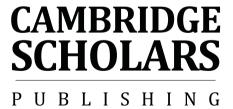# Research in Second Language Acquisition

Research in Second Language Acquisition: Empirical Evidence across Languages

Edited by

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P U B L I S H I N G

CONTENTS

ABOUT THIS BOOK

1 Introduction

Since Pienemann's first publication on Processability Theory (henceforth PT) in 1998, PT has become an established theory in the field of second language acquisition research and the publication of Pienemann (ed.) (2005) marked an extension to the existing theory, including the newer models of *Lexical- Functional Grammar* (Bresnan 2001) and its implications to second language development within the theory. Since the publication of the 2005- volume, various projects have been conducted to apply the extensions made to Processability Theory to a number of new theoretical issues, typologically different languages and pedagogical contexts. Additionally, the scope of PT has been widened to the application of the theory to the field of Applied Linguistics and Language Teaching. All this research has added additional support to the theoretical implications and the explanatory power provided in Pienemann 1998 and 2005.

This volume is a follow- up volume to Mansouri (2007) *Second Language Acquisition Research. Theory Construction and Testing* and Keßler (2008) *Processability Approaches to Second Language Development and Second Language Learning* both also published by Cambridge Scholars Publishing, Newcastle upon Tyne.

Like the latter, the contributions in this volume focus on the application of PT to various settings in second language acquisition research. They provide an overview of the manifold approaches taken to investigate L2 acquisition within the PT framework and combine a more theoretical approach in order to further extend the theory with a number of studies utilizing PT to further investigate bilingual language acquisition and language development in natural and institutional settings.

The structure of this book

Taking into consideration the various aspects of research within the PT framework, this book is organised in two parts. Part 1 "Second Language Processing: Contributions to Theory Development" contains a number of papers discussing the inclusion of further theoretical aspects into PT, focusing on English as a second language. In Part 2 "Second Language Grammars across Languages", PT is applied to a number of typologically different languages and contexts.

Part 1:
Second Language Processing: Contributions to Theory Development

A lot of research within the PT framework focuses on the development of English as a second or foreign language. Part 1 includes four papers working on the inclusion or extension of further theoretical aspects into PT. Leading on from her results in Yamaguchi (2008), Yamaguchi explores the development of plural marking and plural agreement in the context of child English L2 acquisition and provides another longitudinal study confirming the hierarchical nature of L2 processing. Itani- Adams works on simultaneous bilingual language acquisition within a PT context. Her paper adds support to the separate development hypothesis (deHouwer 1990) by utilizing the PT stages as an instrument to describe different developmental paths in the languages acquired by her informant. Keatinge and Keßler present a new extension to the PT framework. Their study reports on the inclusion of ESL interlanguage structures of the passive voice into the framework. Their findings confirm previous research (Pienemann 2005) by showing that the passive voice develops at a later point in time in the acquisition process and they provide an overview of interlanguage development of the passive voice in English. In addition to this study, Wang presents results from an online production study, also exploring the acquisition of the passive voice in English by speakers of Mandarin Chinese. His findings support the results of Keatinge and Keßler.

Part 2: Second Language Grammars across Languages

The second part of this volume examines interlanguage development and a number of morpho- syntactic structures across a variety of typologically different L2s. Ågren reports on her findings of morphological development in Swedish learners of French. Her study features a new innovative method of diagnosing language development online as well as one of the first studies which investigate the interlanguage development of French as L2 within a PT framework. Bettoni et al. analyse the development of a particular Italian construction, namely the postverbal plural and add a new feature to the language specific developmental hierarchy of Italian as L2. Medojevic's study features a first attempt to apply PT to Serbian. Her study investigates the acquisition of Serbian as a family and community language by Serbian/ Australian bilingual teenagers and provides empirical evidence for the interlanguage development of Serbian. Kawaguchi explores the acquisition of causative structures in L2 Japanese by native speakers of English and discusses the inclusion of this particular structure into the PT framework. Her findings confirm previous research on this particular structure, showing that causative constructions – like the passive voice – are acquired at a later point in time of the acquisition process. Ossella investigates case, word order and thematic role in German as a foreign language by native speakers of Italian. Kersten's study provides an insight into further methodological issues of using linguistic profiling to investigate L2 development.

