2 to 7_5). The response pattern was not so consistent in the collective condition (see Tables 7_6 to 7_9), which suggests that the children were biased toward a BV

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[2] CHILD 13 gave a "no"-response to the item in (10).

interpretation even when they had to say "no": it would be easier for them just to accept the question which matches the picture, but they did not do so.

b. BPN Object Condition vs. non-BPN Object Condition

A semantic effect was observed. The children tended to give a BV interpretation to the items with a BPN more often than to those with a non-BPN (compare the results in Table 7_6 and Table 7_8, and Table 7_7 and Table 7_9). Such a tendency was observed strongly under the collective condition (t(14) = 5.8, p < 0.0001).

c. The Effect of Gender Mismatch

As expected, almost no difference was observed between the GM condition and the GMM condition under the distributive condition. A difference was observed under the collective condition: the children tended to give "yes"-responses more often under the GMM condition than the GM condition.

As suggested in (16), the predictions provided in (1) were mostly supported by the experiment.

Based on the results, further statistical analysis was conducted on the data in order to compare the results of English children and those of Japanese children. According to the results of two-factor factorial ANOVAs, the main effect of the semantic factor (BPN vs. non-BPN) was very significant and the effect size was large (F(1, 32) = 42. 798, p < .0001, η^2 = .57) although there was a medium-sized interaction between the semantic factor and the language factor (F(1, 32) = 10.912, p = .0024, η^2 = .25). In contrast, the main effect of the gender factor was not significant (F(1, 32) = 12.68, p = .3131, η^2 = .032), but there was a medium interaction between the gender factor and the language factor (F(1, 32) = 8.235, p = .007, η^2 = .021). These statistical data suggest that the semantic effect of head nouns was observed in both languages although the effect was stronger in Japanese than in English. They also show that the effect of gender information was not strong in either language although it seemed to have more impact in English than in Japanese.

This chapter presented the results of a follow-up study conducted on Japanese children. In addition to replicating the previous findings, the results have shown that gender information

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does not have much effect on the interpretation of null possessive pronouns. This is in conformity with our claim made in Chapter 6: Child grammar of English is similar to that of Japanese.

Chapter 8

Economy Principles and the Acquisition of the BPN Object Construction:

How Do English Children Attain Adult Grammar?

8.1 Introduction

The results of our experiments presented in Chapter 5, Chapter 6 and Chapter 7 have provided new findings about the BPN object construction in child grammar of Japanese and English. It has been shown that both Japanese children and English children are sensitive to the distinction between BPNs and non-BPNs and that Economy of Encoding is at work both in child grammar of Japanese and that of English. Furthermore, it has been argued that English children initially do not use number and gender information in an adult-like way. Taking into consideration another economy principle, Economy of Representation, this chapter considers the remaining questions left open so far: I) What makes child grammar of English similar to that of Japanese? II) How do English children ultimately attain an adult grammar of English? This principle ensures that every child successfully choose their target grammar among possible options given by UG. This principle was proposed by Pérez-Leroux and Roeper (1999) for the acquisition of nominal projections in English and adapted in Nakato-Miyashita and Roeper (2014). The same kind of notion was tacitly assumed in the literature on language acquisition. For example, Hyams (1996) made a similar argument for the acquisition of clausal structure.[1] The following sections consider a possible developmental path for English children to attain fully adult-like knowledge about the morpho-syntactic and semantic properties of the BPN object construction in English.

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[1] See also Radford (1990), Grimshaw (1997), and Rizzi (2000, 2005) among others.

8.2 An Explanation of the Acquisition of the BPN Object Construction in English

8.2.1   Gender and Number Information within a Nominal Projection

A rather natural explanation can be given to our experimental results if Economy of Representation is taken to be at work in language acquisition. The principle is repeated in (1).

(1) a. The initial state reflects an economic representation (e.g. NP).

     b. Non-economic representation carries language particular information (e.g. DP).

     c. Defaults represent economic representation.

     d. Default economic representations are universal.

(Pérez-Leroux and Roeper (1999:940))

The fact that not only number information, but also gender information is lacking (or tends to be ignored, to be more exact) in child grammar of English can be explained by the lack of a relevant functional projection or the under-specification of features of that projection. If it is true that children do indeed extend functional projections, setting parameters on them based on the evidence available, it is possible that the acquisition of number and gender information can be explained as proceeding stepwise along with the extension of functional projections. In order to specify a possible developmental path for English children, we have to consider where within a nominal projection gender and number information is encoded.

The assumption generally held, which is also adopted in this thesis, is that NP forms larger projections by extending functional projections above it (Abney (1987), Longobardi (2001), Schmitt and Munn (2002), Munn and Schmitt (2005)). A projection associated with number, such as NumP or ϕP, is included in projections above NP (Schmitt and Munn (2002), Sauerland (2003), Ihsane (2008)). In this thesis no commitment has been made with respect to a projection associated with gender, but some literature assumes such a projection as GenP or argues that gender information is encoded on the same head as number (Berstein (1993),

Alexiadou (2004), Carminati (2005), Alexiadou et. al (2007)). If a projection associated with gender is formed, it is normally situated above NP and under NumP.

It seems plausible to assume that there is a hierarchy of features, perhaps determined by cognitive salience and/or necessity for the definition of lexical meaning of a noun itself. Such a hierarchy determines the way children extend functional projections above NP, guided by Economy of Representation.[2,3] For a successful acquisition of the properties under discussion, it is necessary to further assume that the hierarchy of features and Economy of Representation is related not only to the development of a syntactic structure but also to the determination of feature specification of lexical items (Carminati (2005)). For example, the hierarchical order of the features relevant to our discussion is roughly illustrated in (2):

(2) DP ((in)definiteness) >> NumP (number) >> GenP (gender) >> NP

Definiteness, which is unlikely to be an inherent property of nominals, is situated highest in the hierarchy. Gender, which is often but not necessarily included in a lexical definition of nominals, is situated lowest: it is taken as an inherent property of animate entities and some words have gender information in their meaning itself. For example, the word *girl* has gender information [+female] in its definition. Number is in-between (see Alexiadou et. al. (2007:240), Carminati (2005: 263)). Not exactly but to a considerable extent, the acquisition of nominal properties follows the hierarchy. Children start with minimum information, namely, a lexical property of nominals, and then associate a morpheme to each functional projection, fixing its semantic and formal features, and finally reach the maximal projection. It takes a long time for English children to give an adequate interpretation to nominals in a

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[2] I would like to thank Sakumi Inokuma and Shun'ichiro Inada for their helpful comments about this point.

[3] There still remain many issues with respect to the acquisition of properties within a nominal projection. For example, how many functional projections are given by UG as available options? Do children project all of such functional projections even in the absence of morpho-phonological markers? These are interesting issues but this thesis does not go into them and leaves them open.

fully adult-like way because, in addition to detection of semantic and formal features associated with each functional projection, implicature computation is required, especially for number interpretation, and DP is necessary for that computation (Nakato-Miyashita and Roeper (2014)).

8.2.2   From an "NP"-language to a "DP"-language

With the assumptions made above, let us consider in more detail how English children attain adult grammar. First, children start with minimal projection universal to every language, namely NP. This is the stage at which children assemble features such as [±animate] into each noun. In other words, at this stage, children build up the lexicon for their target language, beginning with content/lexical words. Child grammar shows properties of root nouns and other properties given by a UG principle: The distinction between BPNs and non-BPNs and preference for a BV-interpretation are expected because the former is related to root nouns and the latter is provided as an initial choice by Economy of Encoding. This is the first stage which every child goes through irrespective of their target language. This makes child grammar of English quite different from adult grammar of English. At this stage, English children have a grammar with minimum functional information within a nominal phrase. Their grammar lacks functional information such as gender and number. In this sense, English children at this stage speak an "NP"-language like Japanese.[4]

After this stage, English children have to learn semantic properties of each functional projection/item, associate such properties with morphemes and set values of parameters, based on language-particular evidence. With respect to gender (and in part number), they have to learn a pronoun paradigm in English. Particularly, they have to learn that possessive pronouns in their grammar have gender inflection and a single morpho-phonological form bears multiple functions: one is simple realization of a null possessor after Agree and the

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[4] Whether or not Japanese has functional projections above NP is still a controversial issue. For an analysis which claims that Japanese is an NP-language which lacks functional projections, see Fukui (1986, 1988), Bošković (2005, 2008, 2009) and Bošković and Gajewski (2011).

other is a "true" pronoun with a referential function. ϕ-features of the former make no semantic contribution at or after the C-I interface, while those of the latter are lexically specified and make a semantic contribution in interpretation. In adult grammar, these two are often either phonologically distinguished or their distinction is sometimes made clear by accompanying gestures. A pronoun with a referential function often bears stress or is accompanied by pointing. Using these as a cue, English children have to find the two distinctive functions associated with a single morpho-phonological form. They also have to set the value of the parameter which requires phonetic realization of every edge of nominals proposed in Chapter 3 (see Section 3.3.1), repeated in (3).

(3) The Requirement of Obligatory Morpho-phonological Realization of the Edge of a Nominal Projection: Do not allow/Allow the left edge of a nominal projection to be left phonetically empty.

Regarding number, children have to learn the value associated with number morphology and its interpretation. At this point, let us consider what value is associated with number morphology (or the projection associated with number interpretation (see Sauerland (2003), Watanabe (2009)). A classical view is that [±singular] is the feature to be set on number morphology. If the value is set to [+singular], the morphology is given a singular interpretation and if the value is set to [−singular], the morphology receives a plural interpretation. However, exactly what meaning [−singular] has is not clear and still under debate. Under the most straightforward interpretation, [−singular] should mean "more than one," which excludes a singular interpretation. Under this view, a singular noun has a set of individuals as its extension, and a plural noun has a set of groups of these individuals (Bennett (1974), Schwarzschild (1996)). For example, if the extension of the singular form of "book" has three individuals, that of the plural form has four groups as in (4a-b).

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(4) a. [[book]] = {a, b, c}

  b. [[books]] = {a+b+c, a+b, a+c, b+c}   (Sauerland (2003))

However, as already mentioned in Chapter 3, Chapter 4 and Chapter 6, English plural forms do not necessarily exclude a singular interpretation. The examples are repeated here in (5).

(5) a. #Does a dog have tails?   (Sauerland et al. (2005))

  b. Does your office have windows?   (Sauerland et al. (2005))

  c. Who has children?   (Roeper (2007))

An alternative view (Sauerland (2003, 2005), Spector (2007)) is that the extension of a plural DP includes atomic individuals, and the interpretation of an indefinite plural induces a computation of implicature. Under this view, [+singular] is associated with an "exactly one" interpretation and [–singular] (or [+plural] in Sauerland's terminology) is associated with an interpretation which does not exclude singularity. The extension of a singular form has atomic individuals and the extension of a plural form also has atomic individuals as well as groups made up of the individuals. For example, the extension of a plural form of 'book' is like (6) instead of (4b).

