

On the Cross-linguistic Variation and Acquisition of Reciprocal Constructions: A Parametric Approach*

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This paper focuses on the extent to which languages vary with respect to the situations describable with reciprocal constructions and considers why such a variation arises. Following the P&P framework, this paper attempts to identify the parameters which give rise to the variation. Adopting the MP, it proposes that the parameters are given in the form of values of features associated with each reciprocal marker and the variation under discussion is explained in terms of the values of these features. It also proposes that these features are not simply listed in UG and assembled randomly, but rather are hierarchically ordered. It further argues some feature values are allowed to remain unspecified by UG, providing supporting evidence for our approach from language acquisition. This approach enables us to distinguish stages in the process of acquisition and to explain how children choose their target grammar among the options given by UG.

Keywords: reciprocal construction, parameters, features, hierarchical ordering of features, unspecified features

1. Introduction

A reciprocal situation differs from a simple transitive situation in that it presupposes some mutual relationship among entities. Suppose a situation where John and Bill started off quarreling, and John, who got excited, hit Bill. The action performed by John is described by a transitive sentence such as in (1).

(1) John hit Bill.

Suppose further that Bill, who also got excited, hit John in revenge. As a result, John and Bill mutually acted on one another, and the situation diverges from a simple one-way action. This situation consists of two sub-events, each of which includes an *agent*, who performs an action, and a *patient*, who receives the action, and the event participants, John and Bill, play both the roles of agent and patient.

A simple question arises as to how such a *reciprocal* situation is described. Do languages have any construction exclusively used for that situation? To describe such a situation, most languages use a sentence with a specific marker, a *reciprocal marker*.¹ In English, for example, a nominal anaphoric expression, *each other*, can be used as in (2).²

(2) John and Bill hit each other.

A reciprocal marker is not necessarily a nominal anaphoric expression, and cross-linguistic variation is observed. In Japanese, for example, a verbal affix, *-aw*, can be used.³

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¹ With the term, reciprocal marker, we refer to an expression which *can* be used to describe a reciprocal situation.

² The nominal expression, *one another*, can also be used as a reciprocal marker in English as in (i).

(i) John and Bill hit one another.

³ The nominal expression, *otagai*, can also be used as a reciprocal marker in Japanese as in (ia). Interestingly, *otagai* and *-aw* are able to co-occur in a sentence as in (ib).

- (3) John-to Bill-ga naguri-aw-ta.⁴
 John-and Bill-Nom hit-AW-Past
 ‘John and Bill hit each other.’

To explain the syntactic and semantic properties of a sentence with a reciprocal marker (henceforth *reciprocal constructions*) is a long-standing issue. One of the factors that make the issue complicated is that some sentences with a reciprocal marker are not used only to describe a reciprocal situation. They give rise to interpretations other than a reciprocal one, and, to make matters worse, the range of permissible interpretation varies from language to language.

Then, a further question arises as to why such diversity is observed. The Principles and Parameters framework (P&P framework, henceforth) assumes that the human language faculty consists of principles which are universal to every language and parameters which give rise to cross-linguistic variation. Under this framework, the question is paraphrased as what parameters are responsible for the variation.

To answer this question is the first aim of this paper.⁵ The simplest answer is that every permissible interpretation is listed as a parameter with the value of [\pm possible]. However, such ad hoc parameters should be dispensed with if a deeper explanation is possible. The current program within the P&P framework (Chomsky (1981) among others), the Minimalist Program (MP) (Chomsky (1995, 2000, 2001, 2004, 2005, 2008)), is one of the promising approaches to such a deeper explanation. The MP assumes the source of cross-linguistic variation to be in lexical entries. Under this approach, parameters should be given in the form of values of features which each lexical item has. Following this assumption, this paper considers the types of features which each reciprocal marker has, and argues that the variation observed with reciprocal constructions can be explained in terms of the difference in values of these features. In doing so, this paper proposes that features do not necessarily have a fixed value but sometimes remain unspecified. Furthermore, this paper claims that these features are not simply listed as possible choices but are rather hierarchically ordered, and that the values of higher ordered features affect how other features are assembled in a lexical entry.

The second aim of this paper is to provide support for this proposal from the view-point of language acquisition. Every hypothesis on adult grammar has to give an appropriate explanation to the problem of how children choose their target grammar among the options available by UG. It is observed that at some stage of language acquisition, children show different behavior from adults in comprehending reciprocal constructions. Furthermore, children’s behavior is not uniform across languages. Our approach makes it possible to explain why such difference is observed and how children attain their target grammar. This paper claims that the developmental process is divided into stages along with the hierarchical ordering of features, and a difference sometimes arises because children, at intermediate stages of the development, leave some features unspecified, which is allowed as a permissible option by UG.

This paper is organized as follows. Section 2 presents the variety of situations which sentences with a reciprocal marker can describe, taking up English, French, and Japanese as concrete examples. Section 3 proposes a possible analysis of this variation, and section 4 considers how the acquisitional process can be explained under this proposal. Section 5 offers concluding remarks.