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Acknowledgements

PART I

SECOND LANGUAGE PROCESSING:

CONTRIBUTIONS TO THEORY DEVELOPMENT

THE DEVELOPMENT OF PLURAL MARKING AND PLURAL AGREEMENT IN CHILD ENGLISH L2 ACQUISITION[1]

YUMIKO YAMAGUCHI

This chapter aims to examine grammatical development, focusing on morphological plural marking -*s* on nouns and NP (Noun Phrase) plural agreement, in child English as a second language (L2) acquisition based on Processability Theory (PT; Pienemann, 1998, 2005). Plural marker -*s* on nouns is predicted to emerge at stage 2 in PT, since it only requires lexical procedure, namely, form variation of one constituent. In contrast, NP plural agreement is claimed to occur at stage 3, as it requires phrasal procedure, that is, exchange of grammatical information between two constituents. However, the developmental sequence of English L2 plural marking and plural agreement predicted in PT has been recently challenged by claiming that phrasal plural agreement with numerals emerges before lexical plural marker -*s* (e.g., Charters and Jansen, 2007). Hence, the current study addresses this issue with fresh evidence from a two-year longitudinal case study of a Japanese L1 primary school aged (5;8 to 7;8) child acquiring English as L2 in Australia, which is work in progress for my PhD thesis. In order to elicit the child speech production, several tasks, such as semi-structured interviews, narratives, and communication games, were performed in this study. Distributional analysis of plural marking in all contexts is carried out and compared with previous English L2 studies (e.g., Pienemann, 1998, 2005). The results demonstrate that plural marker -*s* on nouns (e.g., books) is acquired before NP plural agreement with numerals (e.g., two books) or other quantifiers

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(e.g., a lot of books), as predicted in PT. In addition, NP plural agreement is found to occur with numerals before it appears with other quantifiers.

1. Introduction

This chapter aims to investigate the developmental sequence of morphological plural marker *-s* on nouns and NP (Noun Phrase) plural agreement in Japanese L1 child learner acquiring English L2 acquisition within the framework of Processability Theory (PT; Pienemann, 1998, 2005). PT (Pienemann, 1998, 2005) assumes that L2 learners can produce only those linguistic forms for which they have acquired the necessary processing prerequisites and predicts which grammatical structures can be processed by the L2 learner at a given level of development, based on Levelt's (1989) speech model and Lexical-Functional Grammar (LFG; Kaplan and Bresnan, 1982; Bresnan, 2001).

Processability hierarchy for L2 morphology and syntax predicated in PT have been supported by empirical evidence from recent studies in various language contexts, such as Italian, Japanese, German, Arabic, English, Swedish and Chinese (e.g., Di Biase & Kawaguchi, 2002; Keßler, 2006, Mansouri, 2005; Pienemann, 1998; Pienemann & Håkansson, 1999, Zhang, 2005). However, the original processability hierarchy for English L2 was based on the findings from only cross-sectional studies (Johnston, 1985; Pienemann and Mackey, 1993). Moreover, the developmental sequence of plural marker *-s* on nouns and NP plural agreement in English L2 has been challenged by recent research (e.g., Charters and Jansen, 2007).

The present chapter attempts to address this issue with fresh evidence from a longitudinal study of Japanese L1 child learner acquiring English L2, focusing on the developmental sequence of plural marker *-s* and NP plural agreement. In particular, more detailed analysis of the development of NP plural agreement is carried out by categorizing NP plural agreement into two types, such as numerical and non-numerical agreement. PT currently does not distinguish between these two types of NP plural agreement.

In the following, plural marking systems in English and Japanese are briefly described first. Then, previous findings in English L2 studies on the acquisition of plural morpheme are summarised. Next, Processability Theory (PT; Pienemann, 1998, 2005) is outlined, as well as the findings in previous PT-based studies on English L2 morphology. Then, the current study, including research methods and the findings, is presented. Finally, the findings of the study are discussed based on PT.

2. Plural marking in English and Japanese

In English, there are a number of morpho-syntactic properties that reflect whether we are speaking about one thing or more than one thing (e.g., Ferenz and Prasada, 2002). As for regular English nouns, plural can be formed by adding a plural marker *-s* (or sometimes *-es*) (e.g., *cats, dogs, books, boxes*). In contrast, plural marking is not obligatory in Japanese and occurs only when the speaker wants to draw the listener's attention to the quantity (e.g., Corbett, 2000, Maynard, 1990). The following is an example in which the plurality is not clear.