(6) [[books]] = {a+b+c, a+b, a+c, b+c, a, b, c}

Under this view, the plural form is potentially ambiguous between singular and plural interpretations. When it is used in its bare form, its interpretation always induces implicature. For example, (5a) is not felicitous because an alternative form "a tail" should be used in this case, where the speaker should know the number of tails a dog has. In other words, when a bare plural form is used, a scalar alternative with a singular form is given in mental computation, and there should be a good reason to avoid the use of the singular alternative. Borrowing their terminology, the plural form is semantically less marked than the singular

form. The singular form should be used whenever its use is more felicitous because it has a more specific meaning, "exactly one." Adopting the second view, Nakato-Miyashita and Roeper (2014) argue that English children have to have a full projection of DP before they show fully adult-like knowledge about number information. Number morphology, which is assumed to be hosted by a Num head, may be associated with a feature [-singular] at some stage of acquisition, but in order to determine whether a given use of a plural form is appropriate or not, implicature has to be computed, and implicature computation has to take place after all semantic information of nominals, including definiteness, has become available, namely at DP. Under this view, the semantics of definite and bare plurals is distinguished only at the DP level, where a definite determiner picks up a maximal entity.

Given such a scenario, a question arises with respect to when English children start to make use of gender and number information and finally reach an adult grammar of English. We could get some information about this from the comments some children gave after saying "yes" or "no". First, children seem to start to pay attention to gender information, as well as phonological or associated information, on a possessive pronoun around the age of six. For example, as exemplified in (7a-b), some of the children around the age of six correct the incorrect utterances by the experimenter by using a correct form.[5] In giving this correction, almost all of them put a phonetic emphasis on the possessive pronoun. Much more interesting responses were given by one child (L). As shown in (7c-d), this child used a pointing action in order to make it clear which boy the child referred to. These responses were given under the GM-collective condition. Under this condition, each picture includes two boys and so this child tried to make his statement clear by pointing to one of the boys. This seems to show that the child was fully aware of gender information of a possessive pronoun and had come to know that its deictic use is different from the use as a bound variable.

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[5] Most of the children who consistently gave this type of correction were older than 5;11. L is the youngest among them.

(7) L (5;08)

(GMM-collective Condition)

     a. Is Green touching his nose?   No, he is touching HER nose.

     b. Is Green painting her picture?   No, he is painting HIS picture.

(GM-collective Condition)

     c. Is Blue brushing his teeth?   No, he is brushing HIS teeth together. (with pointing)

     d. Is Blue raising his flag?   No, he is raising HIS flag together. (with pointing)

Second, children come to make an adult-like judgment about number interpretation around the age of seven. As exemplified in (8) and (9), some children gave additional comments after their "yes/no"-responses. The comments in (8a) and (9a) suggest that these children made an adult-like judgment, using their knowledge about body-parts and computing implicature associated with plurals: People normally have one head or one nose, and so there is a more appropriate way to describe the situation, namely the use of a singular form of that body-part. The comments in (8b) and (9b,c) show that they made adult-like judgments based on the visual information available in the picture presented to them. Each person has two ears or arms, but only one of these body-parts is involved in the action. Here again, a more appropriate form should be used, namely a singular form.

(8) J (7;01)

     a. Is each boy touching his heads?   Yes, but he only has one.

     b. Is each girl raising her arms?   Yes, but one.

(9) L (7;04)

     a. Is each girl holding her noses?   No, they only have one nose.

     b. Is each boy pulling his ears?   No, puling one.

     c. Is each girl raising her arms?   Yes, but only one arm.

8.3 Summary

Based on all the new experimental findings presented from Chapter 5 to Chapter 7, this chapter considered the questions left unsolved in these chapters: Does the analysis of adult grammar provide a natural explanation for the observed difference between adults and children or between Japanese children and English children? As a more specific question, this chapter considered how English children, who are supposed to have a grammar quite similar to that of Japanese at the initial stage, attain an adult grammar of English. It was argued that to provide a natural explanation for a possible developmental path, the following additional assumptions are required with respect to the LAD and/or, more generally, the cognitive capacity of human beings. Features are hierarchically ordered and another economy principle, Economy of Representation, is at work in child grammar. Children start with a minimal (lexical) projection, which is assumed to be universal, and extend functional projections above it based on language particular-evidence. In doing so, children follow the hierarchical order of features/functional projections, which is provided by the LAD or their cognitive system. Guided by the mechanisms which facilitate language acquisition, English children start with NP. Using morpho-phonological evidence available to them, they extend functional projections and set parameters associated with them. English children have to set all features related to definiteness, number, and gender, and the maximal projection DP is necessary for them to attain fully adult-like grammar. Implicature, which is necessary to determine the appropriateness of a given form of nominal, is computed only at the DP level, but not below it. Only after children have come to know implicature-computation can their grammar reach an adult-like stage.

Chapter 9

Concluding Remarks

This thesis investigated the acquisition of the BPN object construction in English and Japanese, addressing the following six questions about adult and child grammar of these two languages.

(1) a. Does the BPN object construction in adult grammar of Japanese and that of English show syntactic and semantic properties similar to the EPC in Romance languages and/or the construction with a reflexive anaphor in Germanic languages?

   b. Are properties of the BPN object construction in these two languages also explained in terms of the principles which license reflexivity of predicates?

(2) What kind of principles need to be available in the LAD for the acquisition of the BPN object construction by English and Japanese children?

(3) a. Do the predictions made by the analyses of adult grammar hold in the acquisition of the BPN object construction?

   b. Is there any difference observed (i) between adult grammar and child grammar or (ii) between child grammar of English and that of Japanese?

   c. If any difference is observed, do the analyses of adult grammar provide a natural explanation for it?

In order to answer the questions in (1), investigation into adult Japanese and English was conducted. One plausible analysis was presented with respect to Japanese. This analysis was modified to explain cross-linguistic variation between Japanese and English, and two logically possible explanations were also considered for English. Before investigating the BPN object construction in child grammar, this thesis considered the question in (2). Two economy principles were introduced and it was argued that these two principles work as

guiding principles in language acquisition. In order to answer the questions in (3), some experiments on Japanese and English children were conducted.

With respect to the questions in (1), the following conclusions were reached.

(4)   a. The BPN object construction in Japanese and English shows similar properties to the EPC in Romance languages and/or the construction with a reflexive anaphor in Germanic languages. However, morphological variation is observed within a BPN phrase and on a BPN itself.

b. If the principles which license reflexivity of predicates are slightly modified, the semantic and syntactic properties of the BPN object construction in Japanese and English can be explained by these principles.

Observing that the BPN object construction in Japanese is subject to the semantic restrictions imposed on the EPC in Romance languages and the construction with a reflexive anaphor in Germanic languages, this thesis proposed a noun-incorporation analysis based on the Minimalist Program. In order to explain morpho-syntactic differences between the BPN object construction in Japanese and that in English, the noun-incorporation analysis was modified. English and Japanese differ in the following two respects. First, English requires a possessive pronoun within a BPN object phrase, while Japanese doesn't. Second, because number marking on a head noun is necessary in English, number agreement within a BPN object phrase is observed. Such agreement is not observed in Japanese because it does not mark number on a head noun. A parameter associated with the A-P interface was proposed to explain the first difference: English does not allow the edge of a nominal projection to be unpronounced, but Japanese does. With respect to the second difference, it was argued that an implicature associated with number marking on nominals is responsible for number agreement in English. Two logically possible explanations were also discussed.

For the question in (2), this thesis claimed that two economy principles are at work in language acquisition: Economy of Encoding and Economy of Representation. The former was proposed as a principle responsible for the choice of alternative anaphoric forms in adult grammar. The latter was proposed as a principle which determines the initial state of child grammar and possible developmental paths to an adult grammar of particular languages. This thesis argued that not only Economy of Representation but also Economy of Encoding works as a guiding principle in child grammar.

Through a series of experiments on Japanese children and English children, the following findings were obtained.

(5)   a. The tendency toward a distributive interpretation at the earlier stages is observed both in Japanese and English.

b. The semantic effect of head nouns is observed both in Japanese and English.

c. English children do not use number and gender information in an adult-like manner even around the age of six or seven.

d. Japanese children, like English children, do not use gender information in assigning an interpretation to the BPN object construction.

These findings led us to the following answers to the questions in (3).

(6)   a. The predictions given by the noun-incorporation analysis both in Japanese and English basically hold in the acquisition of the BPN object construction.

b. Differences are observed between adult grammar and child grammar both in Japanese and English. However, child grammar of English is quite similar to that of Japanese.

c. The noun-incorporation analysis of adult grammar can provide a natural explanation for the differences if the two economy principles are available as guiding principles in child grammar.

The finding in (5a) led us to claim that Economy of Encoding is operative from the onset of language acquisition: Children can assign an interpretation resulting from a more economical computation more easily than other interpretations. A distributive interpretation under consideration is the result of a bound-variable interpretation of a possessive pronoun or a null possessor. This obtains as a result of more economical encoding of anaphoric dependency, namely, syntactic dependency. The findings in (5b-d) show that child grammar of English is quite similar to that of Japanese. This is in conformity with what is predicted by Economy of Representation. If Economy of Representation is also operative, it is expected that children's initial grammar starts with a minimal structure, the lexical projection. Children extend functional projections above it based on language-particular evidence. Relevant to our discussion are the properties associated with nominal projections. Properties related to a nominal head, N, will show up in child grammar earlier universally. On the other hand, properties associated with functional projections above N, such as (Gen,) Num or D, will be acquired later. The fact in (5b) shows that the semantic properties associated with head nouns and their interaction with the principles which determine the interpretation of a sentence (namely, the licensing conditions of reflexivity of predicates) are acquired at relatively earlier stages both in Japanese and English. The fact in (5c) is explained in terms of the late acquisition of properties related to functional projections. Number and gender information is not necessarily an intrinsic property of lexical items and can be inserted as features of functional heads projected above NP. A locus of parameters is attributed to the features on functional heads and children have to set parameters based on evidence available in their target language. Initial child grammar has a minimal projection, NP, and children extend functional projections in the course of acquiring a particular language. In the process of the extension, children set the values of parameters and associate these functional heads with morphemes. It is no surprise that English children cannot use number and gender information in an adult-like way even at later stages (7 or 8 years old) because it might take longer to set these values on functional heads. In order to give a fully adult-like number interpretation to nominals, DP is necessary because it is the projection where an implicature associated with

number interpretation is computed. Before reaching this maximal projection, children have to learn the semantics of gender, number, and definiteness and associate them with morphemes in their language. They also have to acquire the way an implicature is computed based on pragmatic information as well as morpho-syntactic and semantic information.