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- (i) a. John-to Bill-ga otagai-o nagut-ta.
 John-and Bill-Nom each other-Acc hit-Past
 ‘John and Bill hit each other.’
 b. John-to Bill-ga otagai-o naguri-aw-ta.
 John-and Bill-Nom each other-Acc hit-AW-Past
 ‘John and Bill hit each other.’

⁴ This paper uses the following abbreviations.

Nom=nominative case marker, Acc=accusative case marker, Pres.Prog=present progressive, Cl=classifier, Top=topic marker

⁵ In this paper, we restrict ourselves to simple sentences which describe “basic” agent-patient events to simplify a complicated issue down to a few easy questions.

2. Variety of Situations Which a Sentence with a Reciprocal Marker Can Describe

As mentioned in section 1, a reciprocal situation is described in English with the nominal anaphoric expression *each other*. A reciprocal situation is defined as a situation which consists of some sub-events, in each of which a participant acts on some other participant, and participants involved in the situation play two roles, for example, of agent and patient.

(4) John and Bill hit each other.

A referential expression, such as *John and Bill*, is interpreted as referring to an entity in a discourse. An anaphoric expression, on the other hand, cannot be interpreted by itself, and has to depend on some other expression in its sentence. *Each other* in (4) takes the subject *John and Bill* as its antecedent, and through this anaphoric relationship, the sentence is interpreted as the entities denoted by the subject, John and Bill, being both an agent and a patient.

An expression which is used as a reciprocal marker is not necessarily nominal. In some languages, a verbal affix is used to describe a reciprocal situation. In addition to the categorical variation among reciprocal markers, languages vary in the range of situations which can be described by a sentence with a reciprocal marker. In most cases, the entities involved in a situation play two roles, but in an extreme case, the entities play only one role. In this section, let us see these variations, taking English, French, and Japanese as specific examples.

The English *each other* construction can be used even if a mutual relationship does not hold among all entities denoted by the antecedent (Heim, Lasnik and May (1991), Dalrymple et al. (1994)). Consider the sentences in (5a) and (5b): According to Heim, Lasnik and May (1991), (5a) can describe only the situation where a mutual relationship holds among all entities denoted by the antecedent subject, but (5b) can describe the situation where such relationship does not necessarily hold. Suppose, for example, there are six men in the room. In (5a), each of the six men must know all of the other five men and must be known by all of them, for the sentence to be true. (5b), on the other hand, can be used to describe a situation where each men hit one or some of the other men and he was hit by one or some of them.

- (5) a. The men in the room know each other.
b. The men in the room hit each other.

Furthermore, this construction can describe a situation where no mutual relationship holds. For example, consider the sentence (6). Here, no mutual relationship can hold among children, since it is impossible for one to catch the measles twice. Henceforth let us call this type of situation *chaining situation*.

(6) The children in that class gave each other the measles.

French is another example of a language whose reciprocal marker ambiguously describes a situation other than a reciprocal situation. In French, a nominal anaphoric expression *se* is used as a reciprocal marker. French differs from English in that it uses the same marker to describe a reflexive situation, in addition to a reciprocal situation. Consider, for example, the sentence in (7). This sentence can be interpreted not only reciprocally as in (7a) but also reflexively as in (7b).

- (7) Un home et une femme se remarquent.
A man and a woman SE observe
a. A man and a woman are observing each other.
b. A man and a woman are observing themselves.

(Donaldson (1973:89))

A reflexive situation cannot be described by a sentence with *each other* in English, and to describe a situation where plural entities perform a reflexive action, *each other* has to be replaced by *themselves* as in (8).

(8) John and Bill hit themselves.

The situations introduced so far, the reciprocal, chaining and reflexive situations, are similar to each other in that an entity involved in the situation plays two roles, for example an agent and a patient, in the situations. Japanese is still another example of a language whose reciprocal marker can be used to describe more than one situation, and Japanese differs from both English and French. As already mentioned in section 1, a verbal affix *-aw* is used as a reciprocal marker and a sentence with this marker can be used to describe even a situation where an entity does not play two roles (Imai & Peters (1996:100)). Consider the following example in (9). Suppose that there are two girls in a room. As the French *se* construction, the sentence can be used to describe a reciprocal situation in (9a) and a reflexive situation in (9b). In addition, it can be interpreted as describing a situation where these two girls are decorating a room, for example, for a birthday party. Differing from both the reciprocal and the reflexive situations, the two girls are interpreted as being only agents, not patients.

- (9) Musume-tachi-ga hana-de kazari-aw-teiru
 Girl-CI-Nom flower-with decorate-AW-Pres.Prog.
 a. ‘The girls are decorating each other with flowers.’
 b. ‘The girls are (in competition) decorating themselves with flowers.’
 c. ‘The girls are (in competition/in collaboration) decorating (a room) with flowers.’