(1) *Heya   ni   neko   ga   iru*
      room   in   cat   SUBJ   be
      'There is a cat/are some cats in the room.'

In order to specify quantity, Japanese employs a set of counters (e.g., Maynard, 1990). While the number of *neko* 'cat' is not specified in example (1), large quantities can be expressed by adding the quantifier, *takusan* 'much, many', after the subject marker, *ga,* as in example (2).

(2) *Heya   ni   neko   ga   takusan   iru*
      room   in   cat   SUBJ   many   be
      'There are many cats in the room.'

Also, a suffix *-tachi* can be used to make plural forms of personal pronouns (e.g., *watashi-tachi* 'we') and other nouns referring to persons (e.g., *otona-tachi* 'adults') (e.g., Maynard, 1990). In example (3), "more than one cat" is emphasized with this suffix *-tachi.*.

(3) *Heya   ni   neko-tachi   ga   iru*
      room   in   cat-PLURAL   SUBJ   be
      'There is more than one cat in the room.'

In addition, there are three other suffixes, such as *-domo, -gata,* and *-ra,* which can be used as plural markers for personal pronouns or human nouns[2].

    In Japanese, whether or not NP head type is animated affects the choice between marking plurality and not marking it. Downing (1996)

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[2] Please see Makino and Tsutui (1986) for further explanations about these suffixes.

summarises the factors which affect the choice between marking plurality and not marking it, as in Table 1.

	referent type	human	other animate	inanimate
	pronoun	required	required	required
NP head type	proper noun	required	rare	impossible
	common noun	possible	rare	impossible

Table 1: The use of plural markers in Japanese (after Downing, 1996: 205)

3. The acquisition of English plural morpheme

The English plural morpheme -*s* is one of the first bound morphemes acquired by English L1 children (Jia, 2003). The results in English L1 studies (e.g., Brown, 1973; de Villiers and de Villiers, 1973) suggest that "most normally developing children master the plural morpheme no later than the 3.0 to 3.5 mean length of utterance (MLU) range or 29-33 months of age, as defined by 80% or 90% correct use in obligatory contexts across two or three consecutive testing sessions" (Jia, 2003, p.1297).

In English L2 studies (e.g., Bialystok and Miller, 1999; Flege, Yeni-Komshian, and Liu, 1999; Jia, Aaronson, and Wu, 2002), it was shown that the native-level mastery of the plural morpheme was hardly achieved by immigrants, even after many years of exposure to English. In particular, studies on speakers of Asian languages, which lack the morphology system for plurality (e.g., Flege et al, 1999; Jia et al, 2002), found that plural morpheme was one of the hardest grammatical structures to acquire. With regard to studies on Japanese L1 speakers, Hakuta (1976, 1978) examined a 5 year old girl acquiring English L2 in the United States over 7 months. In his study, the acquisition points of grammatical morphemes were defined as the first of three consecutive two-week samples in which the morphemes were supplied in over 90% of obligatory contexts. He found that the Japanese child learner, who was exposed to English L2 at 5 years old, achieved only 60% accuracy of the plural morpheme use in the end of his 7 month longitudinal study. He claimed that the reason why the plural morpheme appeared relatively later than other grammatical morphemes, such as progressive -*ing*, in the Japanese child learner's English L2 acquisition was that "the notion of plurality (number) does not exist in the Japanese grammar" (Hakuta, 1978, p. 143).

More recently, Jia (2003) conducted a 5 year longitudinal study on the acquisition of the English plural morpheme by 10 Chinese L1 children,

who immigrated to the United States between ages 5 and 16. Jia (2003) used the criterion of 80% correct use of the morpheme in obligatory contexts across three consecutive testing sessions based on L1 literature (Lahey, Liebergott, Chesnick, Menyuk, and Adams, 1992) and demonstrated that only 7 of these 10 learners mastered the plural morpheme after 5 years of English exposure.

However, accuracy-based criteria used in these previous studies are often claimed to be ambiguous (e.g., Larsen-Freeman and Long, 1991; Pienemann, 1998). In fact, it is difficult to determine whether or not the learner has acquired the grammatical structure based on the accuracy, since even 80 to 90% accurate use across three consecutive testing sessions does not guarantee that the same or higher accuracy use continues in learner's production after those sessions.