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Appendix
List of Test Sentences and Pictures

JAPANESE EXPEIMENT 1

I. The BPN Condition

(1) Pink-tyan-to   Kiiro-tyan-ga   te-o   age-te-iru-yo.

   Pink-TYAN-and   Yellow-TYAN-Nom hand-Acc   raise-Pres.Prog-Part

   'Pinku-tyan and Kiiro-tyan are raising *pro* hand.'

   a.   b.   c.
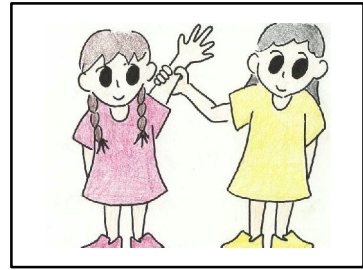
(2) Kuro-kun-to   Chairo-kun-ga   karada-o   arat-te-iru-yo.

   Black-KUN-and   Brown-KUN-Nom   body-Acc   wash- Pres.Prog-Part

   'Black-kun and Brown-kun are washing *pro* body.'

   a.   b.   c.
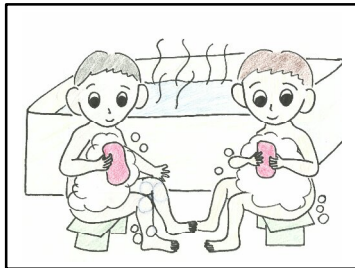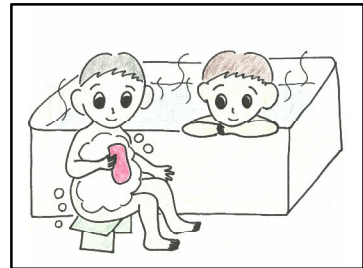
(3) Pink-tyan-to   Kiiro-tyan-ga   ha-o   migai-te-iru-yo.

   Pink-TYAN-and   Yellow-TYAN-Nom teeth-Acc   brush- Pres.Prog-Part

   'Pinku-tyan and Kiiro-tyan are brushing *pro* teeth.'
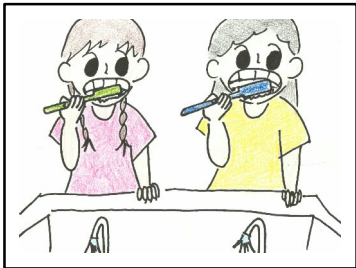
   a.   b.   c.
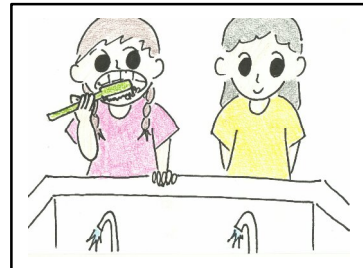
II The non-BPN Condition

(4) Pink-tyan-to　　　Kiiro-tyan-ga　　　hata-o　　　　age-te-iru-yo.
　　Pink-TYAN-and　Yellow-TYAN-Nom　flag-Acc　　　raise- Pres.Prog-Part
　　'Pinku-tyan and Kiiro-tyan are raising *pro* flag.'
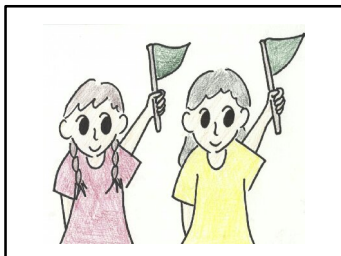
　　a.　　　　　　　　　　　b.　　　　　　　　　　c.

(5) Kuro-kun-to　　　Chairo-kun-ga　　　kutu-o　　　migai-te-iru-yo.
　　Black-KUN-and　Brown-KUN-Nom　shoe-Acc　　brush- Pres.Prog-Part
　　'Black-kun and Brown-kun are brushing *pro* shoe.'
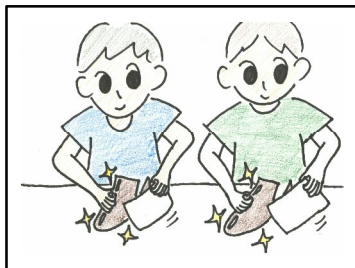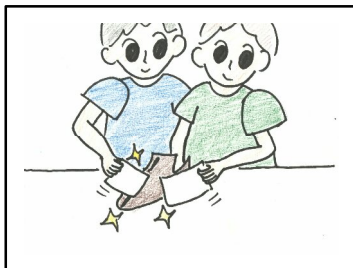
　　a.　　　　　　　　　　　b.　　　　　　　　　　c.
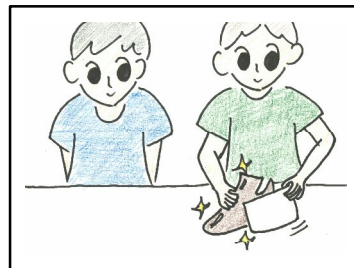
(6) Aka-tyan-to　　　Ao-tyan-ga　　　　kutu-o　　　arat-te-iru-yo.
　　Aka-TYAN-and　Blue-TYAN-Nom　shoe-Acc　　wash- Pres.Prog-Part
　　'Pinku-tyan and Kiiro-tyan are washing *pro* shoe.'
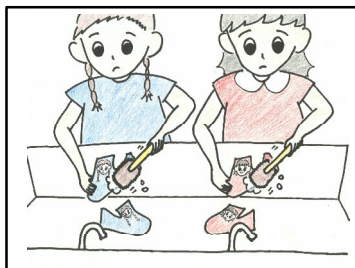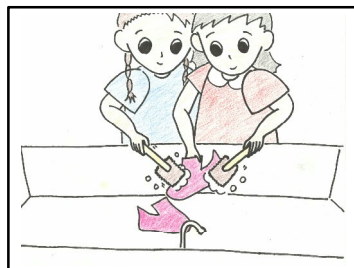
　　a.　　　　　　　　　　　b.　　　　　　　　　　c.
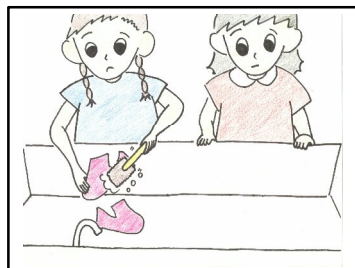
ENGLISH EXPEIMENT 1

I. The BPN Condition

(1) Some children were painting pictures. Their faces got dirty because they put some paint on them. A teacher brought some snacks and said "clean your faces before you have snacks." Billy wanted snacks and cleaned his face. John was not so hungry and wanted to keep the paint on his face. But he knew that his little brother wanted snacks, so he helped the little brother clean his face.

Who cleaned his face?
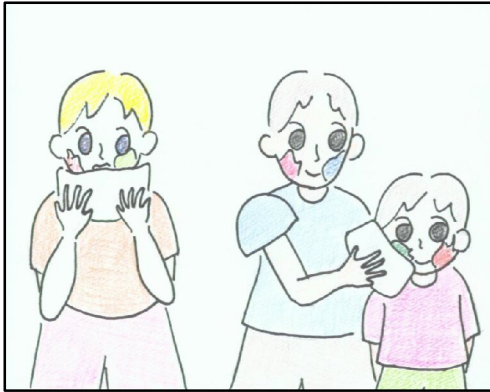
(2) Some children were having a party at a house. A mother came in and said "Anyone who needs cookies raise your hand." Sara wanted cookies and raised her hand. Maria was too shy and didn't like to raise her hand, but she knew that her little sister wanted cookies, so she helped the little sister raise her hand.

Who raised her hand?
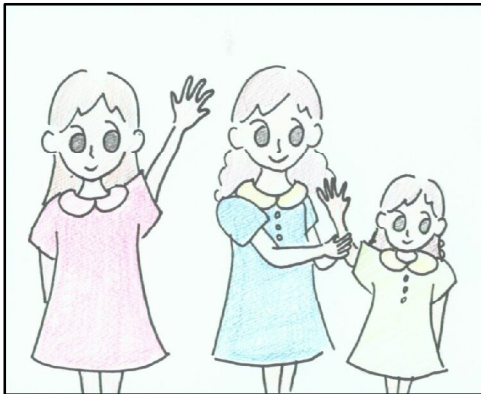
(3) Some children had finished supper. It got dark and they had to go to bed. A father came into the room and said "brush your teeth before you go to bed." Tom felt sleepy and brushed his teeth. Joe didn't feel sleepy and didn't like brushing his teeth. But he knew that his little brother felt tired and wanted to go to bed, so he helped the little brother brush his teeth.

Who brushed his teeth?
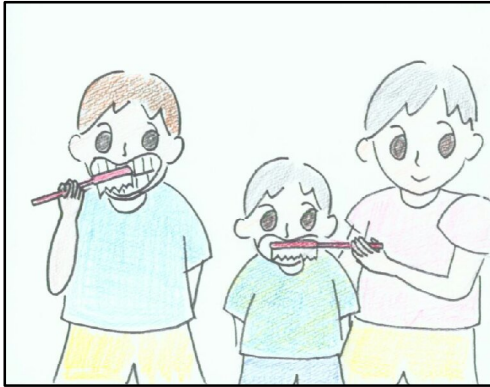
II. The non-BPN Condition

(4) Some children were playing in the snow.   It was freezing cold and a father came out and told them to go back into the house. He said "take off your hat when you come into the house." Maggy took off her hat and went into the house. Jane wanted to keep staying outside and didn't want to take off her hat. But she knew that her little sister wanted to go into the house, so she helped the little sister take off her hat.

Who took off her hat?

(5) Some children had a Christmas party and they each got a Christmas gift. Phil got a small box and took his box home. Chris also got a small box but he didn't like it and didn't want to take his box home. But, he found that his little brother got a big box and could not carry it by himself. So Chris helped the little brother take his box home.

Who took his box home?

(6) Some children went on a picnic. They went into a muddy wood and their shoes got dirty. A mother came and told them to clean their shoes before they went into the house. Jennie wanted to go into the house and cleaned her shoes. Lilly wanted to keep playing outside and didn't want to clean her shoes. But she knew that her little sister wanted to go into the house, so she helped the little sister clean her shoes.