That the presupposition that an entity plays two roles is not necessarily required is much more clearly indicated in the following examples. As shown in (10) and (11), *-aw* is attached to even an intransitive use of the verb, *warau*, and a transitive verb with the object, *sensei-o homeru*.

- (10) Otoko-tachi-ga warai-aw-teiru
 Men-CI-Nom laugh-AW-Pres.Prog
 ‘The men are laughing.’
 (11) Kodomo-tachi-ga sensei-o home-aw-ta
 Children-CI-Nom teacher-Acc praise-AW-Past
 ‘Children praised (their) teachers.’

However, the situations described by (9), (10) and (11) are similar in that they consist of multiple sub-events and that these multiple sub-events must not happen independently from each other. Some relation among the events is prerequisite for the use of *-aw*, and hence, with a singular subject or a phrase clearly indicating that the events happen separately, the sentences become impossible (Imai & Peters (1996)). For example, the sentence (9) becomes unacceptable if it has a singular subject as in (12a), and the sentence (10) does so if it contains a phrase *betsubetsu-no heya-de* (‘in separate rooms’) as in (12b).

- (12) a. *Taro-ga naguri-aw-ta.
 Taro-Nom hit-AW-Past
 *‘Taro hit each other.’
 b. *Otoko-tachi-ga betsubetsu-no heya-de warai-aw-teiru
 Men-CI-Nom separate room-in laugh-AW-Pres.Prog
 ‘The men are laughing in separate rooms.’

Henceforth, let us call a *collective situation* the type of situation where an entity does not necessarily play two

roles but in which multiple events are related to each other.

3. Parameters Associated with Features

Given the variation in the situations which can be described by a sentence with a reciprocal marker, a question arises as to what lies behind such cross-linguistic variation. Within the P&P framework, the question is paraphrased as what parameters are responsible for it. A possible approach would be to list every situation possibly described by a sentence with a reciprocal marker as a parameter with the values of [\pm possible] as in (13).

- (13) Parameters:
- a. Reciprocal Situation [\pm possible]
 - b. Chaining Situation [\pm possible]
 - c. Reflexive Situation [\pm possible]
 - d. Collective Situation [\pm possible]

These parameters, however, were required only to explain the properties of the reciprocal constructions and such ad hoc parameters should be dispensed with if an alternative approach is available. This section seeks such an alternative approach, following the basic assumptions of the MP, which assumes that parameters are given in the form of values of features associated with each lexical item. First, we consider what features each reciprocal marker has and how each value is specified. It is argued that, at least, the following six features and parameters are necessary to explain the observed cross-linguistic variation.⁶

- (14) Parameters:
- a. Category (+D, +v, etc.)
 - b. Referential Property [\pm referential]⁷
 - c. Number [\pm plural]
 - d. Identity of Participants [\pm identical]
 - e. Multiplicity of Events [\pm multiple]
 - f. Relation among Sub-events [\pm related]

It is also claimed that the values of these features are not necessarily fixed for every expression and sometimes remain unspecified. This section further considers how feature assembly of a lexical item is determined and argues that the features are not randomly assembled. Rather, they are hierarchically ordered, and this ordering affects the types of features to be encoded in lexical entry.

⁶ The optimal conclusion this paper seeks is that the properties observed with reciprocal constructions can be explained in terms of features which have “ontological reality” and are construction neutral. Under this approach, what has been called “reciprocal construction” is just an “explanatory artifact,” whose shared property happens to derive as a result of combinations of different feature values. In this paper, we state that out of six features given in (14), only three combinations result in the shared property: (i) [+D], [-referential], [+plural], [-identical], (ii) [+D], [-referential], [\pm plural], and (iii) [+v], [+multiple], [+related]. If we take other languages into consideration, further possibilities may arise. As an anonymous reviewer points out, the issue of how many combinations are possible must be addressed. However, it is beyond the scope of this paper, so I leave it a remaining issue. The reviewer also points out that it should be considered why cross-linguistic variation is observed with respect to the category of reciprocal markers. I would like to consider this issue in future research.

⁷ Readers might wonder why the feature [\pm referential] is necessary, not the conventional features [\pm anaphoric] and [\pm pronominal]. The issues as to how to distinguish anaphoric expressions from non-anaphoric expressions and as to how to make a distinction among anaphoric expressions are still under debate, and require further consideration. The issues are beyond the purposes of this paper, so we use the term [\pm referential] for an expository purpose (See 3.1 and 3.2). See Reuland (2008) for discussion.

sub-event are not identical. In (17a), John becomes an agent and a patient in separate events. John is the agent of John's hitting event and the patient of Bill's hitting event. Thus *each other* and *themselves* have a different value with respect to the feature: *Each other* has the value [−identical], while *themselves* has the value [+identical].