In order to address the issue on the accuracy-based criteria, the emergence criterion, which "identifies the point of first emergence of a structure in an interlanguage system" (Pienemann, 2005, p.54), was developed by Meisel, Clahsen, and Pienemann (1981). As the emergence criterion has been applied in much L2 research based on PT [3] (e.g., Pienemann, 1998; Di Biase and Kawaguchi, 2002), the current study also considers the first emergence of plural maker -s and NP plural agreement as the acquisition points of those structures. More detailed description of PT-based analysis is provided in the following sections.

4. Processability Theory

Processability Theory (PT; Pienemann, 1998, 2005) is one of the major current approaches in second language acquisition (SLA) studies and a universal framework which is able to predict developmental sequences for any L2. According to Pienemann (1998, 2005), the logic underlying PT is that the learner at any stage is able to produce and comprehend only those L2 linguistic structures that current stage of language processor can handle. Therefore, it is important to understand the architecture of the language processor and how it handles an L2 in order to predict the developmental sequences of linguistic structures in L2 acquisition.

PT follows the view on language production proposed by Levelt's (1989) speech model, which overlaps to some extent with Kempen and

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[3] Besides PT-based studies, Yamamoto (2005) has shown that three Japanese L1 children, aged 3, acquired plural marker -s on nouns 24 to 36 months after the children began to be exposed to English L2, although the acquisition criterion in her study was not clearly explained.

Hoenkamp's (1987) and Garrett's (e.g., 1976, 1980, 1982) work. The basic assumptions of the language processing in PT are as follows:

> I.   Processing components are relatively autonomous specialists which operate largely automatically;
> ii.   Processing is incremental.
> iii.The output of the processor is linear, while it may not be mapped onto the underlying meaning in a linear way.
> iv.Grammatical processing has access to a grammatical memory.
> (Pienemann, 2005: 4 ff.)

Based on Kempen and Hoenkamp's (1987) Incremental Procedural Grammar (IPG), a set of grammatical encoding procedures is formed according to their sequence of activation in the language production process. The processing procedures and routines in PT hierarchy are as follows:

> I.   the lemma,
> ii. the category procedure (lexical category of the lemma),
> iii.   the phrasal procedure (instigated by the category of the head),
> iv.the S-procedure and the target language word order rules,
> v.   the subordinate clause procedure - if applicable.
> (Pienemann, 2005: 9)

PT claims that this sequence follows an implicational pattern where each procedure is a necessary prerequisite for the following procedure. L2 learners are claimed to build all of these procedures, apart from the first one (de Bot, 1992).

> "A word needs to be added to the L2 lexicon before its grammatical category can be assigned. The grammatical category of a lemma is needed before a category procedure can be called. Only if the grammatical category of the head of phrase is assigned can the phrasal procedure be called. Only if a phrasal procedure has been completed and its value is returned can Appointment Rules determine the function of the phrase. And only if the function of the phrase has been determined can it be attached to the S-node and sentential information be stored in the S-holder." (Pienemann, 1998:80)

In order to explain the above hierarchy in relation to grammatical structures in individual languages, PT has incorporated Lexical-Functional Grammar (LFG; Kaplan and Bresnan, 1982; Bresnan, 2001), which is a typologically and psychologically plausible grammar theory. According to Pienemann (1998), LFG, which shares the key aspects with Kempen

and Hoenkamp's (1987) IPG, is efficient to analyze the psycholinguistic process of grammatical information exchange.   LFG consists of a constituent structure (c-structure), a lexicon, a functional structure (f-structure) and an argument structure (a-structure).   The most prominent characteristic of LFG is 'feature unification', namely information matching between parts of the sentence.   Figure 1 shows the example of three parallel structures and feature unification in LFG.

Figure 1: Three parallel structures and feature unification in LFG (After Pienemann, Di Biase, and Kawaguchi, 2005: 200)

In the sentence in Figure 1 ('Peter sees a dog'), the lexical entries of the noun 'Peter' and the verb 'sees' have the values '3' (third) and 'SG' (singular).   In order to achieve subject verb-agreement, the grammatical information is passed on to the NP (Noun Phrase) procedure and VP (Verb Phrase) procedure and then two sets of information are passed on to the S (sentence) procedure where the diacritic features of PERSON and NUMBER is matched or unified.   In PT, processability hierarchy is formed based on the points of unification, as follows:

1.   No exchange of grammatical information (= no unification of features).
2.   Exchange of grammatical information within the phrase
3.   Exchange of grammatical information within the sentence.
(Pienemann, 2007: 143)