Who cleaned her shoes?
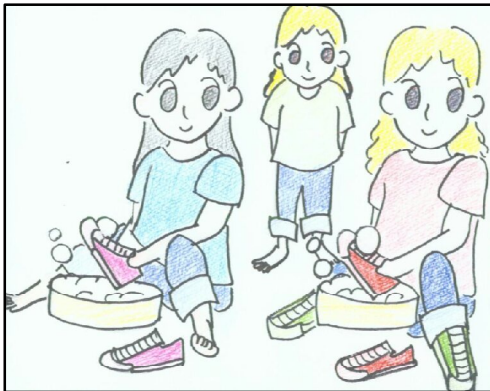
English Experiment 2
I. Plural Condition
i. Pair Condition
(1) Are the boys putting their hands up?
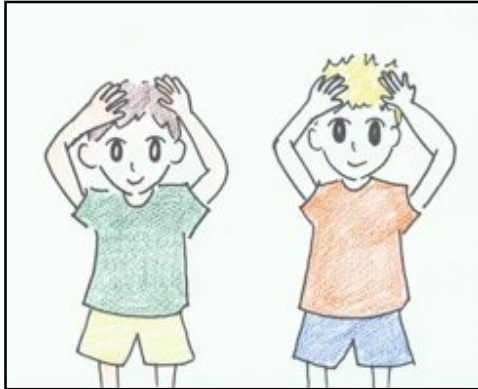
(2) Are the girls touching their eyes?

ii. Non-pair Condition
(3) Are the boys cleaning their faces?

(4) Are the girls touching their mouths?

II. Singular Condition

i. Pair Condition

(5) Is each boy pulling his ears?
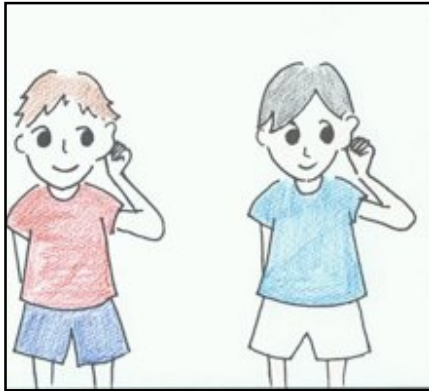
(6) Is each girl raising her arms?
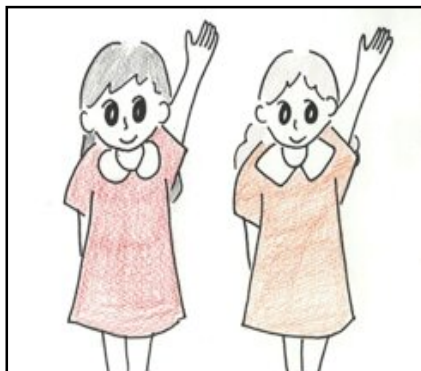
ii. Non-pair Condition

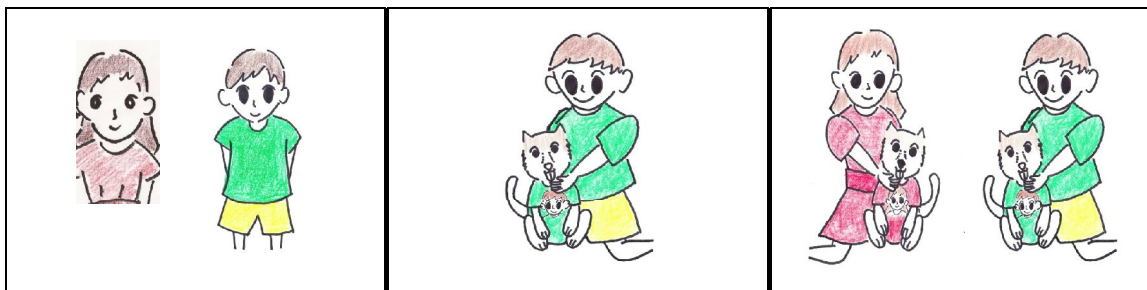(7) Is each boy touching his heads?
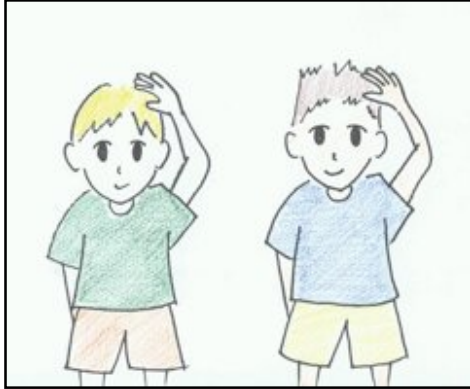
(8) Is each girl holding her noses?

ENGLISH EXPERIMENT 3
I. GMM non-BPN-distributive condition

(1) This is Blue and this is Orange. This is a rocket with Blue's picture on it. Blue is making his rocket. Is Orange making his rocket, too?

(2) This is Green and this is Red. Green is petting/holding his dog. Is Red petting/holding his dog, too?

(3) This is Green and this is Orange. This is Orange's picture. Orange is painting her picture. Is Green painting her picture, too?
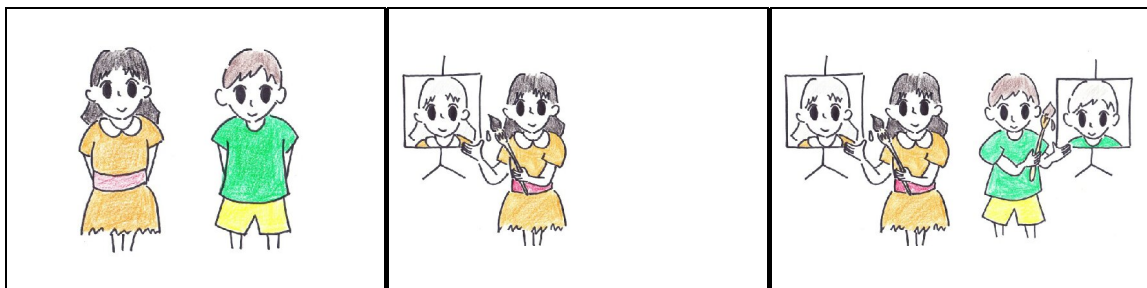
II. GM non-BPN-distributive condition

(4) This is Pink and this is Yellow. Pink is raising her flag. Is Yellow raising her flag, too?
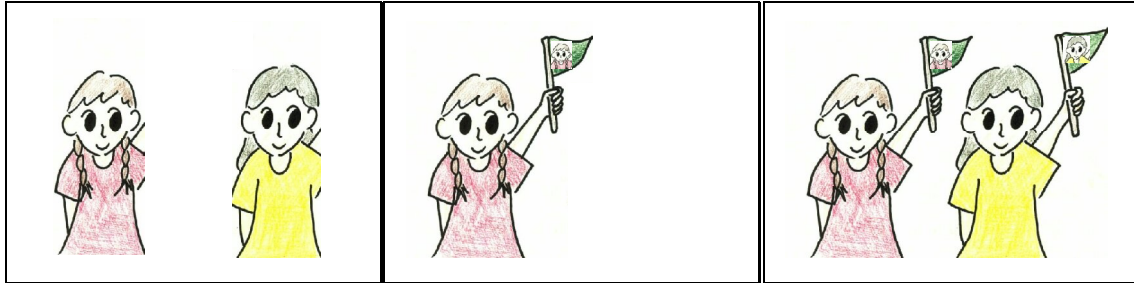
(5) This is Red and this is Orange. Red is holding her picture. Is Orange holding her picture, too?

(6) This is Blue and this is Red. This is Blue's shoe. Blue is cleaning her shoe. Is Red cleaning her shoe, too?
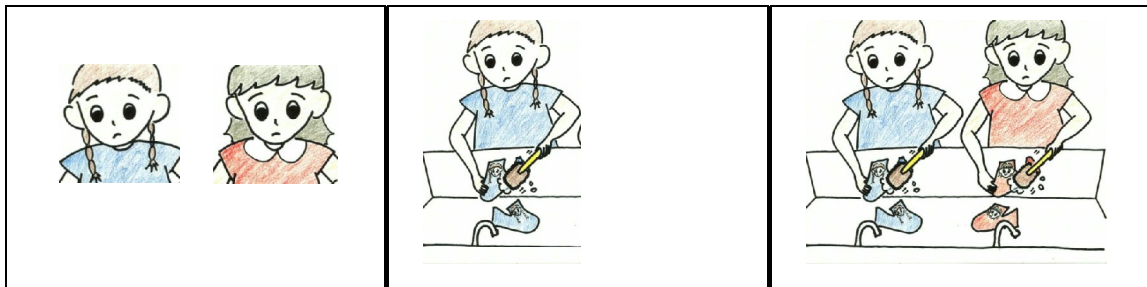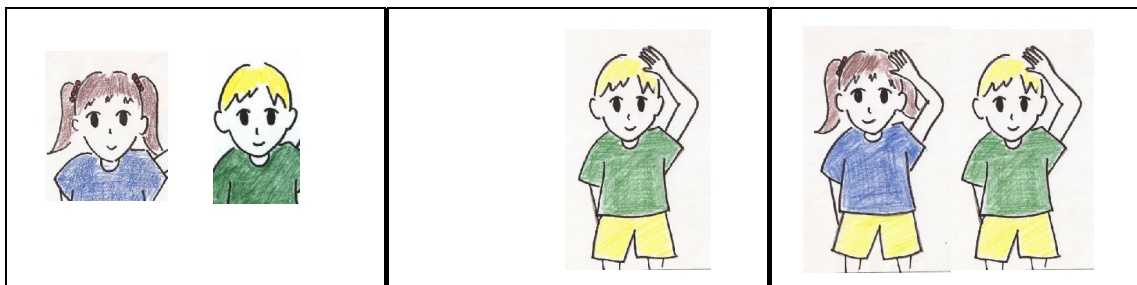
III. GMM BPN-distributive condition

(7) This is Red and this is Blue. Blue is touching his ear. Is Red touching his ear, too?