Next let us consider the French reciprocal marker *se*. This marker crucially differs from *each other* in that it can be used to describe both reflexive and reciprocal situations. Under our approach this variation is attributed to the difference in values of the number feature. Similar to *each other*, *se* has the values of [+D(+N)] and [−referential] with respect to the categorical feature and referential property, respectively, and differing from *each other*, *se* has the value of number feature unspecified as shown in (18).¹⁰

- (18) a. Category [+D(+N)]
 d. Referential Property [−referential]
 c. Number [±plural]

Because of the values of [+D(+N)] and [−referential], *se* occurs in an argument position (and cliticizes onto a verb later) and referentially depends on other expressions in a sentence. Due to the unspecified number feature, it can take either a singular or a plural antecedent, and it describes a reflexive situation when the antecedent is singular and both reflexive and reciprocal situations when the antecedent is plural.

Now, let us turn to the Japanese reciprocal marker *−aw*. The primary difference between this marker and the other two, *se* and *each other*, is that *−aw* is not a nominal expression but a verbal affix. Among the six features in (14), three are encoded in its lexical entry, with the following values.

- (19) a. Category [+v (+V)]
 e. Multiplicity of Events [+multiple]
 f. Relation among Sub-events [+related]

Due to the value [+multiple], *−aw* cannot be used to describe a situation where only a single event is included as in (20).¹¹

- (20) *Taro-ga naguri-aw-ta. (=12a)
 Taro-Nom hit-AW-Past

Also, due to the value of [+related], it cannot describe a situation where multiple events occur independently from each other as in (21).¹²

¹⁰ There are many controversial issues with respect to syntactic status of clitics like French *se* (see, for example, Beukema and den Dikken (1999) and van Riemsdijk (1999)). Which category do they belong to? Are they heads or phrases? Where in syntactic structures are they positioned? In this paper, we basically follow the line of Chomsky (1995).

¹¹ Readers might wonder why it is impossible for (20) to have an “iterative” reading. Actually, in some languages, an expression which can be used to describe a reciprocal situation is used to describe iterative action. According to Liu (1999), Chinese *V-lai-V-qu* ‘V-come-V-go’ is used to describe a reciprocal situation when it takes a plural subject as in (i). In addition, it can be used to mark repeated action with a singular subject as in (ii).

(i) Tamen DA-lai-Da-qu
 they hit-come-hit-go
 ‘They hit each other.’

(ii) Ta zai wuzi-li ZOU-lai-ZOU-qu
 he at room-inside walk-come-walk-go
 ‘He’s walking back and forth in the room.’

(Liu (1999:124))

Further feature specification might be necessary to distinguish *V-aw*, on the other hand, and *V-lai-V-qu*, on the other.

¹² I would like to thank an anonymous reviewer for his/her observation that the following example is acceptable even

- (21) *Otoko-tachi-ga betsubetsu-no heya-de warai-aw-teiru (=12b))
 Men-Cl-Nom separate room-in laugh-AW-Pres.Prog

3.2. Hierarchical Orderings among Features

So far, we have seen that the features presented in (14) are necessary to explain the variation observed with the reciprocal markers in English, French, and Japanese. As tacitly implied in the above argument, the determination of the types of features encoded in a lexical entry and of their values is not independent among features. These features are hierarchically ordered and the higher ordered features determine the other features included in the lexical item. In this section, let us see how the mechanism works in detail.

First, the categorical features determine the types of other features to be specified. In other words, the categorical features are ordered highest in the structure. If a lexical entry belongs to a nominal category, it denotes an entity participating in an event, and hence the features to be encoded are those related to the denotation of an entity. Number, referential property, and identity of participants are examples of them. If a lexical entry is a verbal element, on the other hand, the features to be encoded are not those related to an entity, but rather are those related to an event. Semantically, it functions as modifying an event. Multiplicity of event and relation among sub-events are examples of such features.

- (22) a. Features related to an entity: Number, Referential Property, Identity of Participants
 b. Features related to an event: Multiplicity of Events, Relation among Sub-events

Further hierarchical ordering holds among the features in (22a) and (22b). Consider first the nominal features in (22a). Identity of participants becomes relevant only if the values of referential property and number are set as [−referential] and [+plural], respectively. If all nominal expressions in a sentence are those with the value of [+referential], no anaphoric relation holds among them, and so no further specification on identity of participants is required. Consider the sentence in (23). In this sentence, both *John* and *Bill* are referential, and the sentence can be interpreted as John being an agent and Bill a patient.

- (23) John hit Bill.

The feature, identity of participants, is also irrelevant if a nominal anaphoric expression has the values of [−referential] and [−plural]. If an antecedent which the expression depends on is singular, the situation denoted by a sentence contains only a single event and an agent and a patient necessarily becomes identical. The English reflexive pronoun, *himself*, is an example with such values. Consider the sentence in (24). In the situation denoted by this sentence, only one entity participates in the event and the agent and the patient are necessarily identical.

- (24) John hit himself.