Table 2 shows hypothesized processability hierarchy for English L2 (cf. Pienemann, 2005: 24, Di Biase and Kawaguchi, 2004: 80). In this section, processability hierarchy for English L2 is explained focusing on the morphological structures for plural marking, which the present study examines. Please see Pienemann (1998, 2005) for further explanations on processability hierarchy for English L2.

stage	Processing procedure	Morphosyntactic structures	Examples
6	Subord.cl.procedure (inter-clausal)	Indirect Q	I wonder *where he went*.
5	S-procedure (inter-phrasal)	Wh-Do Q? Wh-Aux Q? SV agreement (= 3rd person -s)	What *did* you eat? Where *can* she play? Mary drink*s* coffee
4	VP procedure (inter-phrasal)	Copula-Sub Q? Wh-Copula Q? Tense agreement (Aux - V)	*Is he* in the car? *Where is* John? He *has* seen Tom.
3	Phrasal procedure (phrasal information)	Do-SV(O) Q? Wh - SV(O) Q? ADV+SV(O) NP agreement	*Do* you like tea? *Where* you go? *Today* I study. I have *two apples*
2	Category procedure (lexical)	SVO Q? SVO Plural -s Past -ed Progressive -ing	You like cats*?* I drink juice We read book*s* Sam walk*ed* Daddy is sleep*ing*
1	Word/lemma	Invariant forms formulae	Dog Hello How are you?

Table 2: Processing hierarchy for English L2 (After Pienemann, 2005: 24, Di Biase and Kawaguchi, 2004: 80)

In PT, plural marker *-s* is called 'lexical'. In order to assign lexical morphemes, such as plural *-s*, regular past *-ed*, and progressive *-ing*, on nouns or verbs, no exchange of grammatical information is required, since the diacritic feature is to be marked in one constituent only. In other words, as diacritic features such as "number" and "tense" are listed in the lexical entries of word, marking on nouns or verbs can be achieved directly from conceptualization. In PT (Pienemann, 1998, 2005), as lexical morphemes can be produced without phrasal procedures, they are

claimed to develop before phrasal procedures. Hence, they are hypothesized to emerge at stage 2, as shown in Table 2.

With regard to NP agreement, diacritic features are to be marked in several constituents and their value information has to be matched between constituents. The following example shows the relevant lexical entries for the phrase "many dogs" (Pienemann, 2005: 25).

many:	DET	(SPEC)	=	MANY
		(NUM)	=	PL
dogs:	N	(PRED)	=	DOG
		(NUM)	=	PL

In this example, as the value of DET (determiner) (i.e., "many") for NUM (number) is PL (plural), the value of the head N (noun) (i.e., "dog") for NUM needs to be PL with plural marker *-s* for NP agreement. In other words, "the value for the diacritic feature 'number' has to be unified between DET and N" (Pienemann, 2005: 25). For this process, the grammatical information is stored in a phrasal procedure. As "this type of morpheme becomes available to the language learner once phrasal procedures have been developed for the L2" (Pienemann, 2005, p.12), it is called 'phrasal' in PT. Accordingly, it is hypothesized to emerge at stage 3.

5. PT-based studies in English L2

Pienemann (1998, 2005) tested Processability hierarchy for English L2 against empirical data from Johnston's (1985) study of Vietnamese and Polish adult learners and Pienemann and Mackey's (1993) study of child learners. Johnston's (1985) cross-sectional study examined the development of 12 English grammatical structures in 24 Polish and Vietnamese adult immigrants in Australia. Pienemann (1998) has shown that the 12 grammatical structures were acquired by Vietnamese and Polish adult learners in the order described in PT and has claimed that Johnston's (1985) study strongly supports English L2 processability hierarchy.

Another study, which Pienemann (1998) examined in order to test English L2 processability hierarchy, was a cross-sectional study of child English L2 acquisition by Pienemann and Mackey (1993). In their study, the speech samples from 13 children aged 8 to 10 years old were collected using various communication tasks, such as habitual actions, story completion, informal interview, picture sequencing, picture differences,

and meet partner. Although the implicational analysis of the children's speech corpus was presented in the same way as that for Johnston's (1985) data, two additional structures were included in Pienemann and Mackey's (1993) study. As in Johnston's (1985) study, no contradictory evidence to the hierarchy predicted in PT has been found in the child English L2 acquisition. Hence, the empirical data from Pienemann & Mackey's (1993) study has shown additional support for English L2 processability hierarchy. It means both English L2 studies (Johnston, 1985; Pienemann and Mackey, 1993) have shown that plural marker -s is acquired before NP plural agreement as predicted in PT.