(8) This is Green and this is Blue. Blue is pinching her nose. Is Green pinching her nose, too?
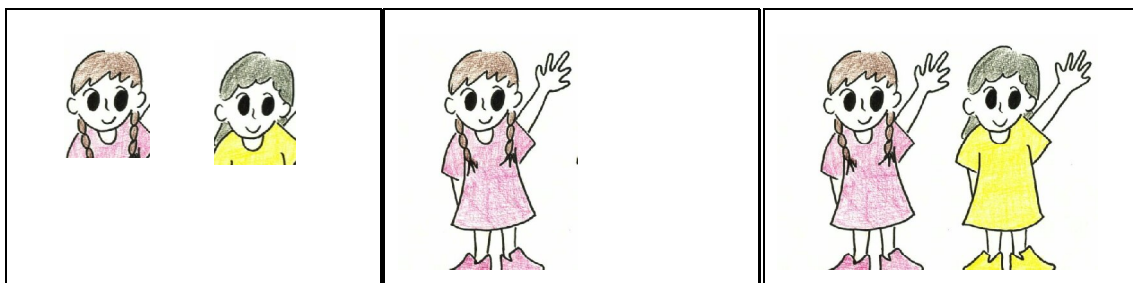
(9) This is Blue and this is Green. Green is touching his head. Is Blue touching his head, too?
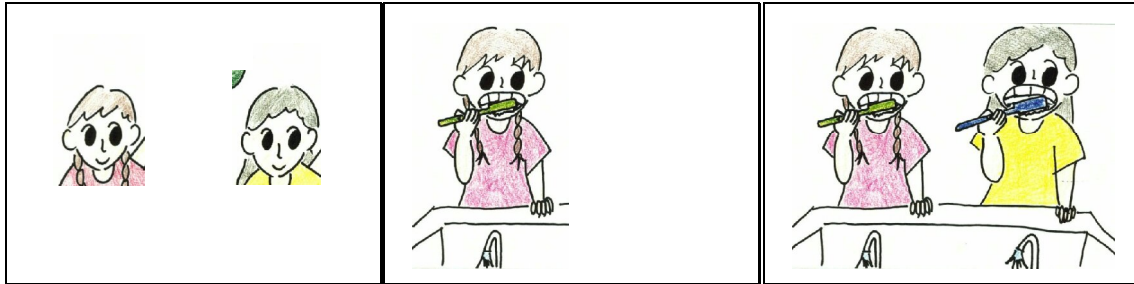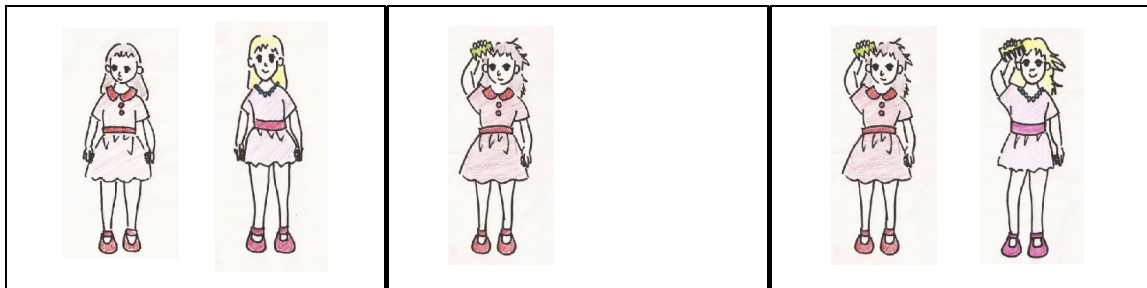
IV. GM BPN-distributive condition

(10) This is Pink and this is Yellow. Pink is raising her hand. Is Yellow raising her hand, too?

(11) This is Pink and this is Yellow. Pink is brushing her teeth. Is Yellow brushing her teeth, too?
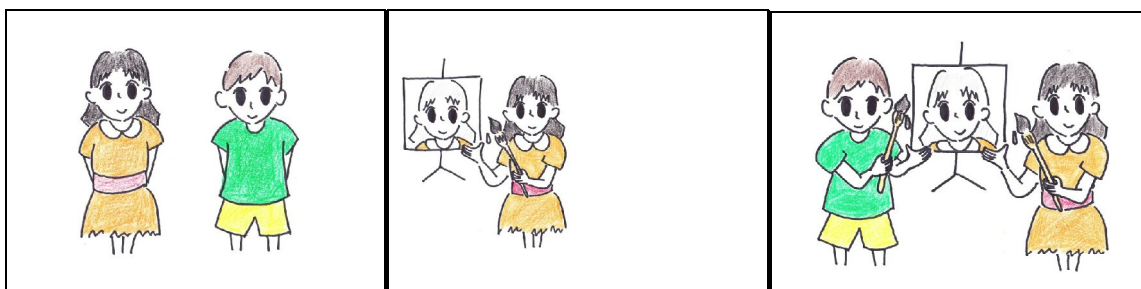

(12) This is Red and this is Pink. Red is combing her hair. Is Pink combing her hair, too?
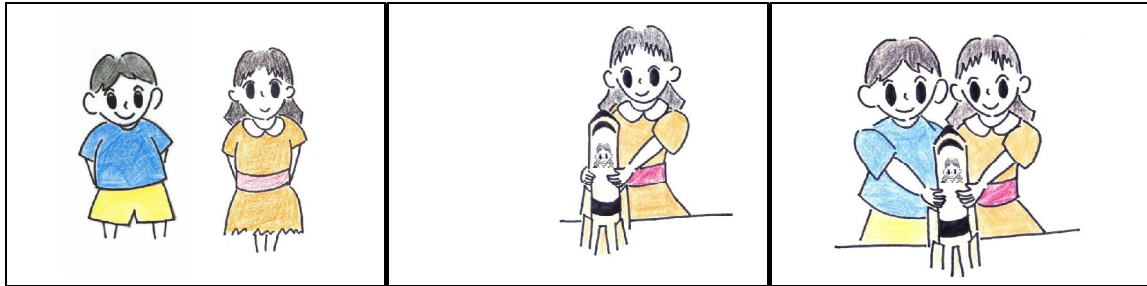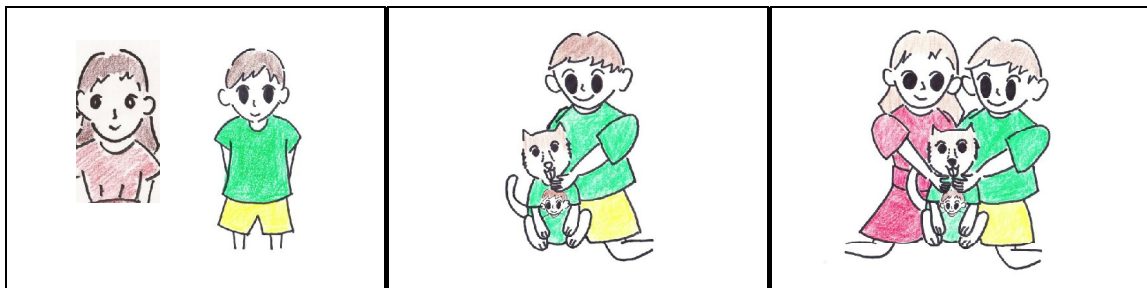

V. GMM non-BPN collective condition

(13) This is Green and this is Orange. Orange is painting her picture. Is Green painting his picture, too?

(14) This is Blue and this is Orange. This is Orange's rocket. Orange is making her rocket. Is Blue making his rocket, too?
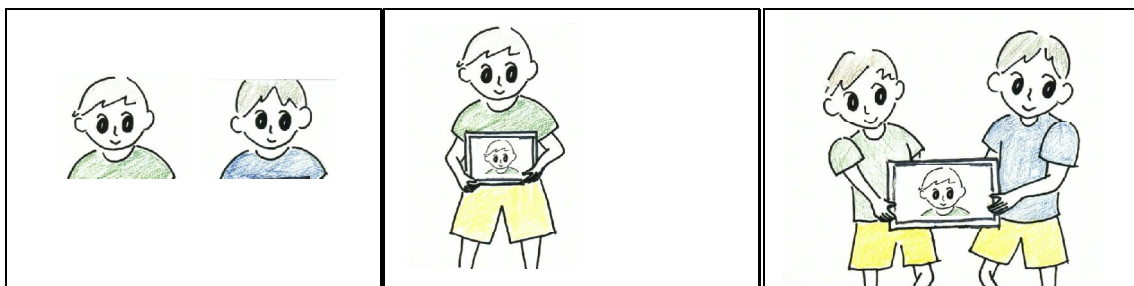

(15) This is Green and this is Red. Green is petting/holding his dog. Is Red petting/holding her dog, too?

VI. GM non-BPN-collective condition

(16) This is Green and this is Blue. Green is holding his picture. Is Blue holding his picture, too?

(17) This is Blue and this is red. Red is cleaning his shoe. Is Blue cleaning his shoe, too?
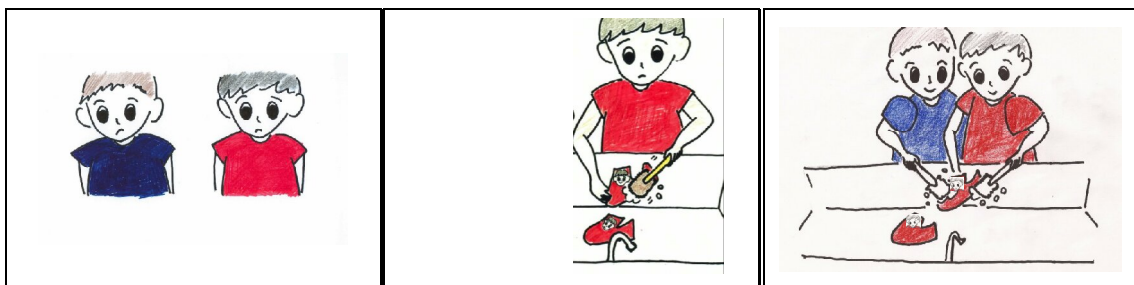
(18) This is Red and this is Blue. This is Red's flag. Red is raising his flag. Is Blue raising his flag, too?

VII. GMM BPN-collective condition

(19) This is Blue and this is Green. Green is touching his head. Is Blue touching her head, too?
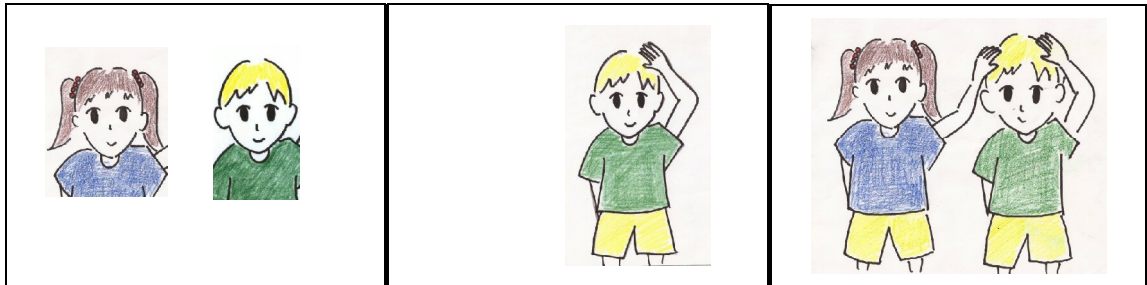
(20) This is Blue and this is Green. Blue is pinching her nose. Is Green pinching his nose, too?

(21) This is Red and this is Blue. Red is touching her ear. Is Blue touching his ear, too?
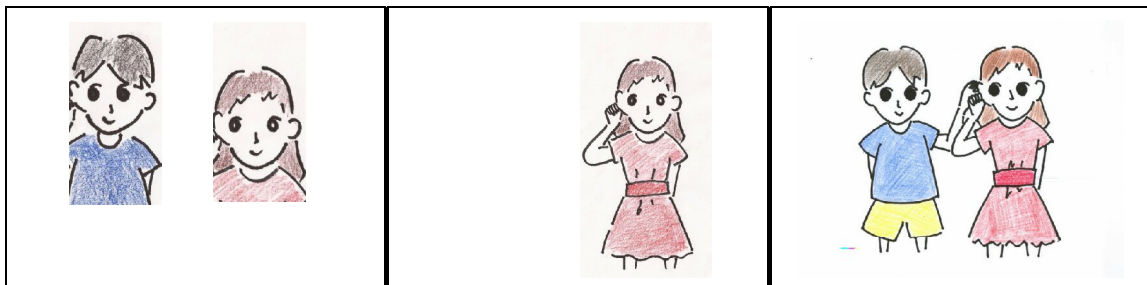
VIII GM BPN-collective condition

(22) This is Green and this is Blue. Green is raising his hand. Is Blue raising his hand, too?