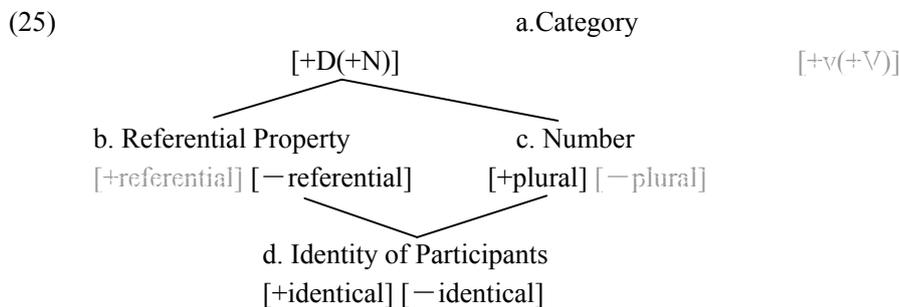
Thus, when a nominal anaphoric expression has the values of [−referential] and [+plural], it requires further specification of the feature, identity of participants, because with these two feature values, only the anaphoric

with a phrase which indicates that the sub-events did not happen simultaneously.

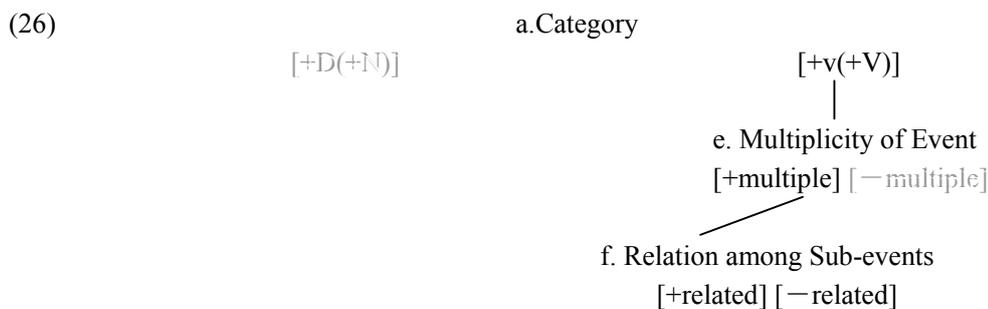
- (i) Taro-to Ziro-wa betsubetsu-no gakkai-de hihan-shi-aw-ta
 Taro-and Ziro-Top separate conference-at criticize-AW-Past
 ‘Taro and Ziro criticized (each other) at separate conferences.’

This example differs from the one in (21) in that it is clear that *Taro* and *Ziro* are affected by each sub-event. The exact definition of the feature [±related] requires further refinement. Intuitively, [+related] is defined that the entities denoted by the subject have to be (directly or indirectly) affected by sub-events as a result of their relation.

relation between the set of agents and the set of patients follows. In order to ensure that an agent and a patient in each sub-event are distinct, the feature of identity of participants has to be specified as [− identical], and to ensure that an agent and a patient in each sub-event are identical, the feature has to be specified as [+ identical]. This hierarchical relation among the features in (22a) is illustrated as in (25).



Now, let us turn to the verbal features in (22b). If the event does not have multiple sub-events, relevance among sub-events does not matter. Hence only if the feature of multiplicity of events is specified as [+ multiple], is the lower-ordered feature put under consideration. This hierarchical relation is illustrated as in (26).



4. How Do Children Acquire Reciprocal Constructions?

So far, we have considered how the cross-linguistic variation in the reciprocal constructions is explained. We have claimed that the variation can be attributed to the difference in values of features associated with each reciprocal marker. Furthermore, we have argued that some values of the features remain unspecified as a permissible option provided by UG, and that these features are hierarchically ordered. Another advantage of this approach is that it also provides a possible explanation to the curious fact observed in the acquisition of reciprocal constructions, which Nakato (2005a, b, 2010) has tried to explain: Children sometimes exhibit different behavior from adults in comprehending reciprocal constructions and the process of how children come to use the construction in an adult-like way differs from language to language. In this section, let us see how such observation is given an explanation.

Given the variety of ambiguities with reciprocal constructions, a question arises as to how children attain their target grammar with limited information available to them. One possibility would be that any child, regardless of his/her target language, would start to use the construction only to describe one situation and extend its use to another situation based on positive evidence provided to him/her.¹³ Nakato (2005a, b) surveys three experimental

¹³ This prediction follows if there is a subset relation among the situations denoted by reciprocal constructions, and if children follow the Subset Principle in the course of language acquisition (Berwick (1985), Wexler and Manzini (1987), Crain et al. (1994) among others). At first sight, it seems that the following subset relation holds among the possible interpretations (cf. Philip (2000), Matsuo (1999/2000)).

(i) reciprocal situation < chaining situation < reflexive situation < collective situation

If children start with the smallest subset, the following developmental process will be expected. (In (ii), A > B means

studies (Matsuo (1999/2000), Philip (2000), and Nakato (2004)), each of which investigates the acquisition of reciprocal constructions in different languages, and reports that this prediction cannot be borne out. The languages under investigation, Japanese (Nakato (2004)), on one hand, and English and Dutch (Matsuo (1999/2000), Philip (2000)), on the other, differ in that the range of situations which can be described by a sentence with a reciprocal marker is wider in Japanese than in English and Dutch. As we have already seen in the previous sections, the Japanese reciprocal marker *-aw* can be used to describe not only a reciprocal situation but a reflexive and a collective situation. The latter two situations cannot be described by the English reciprocal marker *each other* and the same is true of the Dutch reciprocal marker *elkaar*.