However, empirical evidence for English L2 processability hierarchy is still limited, since studies by Johnston's (1985) and Pienemann and Mackey's (1993) were both cross-sectional and PT has never been tested in longitudinal studies in English L2 context. Moreover, more detailed analysis on the English L2 developmental sequence for plural marker -s and NP plural agreement is required, since the sequence predicted in PT has been challenged by some recent research (Charters and Jansen, 2007; Dao, 2007).

In Dao's (2007) study, spontaneous oral production of 36 Vietnamese instructed learners of English L2, aged between 13 and 18, was elicited by tasks and their morphological development was examined. The results of her study showed that plural marker -s had occurred with numerals (e.g., five books), before plural marker -s without any quantifiers (e.g., books) emerged. More specifically, 6 Vietnamese learners, who did not acquire lexical plural morpheme -s, were found to have already acquired NP plural agreement with numerals in Dao's (2007) study. This suggests that the developmental sequence for plural marker -s and NP plural agreement in Vietnamese learners' English L2 acquisition is not consistent with the sequence predicted in PT. Based on the findings in Dao (2007), Charters and Jansen (2007) have claimed that as numerals facilitate the acquisition of plural marking by highlighting the conceptual transparency, 'phrasal plural' with numerals (e.g., "I have two apples") emerges before 'lexical plural' (e.g., "I like apples").

However, as Dao (2007) examined instructed L2 learners cross-sectionally, more detailed analysis, in particular, in longitudinal studies on naturalistic L2 learners needs to be conducted to investigate the discrepancy. In addition, PT currently does not distinguish between two types of NP plural agreement (i.e., NP plural agreement with numerals and other quantifiers). Hence, the development sequence for each type of NP plural agreement should be analysed separately, as Charters and Jansen (2007) suggested.

6. Empirical Study

The present study is based on a work in progress for my PhD thesis. The study takes the form of a two-year longitudinal case study of a Japanese L1 primary school aged (5;8 to 7;8) child acquiring English as L2 in Australia.

In order to investigate the developmental sequence for English L2 plural marker -*s* and NP plural agreement predicted in PT and to examine the discrepancy between PT and recent English L2 research (e.g., Charters and Jansen, 2007), the present study addresses the question whether plural marker -*s* on nouns (e.g., books) is acquired before NP plural agreement, in particular, NP plural agreement with numerals (e.g., two books), in English L2 acquisition of a Japanese child.

6.1 Participant

The participant, Kumi[4], is the second daughter of Japanese native speaker parents. Their conversation at home is always in their native language, Japanese. The family moved to Australia when she was five years old and she was enrolled in a local primary school where all subjects were taught in her second language, English. She had learned some English before she moved to Australia. However, her English skills were very limited at the time when she started attending the local primary school. She was able to produce only basic sentences such as "I don't know" and "thank you". Such sentences are recognized as formulae or chunks at stage 1 in processability hierarchy, as they require no procedural skills.

6.2 Procedures

Data collection started one month after Kumi started attending local primary school. In other words, she had been exposed to English for one month in Australia by the time of the first recording. Kumi's speech in English was tape-recorded from the time she was 5 years 8 months old until 7 years 8 months old, namely over two years.

Data was collected fortnightly for the first two months, after that, every two months for the rest of the first year, and every three months in the second year. For speech elicitation, various tasks, including semi-structured interviews, narratives, and communication games were utilized

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[4] Kumi is a fictitious name.

and performed with native or near native speakers of English. Each recording session lasted around 20 to 30 minutes. Kumi's speech production was transcribed.