(23) This is Green and this is Orange. Orange is combing his hair. Is Green combing his hair, too?

(24) This is Green and this is Blue. Green is brushing his teeth. Is Blue brushing his teeth, too?
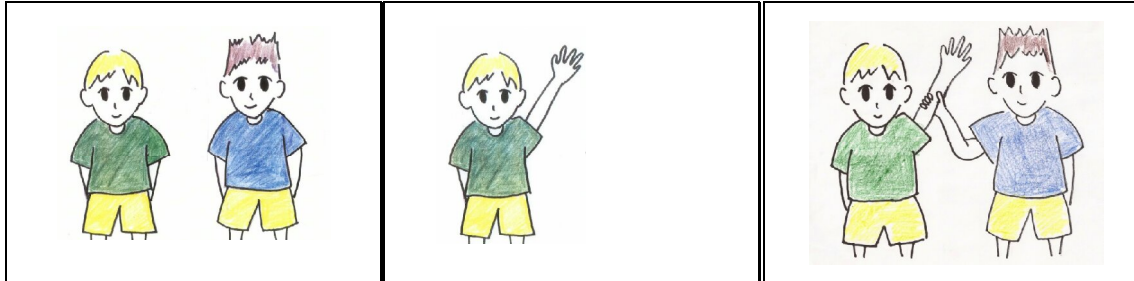
JAPANESE FOLLOW-UP EXPERIMENT

I. GMM non-BPN-distributive condition

(1) a. Kono-ko-wa   Ao-kun.   Kono-ko-wa   Orenzi-tyan   desu.

  This-child-Top   Blue-KUN   This-child-Top   Orange-TYAN   is

  "This is Blue and this is Orange.'

  b. Ao-kun-wa   roketto-o   tukut-te-iru-ne.

  Blue-KUN-Top   rocket-Acc   make-Pres.Prog-Part

  "Blue is making his rocket."

  c. Orenzi-tyan-mo   tukut-te-iru   kana? I-nai   kana?

  Orange-TYAN-too   make-Pres.Prog   Q   Prog-Neg   Q

  "Is Orange making *pro* rocket, too, or not?"

(2) a. Kono-ko-wa   Midori-kun.   Kono-ko-wa   Orenzi-tyan   desu.

  This-child-Top   Green-KUN   This-child-Top   Orange-TYAN   is

  "This is Green and this is Orange.'

  b. Orenzi-tyan-wa   e-o   kai-te-iru-ne.

  Orange-TYAN-Top   picture-Acc   paint-Pres.Prog-Part

  "Orange is painting her picture."

  c. Midori-kun-mo   kai-te-iru   kana? I-nai   kana?

  Green-KUN-too   paint-Pres.Prog   Q   Prog-Neg   Q

  "Is Green painting *pro* picture, too, or not?"

(3) a. Kono-ko-wa   Midori-kun.   Kono-ko-wa   Aka-tyan   desu.

This-child-Top   Green-KUN   This-child-Top   Red-TYAN   is

"This is Green and this is Red.'

b. Midori-kun-wa   inu-o   nadenadesi-te-iru-ne.

Green-KUN-Top   dog-Acc   pet-Pres.Prog-Part

"Green is petting his dog."

c. Aka-tyan-mo   nadenadesi-te-iru   kana? I-nai   kana?

Red-TYAN-too   pet-Pres.Prog   Q   Prog-Neg   Q
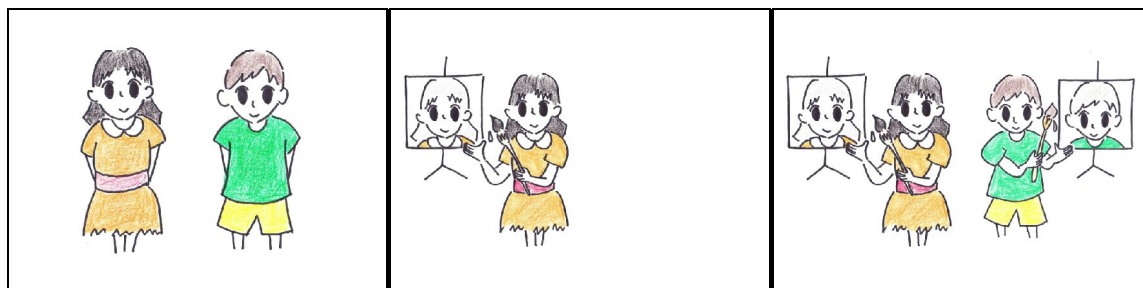
"Is Red petting *pro* dog, too, or not?"


II. GM non-BPN-distributive condition

(4) a. Kono-ko-wa   Pinku-tyan.   Kono-ko-wa   Kiiro-tyan   desu.

This-child-Top   Pink-TYAN   This-child-Top   Yellow-TYAN   is

"This is Pink and this is Yellow.'

b. Pinku-tyan-wa   hata-o   age-te-iru-ne.

Pink-TYAN-Top   flag-Acc   raise-Pres.Prog-Part

"Pink is raising her flag."

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c. Kiiro-tyan-mo   age-te-iru   kana?   I-nai   kana?

Yellow-TYAN-too   raise-Pres.Prog   Q   Prog-Neg   Q

"Is Yellow raising her flag, too, or not?"
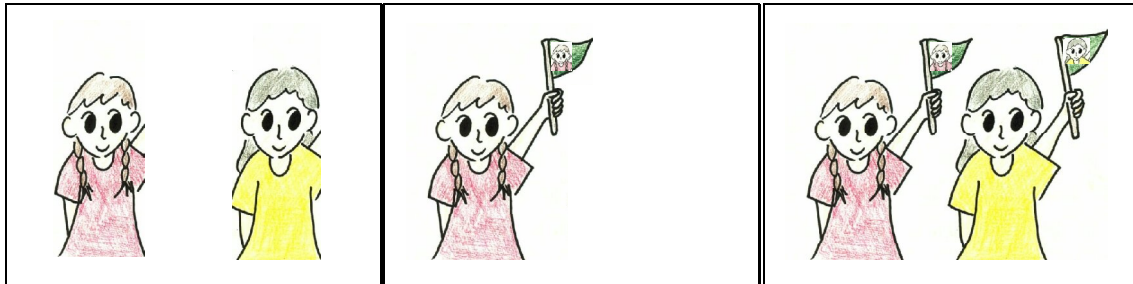
(5) a.   Kono-ko-wa   Aka-tyan.   Kono-ko-wa   Orenzi-tyan   desu.

This-child-Top   Red-TYAN   This-child-Top   Orange-TYAN   is

"This is Red and this is Orange.'

b.   Aka-tyan-wa   syasin-o   mot-te-iru-ne.

Red-TYAN-Top   picture-Acc   hold-Pres.Prog-Part

"Red is holding her picture."

c.   Orenzi-tyan-mo   mot-te-iru   kana?   I-nai   kana?

Orange-TYAN-too   hold-Pres.Prog-Part   Q   Prog-Neg   Q

"Is Orange holding her picture, too, or not?"

(6) a.   Kono-ko-wa   Ao-tyan.   Kono-ko-wa   Aka-tyan   desu.

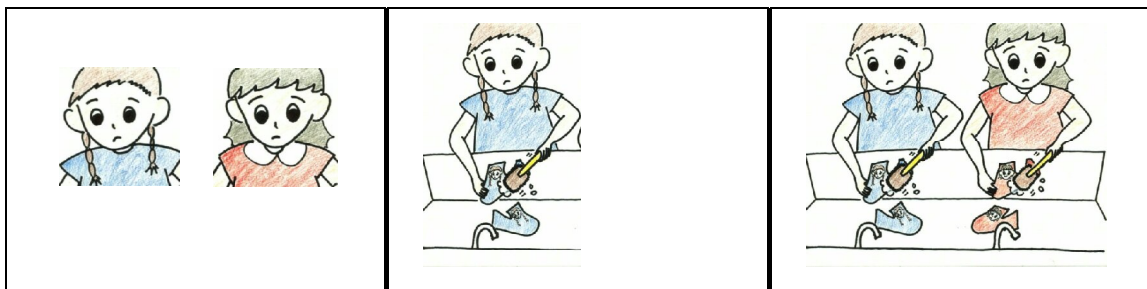This-child-Top   Blue-TYAN   This-child-Top   Red-TYAN   is

"This is Blue and this is Red.'

b. Ao-tyan-wa   kutu-o   arat-te-iru-ne.

Blue-TYAN-Top   shoe-Acc   clean-Pres.Prog-Part

"Blue is cleaning her shoe."

c. Aka-tyan-mo   arat-te-iru   kana? I-nai   kana?

Red-TYAN-too   clean-Pres.Prog   Q   Prog-Neg   Q

"Is Red cleaning his shoe, too, or not?"

III. GMM BPN-distributive condition

(7) a. Kono-ko-wa   Aka-tyan.   Kono-ko-wa   Ao-kun   desu.

This-child-Top   Red-TYAN   This-child-Top   Blue-KUN   is

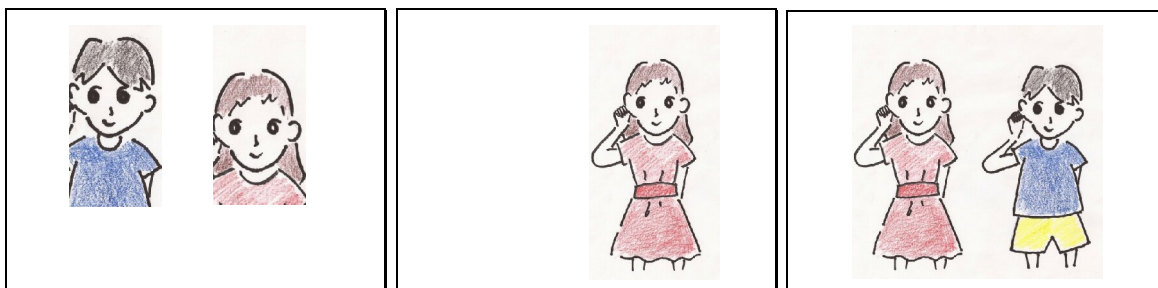"This is Red and this is Blue.'

b. Aka-tyan-wa   mimi-o   sawat-te-iru-ne.