(27) Situations Described by a Sentence with a Reciprocal Marker (Adult Grammar)

	Japanese	English	Dutch
a. Reciprocal Situation	possible	possible	possible
b. Reflexive Situation	possible	impossible	impossible
c. Collective Situation	possible	impossible	impossible

By comparing the result of the three acquisitional studies, Nakato (2005a, b) finds that how children comprehend sentences with a reciprocal marker differs from language to language, especially when the target sentences are used in a reflexive and a collective situation. Under a reciprocal situation, all the children under investigation correctly accept a sentence with a reciprocal marker, without distinction of the language which they are learning. Under a reflexive situation, the English-learning children correctly turn down and the Japanese-learning children correctly accept the target sentences. An interesting finding is that a discrepancy is observed between the adults and the children in Dutch: the Dutch-learning children tend to wrongly accept the target sentences under this situation. Under a collective situation, the Japanese-learning children correctly accept the target sentences and the English-learning children and the Dutch-learning children correctly turn down the sentences. The findings are summarized as in (28).¹⁴

(28) Children's Responses to Sentences with a Reciprocal Marker

	Japanese	English	Dutch
a. Reciprocal Situation	accepted	accepted	accepted
b. Reflexive Situation	accepted	not accepted	accepted
c. Collective Situation	accepted	not accepted	not accepted

The findings in (28) lead Nakato (2010) to raise the following questions.

- (29) a. Why do the Japanese children and the Dutch children correctly respond with respect to the collective situation?
 b. Why do the Dutch children accept the reciprocal construction in a wider range of situations than the English children do? More specifically, why do the Dutch children accept the construction under the reflexive situation, while the English children do not?
 c. How do the Dutch children, who wrongly accept the construction in wider situation than the adults do, narrow down the possible interpretations of the construction?

that children use the sentence under the situation A prior to the situation B.)

(ii) a. English(Dutch): reciprocal situation > chaining situation

b. Japanese: reciprocal situation > chaining situation > reflexive situation > collective situation

However, it is still under debate whether children follow the Subset Principle (Gualmini and Schwarz (2009)), and the subset relation among the possible interpretations still needs careful consideration (see Nakato (2010) and Cann et al. (2009)). We would like to address these issues in the near future.

¹⁴ See Nakato (2004, 2005a, b) for detail.

Our approach presented in the previous section makes it possible to partially answer to these issues. Under our approach, the answers lie in the hierarchical ordering of features, under-specification of feature-values, and morphological composition of each reciprocal marker. Given the ordering, it is not unnatural to assume that the course of language acquisition is divided into some stages along with the ordering. At the first stage, children set the value of the highest ordered features, and what follows after this stage depends on the value of higher-ordered features. In our case, the categorical feature of each reciprocal marker comes first, and the value of it determines the types of features whose value has to be set at the subsequent stages. With respect to *-aw*, the values of multiplicity of event and relation among sub-events have to be set in the subsequent stages as in (30a), and with respect to *each other/elkaar*, the values of number and referential property have to be set at the second stage, and depending on the values of these features, the value of identity of participants has to be put under consideration as in (30b).

(30) a. Japanese *-aw*

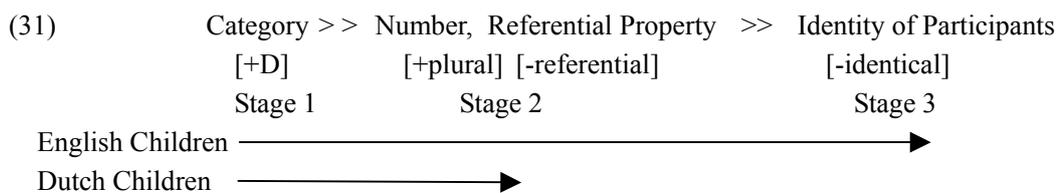
Category >>	Multiplicity of Event >>	Relation among Sub-events
[+v]	[+multiple]	[+related]
Stage 1	Stage 2	Stage 3

b. English *each other*/Dutch *elkaar*

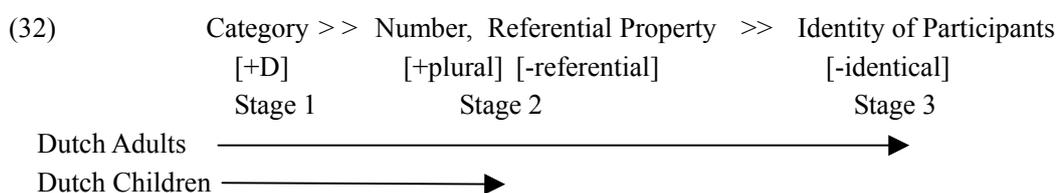
Category >>	Number, Referential Property >>	Identity of Participants
[+D]	[+plural] [-referential]	[-identical]
Stage 1	Stage 2	Stage 3