6.3 Data Analysis

Based on the transcribed speech corpus for two-year longitudinal study on Japanese L1 child learner acquiring English L2, a distributional analysis of plural marker -s on nouns and two types of NP plural agreement (i.e., NP plural agreement with numerals and non-numeric quantifiers) was conducted. The obligatory plural contexts were determined based on Jia (2003), which examined English L2 plural morpheme acquisition by Chinese children. Jia (2003) adopted linguistic cues and contextual cues as the criteria for the obligatory contexts for plural morpheme, following Cazden (1968):

> The obligatory context indexed by linguistic cues refers to count nouns that occur after (a) determinatives, such as *some, all, both*; (b) cardinal numbers, such as *two* and *three*; (c) noun phrases, such as *a dozen*, or fractions, such as *two thirds*; and (d) plural demonstratives, such as *these* and *those*. The contextual cues included those derived from sentential contexts (e.g., *break into pieces* or *use chopsticks*), discourse contexts (e.g., *her stepsisters were jealous of her beauty, after mentioning that Cinderella's stepmother had two daughters*), and pictorial contexts (the number of a particular object portrayed on a picture).
> (Jia, 2003, p.1301)

In this study, as lexical plural (i.e., plural marker -s) and phrasal plural (i.e., NP plural agreement) are examined separately, based on PT. Hence, the present study determines the obligatory plural contexts for plural marker -s based on the contextual cues and those for NP agreement based on the linguistic cues.

Following Jia (2003), the current study excludes contexts for routine uses of plural marking. These include "the names of cartoon characters (e.g., *Power Rangers* and *Goose Bumps*), names of places (e.g., *Six Flags*), nations (e.g., *United States*), and school subjects, (e.g., *Social Studies*)" (Jia, 2003, p.1301). Jia (2003) claims that the learner may produce plural forms of these nouns through rote memory and that the singular forms of these nouns are not used in English, in contrast to other nouns with plural forms. Moreover, if there were any doubts about whether the plural marker was obligatory or not, it was excluded from the analysis. Echoic

expressions, which occurred when the learner repeated the interlocutor's utterances, were also excluded.

Based on previous PT studies, emergence criterion was applied to determine the acquisition points of target structures.
A structure was considered to have been acquired if the rule is supplied more than once in lexically and structurally varied contexts, following Di Biase & Kawaguchi (2002). Although most previous studies on the acquisition of grammatical morphemes (e.g., Brown, 1973; Cazden, 1968; Hakuta, 1976, 1978; Jia, 2003) determined the acquisition point based on the accuracy, it has been pointed out that the accuracy of morpheme insertion cannot be guaranteed to develop steadily (e.g., Larsen-Freeman and Long, 1991; Pienemann, 1998).

6.4 Results

The results of the distributional analysis on Kumi's two-year longitudinal study on English L2 acquisition of morphological plural marking are presented in Table 3. The first row shows the different points in time (T1, T2…) in the corpus, while the far left column indicates the hypothesized morphological structures for plural marking, that is, plural marker *-s* on nouns, NP plural agreement with numerals, and NP plural agreement with non-numeric quantifiers. In this table, the number after "+" shows the total number of the occurrences of the hypothesized structures in obligatory plural contexts. The number after "-" indicates the total number of the contexts in which Kumi failed to produce the hypothesized structures in obligatory plural contexts. In addition, ">" shows the instances when Kumi oversupplied plural marker *-s* on nouns in singular contexts or on irregular plural nouns. There is no "oversupply" for NP plural agreement, as all the NPs analyzed had numerals or non-numeric quantifiers.

Table 3 indicates that Kumi acquired plural marker *-s* on nouns in Time 3, namely 2 months after she was exposed to English L2 in Australia. NP plural agreement with numerals is shown to have emerged in Time 7, that is, after 7 month exposure of English L2. Then, NP plural agreement with other quantifiers appeared in Time 9, namely 11 months after her first exposure to English L2.

structures	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14
NP plural agreement with other quantifiers	0	0	0	0	+0 −1	0	+0 −3	0	+3 −2	+6 −3	+2 −0	+6 −1	+6 −4	+9 −0
NP plural agreement with numerals	0	+0 −6	+0 −6	0	+1 −4	0	+2 −1	+1 −2	+1 −3	+6 −6	+3 −2	+2 −0	+0 −1	+5 −1
plural marker -s on nouns	+0 −5	+2 −7 >1	+2 −6	+2 −4	+2 −4	+22 −2	+2 −4	+2 −2	+7 −8	+10 −2	+6 −2	+9 −1	+14 −12 >1	+39 −3 >1

Note: "+" = supplied in plural context, "-" = not supplied in plural context,
">" = oversupply (marked in singular context or overregularizations)

Table 3. Distributional analysis of Kumi's plural marking acquisition

All the instances involving three hypothesized structures, such as plural marker -*s* on nouns, NP plural agreement with numerals, and NP plural agreement with non-numeric quantifiers, in Kumi's speech production are presented in Appendix A, B, and C respectively.