Red-TYAN-Top   ear-Acc   touch-Pres.Prog-Part

"Red is touching her ear."

c. Ao-kun-mo   sawat-te-iru   kana? I-nai   kana?

Blue-KUN-too   touch-Pres.Prog   Q   Prog-Neg   Q

"Is Blue touching *pro* ear, too, or not?"

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(8) a. Kono-ko-wa   Midori-kun.   Kono-ko-wa   Ao-tyan   desu.

   This-child-Top   Green-KUN   This-child-Top   Blue-TYAN   is

   "This is Green and this is Blue.'

   b. Ao-tyan-wa   hana-o   tuman-de-iru-ne.

   Blue-TYAN-Top   nose-Acc   pinch-Pres.Prog-Part

   "Blue is pinching her nose."

   c. Midori-kun-mo   tuman-de-iru   kana? I-nai   kana?

   Green-KUN-too   pinch-Pres.Prog   Q   Prog-Neg   Q

   "Is Green pinching *pro* nose, too, or not?"

(9) a. Kono-ko-wa   Ao-tyan.   Kono-ko-wa   Midori-kun   desu.

   This-child-Top   Blue-TYAN   This-child-Top   Green-KUN   is

   "This is Blue and this is Green.'

   b. Midori-kun-wa   atama-o   sawat-te-iru-ne.

   Green-KUN-Top   head-Acc   touch-Pres.Prog-Part

   "Green is touching his head."

   c. Ao-tyan-mo   sawat-te-iru   kana? I-nai   kana?

   Blue-TYAN-too   touch-Pres.Prog   Q   Prog-Neg   Q

   "Is Blue touching *pro* hand, too, or not?"
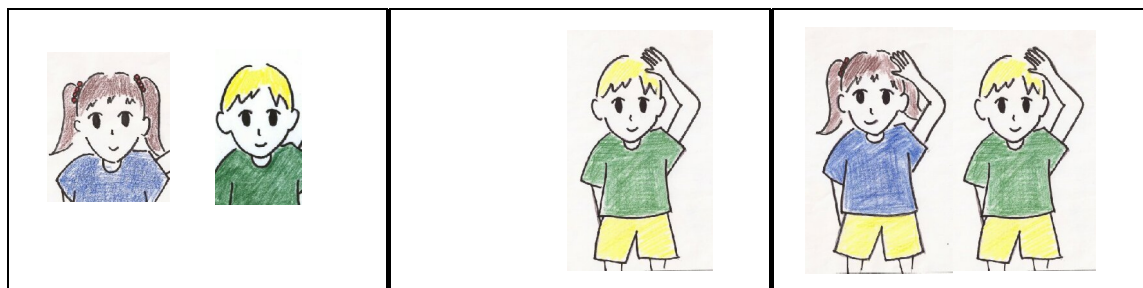
IV. GM BPN-distributive condition

(10) a. Kono-ko-wa   Pinku-tyan.   Kono-ko-wa   Kiiro-tyan   desu.

This-child-Top   Pink-TYAN   This-child-Top   Yellow-TYAN   is

"This is Pink and this is Yellow.'

b. Pinku-tyan-wa   ha-o   migai-te-iru-ne.

Pink-TYAN-Top   teeth-Acc   brush-Pres.Prog-Part

"Pink is brushing her teeth."

c. Kiiro-tyan-mo   migai-te-iru   kana? I-nai   kana?

Yellow-TYAN-too   brush-Pres.Prog   Q   Prog-Neg   Q

"Is Yellow brushing her teeth, too, or not?"

(11) a. Kono-ko-wa   Pinku-tyan.   Kono-ko-wa   Kiiro-tyan   desu.

This-child-Top   Pink-TYAN   This-child-Top   Yellow-TYAN   is
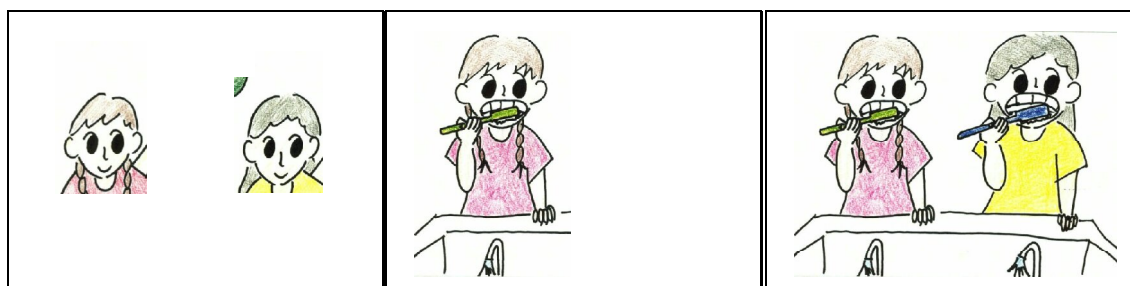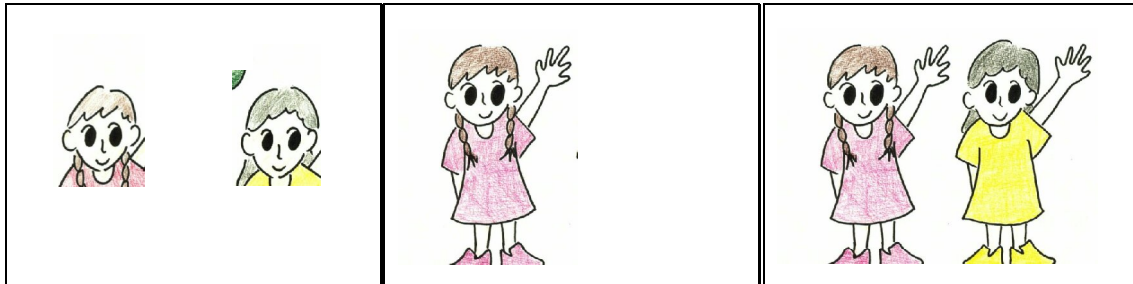
"This is Pink and this is Yellow.'

b. Pinku-tyan-wa   te-o   age-te-iru-ne.

Pink-TYAN-Top   hand-Acc   raise-Pres.Prog-Part

"Pink is raising her hand."

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c. Kiiro-tyan-mo   age-te-iru   kana? I-nai   kana?

Yellow-TYAN-too   raise-Pres.Prog   Q   Prog-Neg   Q

"Is Yellow raising her hand, too, or not?"

(12) a. Kono-ko-wa   Aka-tyan.   Kono-ko-wa   Pinku-tyan   desu.

This-child-Top   Red-TYAN   This-child-Top   Pink-TYAN   is

"This is Red and this is Pink.'

b. Aka-tyan-wa   kami-o   tokasi-te-iru-ne.

Red-TYAN-Top   hair-Acc   comb-Pres.Prog-Part

"Red is combing her hair."

c. Pinku-tyan-mo   tokasi-te-iru   kana? I-nai   kana?

Pink-TYAN-too   comb-Pres.Prog   Q   Prog-Neg   Q

"Is Pink coming her hair, too, or not?"
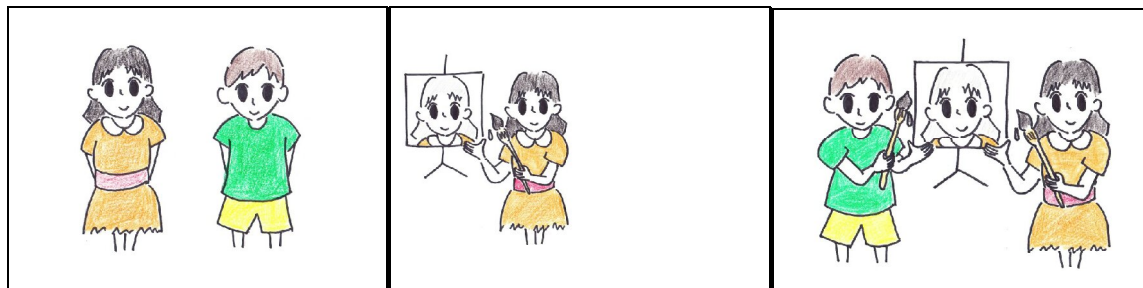
V. GMM non-BPN collective condition

(13) a. Kono-ko-wa   Midori-kun.   Kono-ko-wa   Orenzi-tyan   desu.

     This-child-Top   Green-KUN   This-child-Top   Orange-TYAN   is

     "This is Green and this is Orange.'

   b. Orenzi-tyan-wa   e-o   kai-te-iru-ne.

     Orange-TYAN-Top   picture-Acc   paint-Pres.Prog-Part
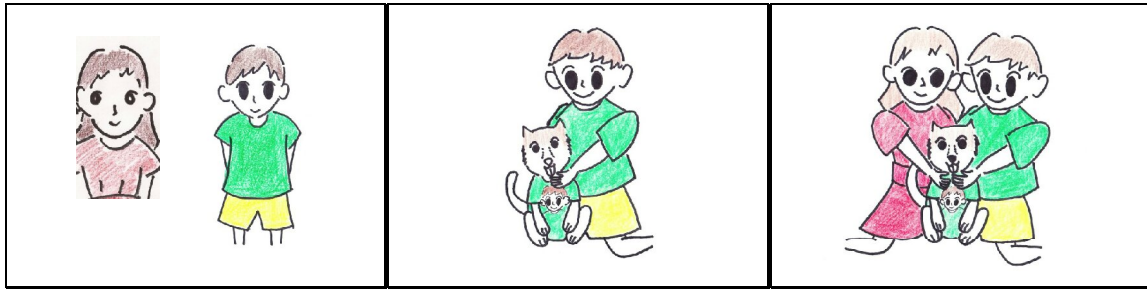
     "Orange is painting her picture."

   c. Midori-kun-mo   kai-te-iru   kana? I-nai   kana?

     Green-KUN-too   paint-Pres.Prog   Q   Prog-Neg   Q

     "Is Green painting *pro* picture, too, or not?"

(14) a. Kono-ko-wa   Midori-kun.   Kono-ko-wa   Aka-tyan   desu.

     This-child-Top   Green-KUN   This-child-Top   Red-TYAN   is

     "This is Green and this is Red.'

   b. Midori-kun-wa   inu-o   nadenadesi-te-iru-ne.

     Green-KUN-Top   dog-Acc   pet-Pres.Prog-Part

     "Green is petting his dog."

   c. Aka-tyan-mo   nadenadesi-te-iru   kana? I-nai   kana?

     Red-TYAN-too   pet-Pres.Prog   Q   Prog-Neg   Q

     "Is Red petting *pro* dog, too, or not?"

(15) a. Kono-ko-wa   Ao-kun.   Kono-ko-wa   Orenzi-tyan   desu.