If this assumption is on the right track, the following answers are provided to the questions in (29). Let us start with the first question: why do the Dutch children correctly turn down the *elkaar* construction in the collective situation, while the Japanese children correctly accept the *V-aw* construction in the same situation? Recall the semantic difference between the collective situation and the other situations. The former situation does not presuppose that event participants play two roles in that event, while the other situations do. If the Japanese children and the Dutch children have already set the value of categorical feature for *-aw* and *elkaar* respectively, and the Dutch children have further set the values of number and referential property, whether participants play two roles does not matter for the Japanese-children, but it does for the Dutch-children. As a result, they correctly respond to the collective situation.

Next, let us turn to the second question: why do the Dutch children accept the construction under the reflexive situation, while the English children do not? To answer this question, morphological composition of each reciprocal marker needs to be taken into consideration, and the assumption of under-specification of feature-values also comes to play a role. English *each other* is comprised of *each* and *other*, each of which has independent use. Dutch *elkaar*, on the other hand, consists of *elk* ‘each,’ which can be independently used, and *aar*, which does not have independent use. A possible conjecture is that the morphological transparency makes it easier for English-learning children to identify the semantic contribution of *each other*, and that they can reach the third stage relatively earlier than Dutch-learning children. Recall again the semantic similarity and difference between the reflexive situation and the reciprocal situation. These two situations are similar in that they presuppose the identity of two sets of participants: the set of agents and the set of patients must be identical in a whole event. However, they are distinguished by the identity of participants in each sub-event. In the reflexive situation, the agent and the patient are identical, while in the reciprocal situation they are not. If the English children have already attained the third stage and specified the value of identity of participants as [-identical], they correctly turn down the *each other* construction under the reflexive situation. If, on the other hand, the Dutch children have not attained that stage yet, and the value of identity of participants still remains unspecified, it is possible for them to accept the *elkaar* construction under the reflexive situation. This scenario is schematically illustrated in (31).



Finally, let us consider the third question: how do the Dutch children, who wrongly accept the construction in a wider range of situations than the adults do, narrow down the possible interpretations of the construction? The answer to this question is also attributed to the difference in the specification in the value of identity of participants between adults and children. The fact that the Dutch *elkaar* construction cannot be used to describe a reflexive situation suggests that the value has to be specified as [-identical] in adult grammar. The Dutch-learning children who have not attained the third stage possibly accept the construction in more situations than the adults, but if they finally reach that stage, they successfully narrow down the possible interpretations in adult-like way.¹⁵



The reason why they cannot attain the third stage as soon as they set the values of number and referential property is still not clear, but as Nakato (2005b) argues, it could be attributed to their cognitive development.

5. Concluding Remarks

This paper focuses on the variation among languages in the situations which can be described by reciprocal constructions and considers why such variation arises. Following the P&P framework, this paper seeks the parameters which give rise to the variation, and adopting the MP, it proposes that the parameters are given in the form of the values of the following six features: category, referential property, number, identity of participants, multiplicity of events, and relation among sub-events. This paper proposes that these features are not simply listed in UG and randomly assembled, but rather they are set in accordance with the hierarchical relation among them. It is further argued that UG also allows some feature values to remain unspecified. The variation under discussion is explained in terms of the value of these features. The difference between Japanese *-aw*, on the one hand, and English *each other* and French *se*, on the other, is attributed to the total difference in their feature compositions, which results from the categorical difference among reciprocal markers. The difference between English *each other* and French *se* is attributed to the difference in the value of number feature, which is specified as [+plural] in the lexical entry of English *each other* and unspecified in that of French *se*.

This paper also shows that the approach can be supported from the view-point of language acquisition. The questions of why children show different behavior from adults in some languages and why children do not show uniform developmental pattern without distinction of their target languages have remained unsolved. Our approach makes it possible to divide the acquisitional process into some stages along with the hierarchical orderings of features and to answer these questions.

¹⁵ How the Dutch-learning children reach the final stage is an issue to be addressed, which I have no answer at this moment. One possibility would be that the language acquisition device makes it possible for children to make an induction from evidence available to them when subset principle is not applicable (I would like to thank Christopher Tancredi for his suggestion on this issue). To solve the issue, it is necessary to consider the property of language acquisition device and I leave it open here.