Most of the obligatory contexts for plural marking observed in Kumi's early English L2 production occurred when she talked about pictures (i.e., 'pictorial contexts'). In Time 1, namely, one month after Kumi started attending local primary school in Australia, Kumi never supplied plural marker -*s* on nouns, although there were 5 obligatory contexts. There was no context for NP plural agreement with either numerals or non-numeric quantifiers in Time 1.

In Time 2, namely after 1.5 month English L2 exposure, Kumi produced "sunglasses" twice. However, as they occurred in the same lexical contexts, Time 2 was not considered as the emergence point for plural marker -*s*. As for NP plural agreement, there were 6 obligatory contexts with numerals (e.g., "two light"). However, Kumi never produced NP plural agreement with numerals.

In Time 3, Kumi supplied plural marker -*s* on nouns twice (i.e., "books", "shoes"). As they occurred more than once in lexically and structurally varied contexts, Time 3 was considered as the acquisition point for plural marker -*s*. Time 3 was 2 months after Kumi had started attending local primary school in Australia. At the same time, obligatory contexts for NP plural agreement with numerals occurred 6 times (e.g., "two mountain", "three tree"). However, she failed to produce NP plural agreement successfully.

As shown in Table 3, it is clear that Kumi started supplying plural marker -*s* on nouns constantly in obligatory contexts from Time 3. However, NP plural agreement was not acquired until Time 7, although Kumi produced NP plural agreement with a numeral once in Time 5 (i.e., eight babies). As this was only instance for successful NP plural agreement with numerals, Time 5 was not considered as the acquisition point. There was no context for NP plural agreement in Time 6.

In Time 7, namely 7 months after Kumi was exposed to English L2 in Australia, NP plural agreement occurred twice in lexically and structurally varied contexts (i.e., "one hundred bees" and "two mans"). Although the plural marker -*s* in "two mans" is oversupplied on an irregular plural noun[5], it can be considered as a positive occurrence for NP plural agreement, as this indicates that Kumi attempts to express plurality

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[5] Irregular plural nouns, such as "men" and "feet" are called "vowel-change plurals" (Jia, 2003). See Jia (2003) for further information on irregular plural nouns.

with plural marker -*s*. Hence, Time 7 was considered as the acquisition point for NP plural agreement with numerals. However, Kumi failed to produce NP plural agreement with non-numeric quantifiers in two obligatory contexts (i.e., "lots of baby", "many difference") in Time 7.

In Time 9, that is, after 11 months exposure to English L2 in Australia, Kumi produced NP plural agreement with non-numeric quantifiers in three contexts (i.e., "most kids", "a lot of girls", "a lot of letters"). It means that Kumi acquired NP plural agreement with non-numeric quantifiers in Time 9.

In sum, Kumi acquired plural marker -*s* in Time 3, namely 2 months after she was exposed to English L2 in Australia. Then, she acquired NP plural agreement with numerals in Time 7, that is, after 7 month exposure to English L2. Finally, in Time 9, namely 11 months after Kumi was exposed to English L2, NP plural agreement with non-numeric quantifiers was acquired.

7. Discussion

The results of Kumi's longitudinal study show that she first acquired plural marker -*s* on nouns, which requires lexical procedure, and then NP plural agreement, which requires phrasal procedure, in her English L2 acquisition. In other words, Kumi's acquisition of English L2 plural morphemes was implicational: lexical procedure > phrasal procedure, as shown in Table 4. It suggests that the developmental sequence of plural marker -*s* on nouns and NP plural agreement in English L2 acquisition of the Japanese L1 child is compatible with the sequence predicted in PT.

structures/time	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14
NP plural agreement (phrasal)	/	-	-	/	-	/	+	+	+	+	+	+	+	+
plural marker -s on nouns (lexical)			+	+	+	+	+	+	+	+	+	+	+	+

Note: "+ =acquired, "-" = not acquired, "/" = no context
Amount of L2 exposure time: T1=1 month, T2=1.5 months, T3=2 months, T4=2.5 months, T5=3 months, T6=5 months, T7=7 months, T8=9 months, T9=11 months, T10=13 months, T11=16 months, T12=19 months, T13=22 months, T14=25 months

Table 4: Implicational analysis of Kumi's plural marking acquisition