     This-child-Top   Blue-KUN   This-child-Top   Orange-TYAN   is

     "This is Blue and this is Orange.'

  b. Ao-kun-wa   roketto-o   tukut-te-iru-ne.

     Blue-KUN-Top   rocket-Acc   make-Pres.Prog-Part

     "Blue is making his rocket."

  c. Orenzi-tyan-mo   tukut-te-iru   kana? I-nai   kana?

     Orange-TYAN-too   make-Pres.Prog   Q   Prog-Neg   Q

     "Is Orange making *pro* rocket, too, or not?"

VI. GM non-BPN-collective condition
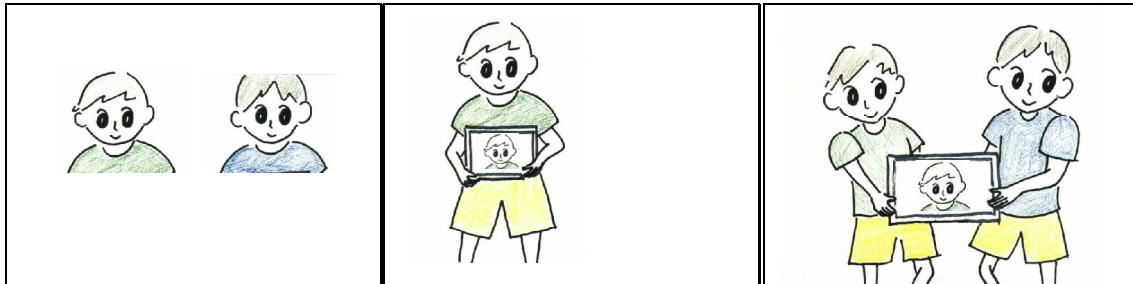
(16) a. Kono-ko-wa   Midori-kun.   Kono-ko-wa   Ao-kun   desu.

     This-child-Top   Green-KUN   This-child-Top   Blue-KUN   is

     "This is Green and this is Blue.'

  b. Midori-kun-wa   syasin-o   mot-te-iru-ne.

     Green-KUN-Top   picture-Acc   hold-Pres.Prog-Part

     "Green is holding his picture."

c. Ao-kun-mo   mot-te-iru   kana? I-nai   kana?

Blue-KUN-too   hold-Pres.Prog-Part   Q   Prog-Neg   Q

"Is Blue holding his picture, too, or not?"

(17) a. Kono-ko-wa   Ao-kun.   Kono-ko-wa   Aka-kun   desu.

This-child-Top   Blue-KUN   This-child-Top   Red-KUN   is

"This is Blue and this is Red.'

b. Aka-kun-wa   kutu-o   arat-te-iru-ne.

Red-KUN-Top   shoe-Acc   clean-Pres.Prog-Part

"Red is cleaning his shoe."

c. Ao-kun-mo   arat-te-iru   kana? I-nai   kana?

Blue-KUN-too   clean-Pres.Prog   Q   Prog-Neg   Q

"Is Blue cleaning his shoe, too, or not?"

(18) a. Kono-ko-wa   Aka-kun.   Kono-ko-wa   Ao-kun   desu.

This-child-Top   Red-KUN   This-child-Top   Blue-KUN   is

"This is Red and this is Blue.'
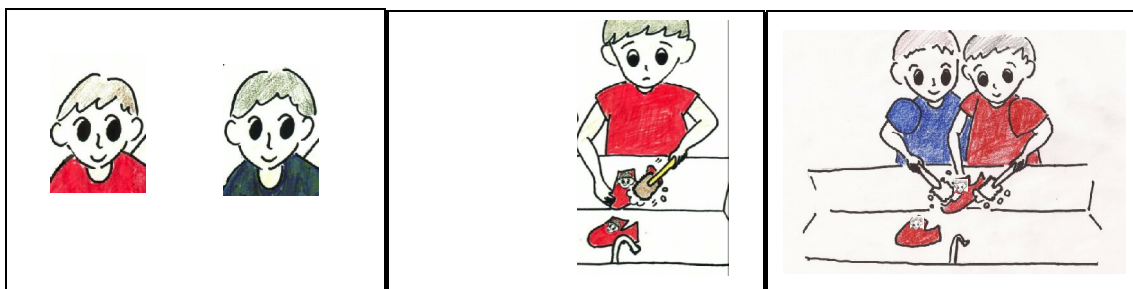
b. Aka-kun-wa   hata-o   age-te-iru-ne.

Red-KUN-Top   flag-Acc   raise-Pres.Prog-Part

"Red is raising his flag."

c. Ao-kun-mo   age-te-iru   kana? I-nai   kana?

Blue-KUN-too   raise-Pres.Prog   Q   Prog-Neg   Q

"Is Blue raising his flag, too, or not?"

VII. GMM BPN-collective condition

(19) a. Kono-ko-wa   Ao-tyan.   Kono-ko-wa   Midori-kun   desu.

This-child-Top   Blue-TYAN This-child-Top   Green-KUN   is
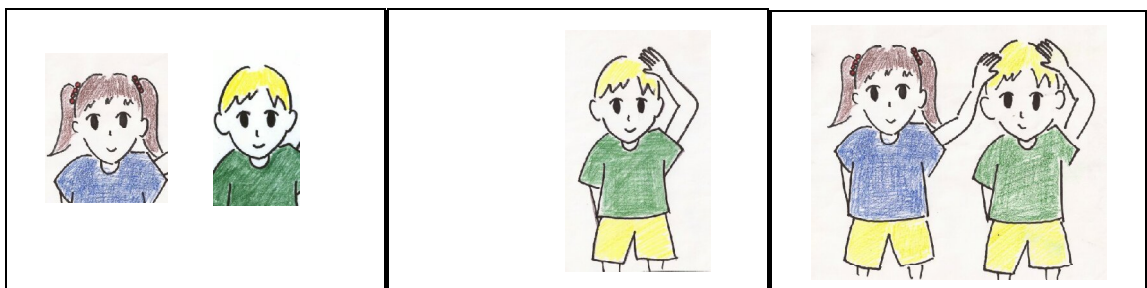
"This is Blue and this is Green.'

b. Midori-kun-wa   atama-o   sawat-te-iru-ne.

Green-KUN-Top   head-Acc   touch-Pres.Prog-Part

"Green is touching his head."

c. Ao-tyan-mo   sawat-te-iru   kana? I-nai   kana?

Blue-TYAN-too   touch-Pres.Prog   Q   Prog-Neg   Q

"Is Blue touching *pro* hand, too, or not?"

(20) a. Kono-ko-wa   Midori-kun.   Kono-ko-wa   Ao-tyan   desu.

   This-child-Top   Green-KUN   This-child-Top   Blue-TYAN   is

   "This is Green and this is Blue.'

 b. Ao-tyan-wa   hana-o   tuman-de-iru-ne.

   Blue-TYAN-Top   nose-Acc   pinch-Pres.Prog-Part

   "Blue is pinching her nose."

 c. Midori-kun-mo   tuman-de-iru   kana? I-nai   kana?

   Green-KUN-too   pinch-Pres.Prog   Q   Prog-Neg   Q

   "Is Green pinching *pro* nose, too, or not?"

(21) a. Kono-ko-wa   Aka-tyan.   Kono-ko-wa   Ao-kun   desu.

   This-child-Top   Red-TYAN   This-child-Top   Blue-KUN   is

   "This is Red and this is Blue.'

 b. Aka-tyan-wa   mimi-o   sawat-te-iru-ne.

   Red-TYAN-Top   ear-Acc   touch-Pres.Prog-Part

   "Red is touching her ear."

 c. Ao-kun-mo   sawat-te-iru   kana? I-nai   kana?

   Blue-KUN-too   touch-Pres.Prog   Q   Prog-Neg   Q

   "Is Blue touching *pro* ear, too, or not?"

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VIII GM BPN-collective condition

(22) a. Kono-ko-wa   Midori-kun.   Kono-ko-wa   Ao-kun   desu.

This-child-Top   Green-KUN   This-child-Top   Blue-KUN   is

"This is Green and this is Blue.'

b. Midori-kun-wa   te-o   age-te-iru-ne.

Green-KUN-Top   hand-Acc   raise-Pres.Prog-Part

"Green is raising his hand."

c. Ao-kun-mo   age-te-iru   kana? I-nai   kana?

Blue-KUN-too   raise-Pres.Prog   Q   Prog-Neg   Q

"Is Blue raising his hand, too, or not?"

(23) a. Kono-ko-wa   Midori-kun.   Kono-ko-wa   Orenzi-kun   desu.

This-child-Top   Green-KUN   This-child-Top   Orange-KUN   is
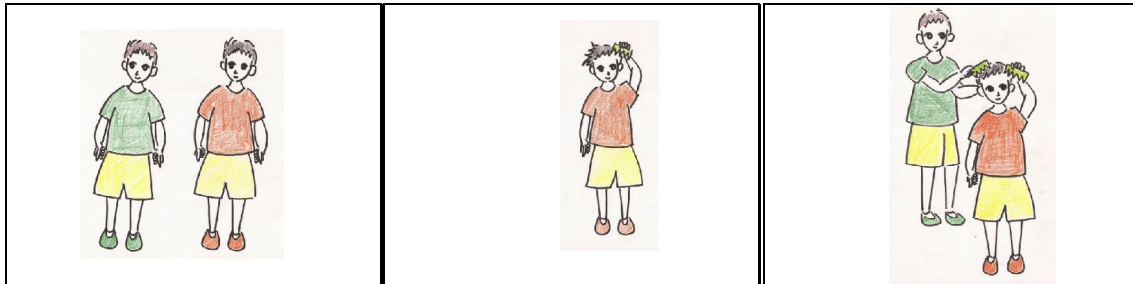
"This is Green and this is Orange.'

b. Orenzi-kun-wa   kami-o   tokasi-te-iru-ne.

Orange-KUN-Top   hair-Acc   comb-Pres.Prog-Part

"Orange is combing his hair."

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c. Midori-kun-mo   tokasi-te-iru   kana? I-nai   kana?

Green-KUN-too   comb-Pres.Prog   Q   Prog-Neg   Q

"Is Green coming his hair, too, or not?"

(24) a. Kono-ko-wa   Midori-kun. Kono-ko-wa   Ao-kun   desu.

This-child-Top   Green-KUN This-child-Top   Blue-KUN   is

"This is Green and this is Blue.'

b. Midori-kun-wa   ha-o   migai-te-iru-ne.

Green-KUN-Top   teeth-Acc   brush-Pres.Prog-Part

"Green is brushing his teeth."

c. Ao-kun-mo   migai-te-iru   kana? I-nai   kana?

Blue-KUN-too   brush-Pres.Prog   Q   Prog-Neg   Q

"Is Blue brushing his teeth, too, or not?"