References

- Berwick, Robert C. (1985) *The Acquisition of Syntactic Knowledge*, MIT Press, Cambridge, Mass.
- Beukema, Frits, and Marcel den Dikken eds. (1999) *Clitic Phenomena in European Languages*, John Benjamins Publishing Company, Amsterdam/Philadelphia.
- Cann, Rennie, Ruth Kempson and Eleni Gregoromichelaki (2009) *Semantics: An Introduction to Meaning in Language*, Cambridge University Press, New York.
- Chomsky, Noam (1981) *Lectures on Government and Binding*, Foris, Dordrecht, The Netherlands.
- Chomsky, Noam (1995) *The Minimalist Program*, MIT Press, Cambridge, MA.
- Chomsky, Noam (2000) "Minimalist Inquiries: The Framework," *Step by Step: Essays on Minimalist Syntax in Honor of Howard Lasnik*, ed. by Roger Martin, David Michaels, and Juan Uriagereka, 89-155, MIT Press, Cambridge, MA.
- Chomsky, Noam (2001) "Derivation by Phase," *Ken Hale: A Life in Language*, ed. by Michael Kenstowicz, 1-52, MIT Press, Cambridge, MA.
- Chomsky, Noam (2004) "Beyond Explanatory Adequacy," *Structures and Beyond: The Cartography of Syntactic Structures*, ed. by Adriana Belletti, 104-131, Oxford University Press, Oxford.
- Chomsky, Noam (2005) "Three Factors in Language Design," *Linguistic Inquiry* 36, 1-22.
- Chomsky, Noam (2008) "On Phases," *Foundational Issues in Linguistic Theory*, ed. by Robert Freidin, Carlos P. Otero and Maria Luisa Zubizarreta, 133-165, MIT Press, Cambridge, MA.
- Crain, Stephen, Weijia Ni, and Lura Conway (1994) "Learning, Pursing, and Modularity," *Perspectives on Sentence Processing*, ed. by Charles Clifton, Lyn Frazier, and Keith Rayner, 443-467, Lawrence Erlbaum Associate, Hillsdale, NJ.
- Dalrymple, Mary, Makoto Kanazawa, Sam Mchombo, and Stanley Peters (1994) "What Do Reciprocals Mean?" *SALT IV*, 61-78.
- Donaldson, Weber D. (1973) *French Reflexive Verbs: A Case Grammar Description*, Mouton, The Hague.
- Fiengo, Robert and Howard Lasnik (1973) "The Logical Structure of Reciprocal Sentences in English," *Foundations of Language* 9(4), 447-468.
- Gualmini, Andrea and Bernhard Schwarz (2009) "Solving Learnability Problems in the Acquisition of Semantics," *Journal of Semantics* 26, 185-215.
- Heim, Irene, Howard Lasnik, and Robert May (1991) "Reciprocity and Plurality," *Linguistic Inquiry* 22, 63-101.
- Imai, Ikumi and Stanley Peters (1996) "Reciprocity and the Semantics of (*O*)*tagai* and *-Aw* in Japanese," ed. by Takao Gunji, *Studies on the Universality of Constraint-Based Phrase Structure Grammars*, 99-109.
- Liu, Meichun (1999) "Reciprocal Marking with Deictic Verbs *Come* and *Go* in Mandarin," *Reciprocals: Forms and Functions*, ed. by Zygmunt Frajzyngier and Traci S. Curl, 123-132, John Benjamins Publishing Company, Amsterdam/Philadelphia.
- Nakato, Terue (2004) "Adult and Child Interpretation of Japanese *V-aw* Construction: A Preliminary Study," *Linguistic Research* 20, 237-255, The University of Tokyo English Linguistics Association.
- Nakato, Terue (2005a) "Saiki-hyogen, Sogo-hyogen no Kakutoku ni tsuite," *The Rising Generation* 151, 46-49, 93-96, Kenkyusya.
- Nakato, Terue (2005b) "On the Acquisition of Reciprocal Expressions," *The World of Linguistic Research: A Festschrift for Kinsuke Hasegawa on the Occasions of His Seventieth Birthday*, ed. by Noriko Imanishi, 223-231, Kaitakusha, Tokyo.
- Nakato, Terue (2010) "On the Acquisition of Reciprocal Expressions: A View Based on the Minimalist Program," *JELS* 27, 167-176, The English Linguistic Society of Japan.
- Matsuo, Asumi (1999/2000) "Children's Acquisition of Reciprocal Sentences with Stative and Active Predicates," *Language Acquisition* 8, 1-22.
- Philip, William (2000) "Adult and Child Understanding of Simple Reciprocal Sentences," *Language* 76, 1-27.

- Reuland, Eric (2008) "Anaphoric Dependencies: How are They Encoded? Towards a Derivation-Based Typology," *Reciprocals and Reflexives: Theoretical and Typological Explorations*, ed. by Ekkehard König and Volker Gast, 499-556, Mouton de Gruyter, Berlin/New York.
- Reinhart, Tanya, and Eric Reuland (1993) "Reflexivity," *Linguistic Inquiry* 24, 657-720.
- Riemsdijk, Henk van ed. (1999) *Clitics in the Languages of Europe*, Mouton de Gruyter, Berlin/New York.
- Wexler, Kenneth and Rita Manzini (1987) "Parameters and Learnability in Binding Theory," *Parameter Setting*, ed. by Thomas Roeper and Edwin Williams, 41-76, Reidel, Dordrecht.