A Study of the Validity for Processability Theory with Writing Tasks

Yuko MICHIMOTO*

Abstract: The purpose of this study is to elaborate Michimoto's analysis (2015a) regarding testing as to whether Processability Theory (PT) can predict developmental stages with writing tasks. PT validity has been supported by a number of empirical studies concerning speaking (e.g. Kawaguchi, 2009; Spinner, 2011; Baten, 2011). On the other hand, Håkansson and Norby (2006) studied Swedish learners' writing performance. However, they did not use tasks to elicit spontaneous production according to PT. The other writing PT study is Michimoto (2015a). 45 Japanese EFL learners participated in the study. However, the results did not provide evidence consistent with PT. In the current study, a reanalysis was done for the data from Michimoto (2015a) by separating morphology and syntax in accordance with recent PT studies (Yamaguchi and Kawaguchi, 2014; Eguchi and Sugiura, 2015). The results of writing done by the subjects show evidence of predictive ability regarding learners' syntactic structures based on PT.

Key words: Processability Theory, writing tasks, EFL learners, syntax

1 Introduction

Processability Theory (PT) is an SLA theory which has explained the phenomenon of stage development which Pienemann (1998) proposed as the main PT framework and which Pienemann and Keßler (2011) developed further. PT has provided a developmental schedule for language production based on the speech processor postulated by Levelt (1989) in his model of language generation, and it has considered the processability hierarchy as a core component of the theory. A fundamental assumption is that the hierarchy can be applicable to all languages; by following the hierarchy, all L2 learners can incrementally acquire linguistic forms and functions. Moreover, PT predicts the hierarchy can be applied for not only L2 development but also some other phenomena.

The hierarchy which PT has proposed includes five processing procedures and they define six stages. According to PT, the language-specific procedures are (a) the lemma, (b) the category procedure, (c) the phrasal procedure, (d) the S-procedure and the target language word order rules, (d) the subordinate clause procedure (if applicable). Table 1 shows an example of PT developmental stages applied to English learners based on PT for ESL (English as Second Language) acquisition [1].

(Accepted January 7, 2016)
* National Institute of Technology, Ube College, Department of General Education

Although a number of studies have presented empirical evidence supporting PT validity, many of them have investigated L2 speaking (e.g. Kawaguchi, 2009, Spinner, 2011: Baten, 2011: Itani-Adams, 2011). For Japanese EFL learners, Sakai (2008) studied oral performance in English with seven Japanese-speaking university students and Eguchi and Sugiura (2015), with 14 adolescent Japanese EFL learners, also studied speaking. Both studies showed that the PT developmental pattern was valid for Japanese-speaking EFL learners using some spontaneous speaking tasks.

Table 1. ESL acquisition based on PT

Stage	Syntax	Morphology
6	Cancel inversion	
5	Do-2nd Aux-2nd	3rd person singular -s
4	Yes/No inversion Copula inversion Pseudo inversion	
3	Do-fronting Adverb-fronting	plural agreement
2	Canonical word order (SVO)	past -ed plural -s possessive -s
1	Single word Formulae	

On the other hand, PT has not been shown to be valid for prediction when writing tasks are used except for a study by Håkansson and Norby (2006) which used translation and composition writing tasks and did not try to use spontaneous production. Michimoto (2015a) tried to examine PT validity with 45 Japanese EFL learners using five writing tasks which she designed; she was only able to uncover technical problems and decided to retain the results for subsequent studies.

Recent PT studies suggest that analysis should be done by dividing morphology and syntax (Yamaguchi and Kawaguchi, 2014; Eguchi and Sugiura, 2015) and they have shown another possibility of PT.

In the current study, the validity of PT prediction with writing tasks will be tested by an analysis for syntax. One purpose of this study is to show the possibility of PT validation with writing tasks and this is done through data from the writing of 45 Japanese EFL learners as tabulated by Michimoto (2015a). At the same time, this study will be research into how to test PT with writing tasks and how to construct writing tasks for PT.

2 Previous studies

One PT study by Håkansson and Norby (2006) used writing tasks with Swedish for L2 and foreign language learners and the other PT study using writing tasks was done with Japanese EFL learners by Michimoto (2015a).

Håkansson and Norby (2006), in what is the first PT study with writing, tested PT with speaking tasks and “writing tasks” to elicit target structures from learners. A composition task and a translation task were used. The result was that the participants produced syntactic structures in accordance with PT prediction in their speaking and writing, but for some participants, the writing tasks which allowed planning time helped the participants produce some target structures they could not produce in speaking tasks. However PT is based on a speaking model in accordance with Levelt’s (1989) model of language generation; Pienemann and Keßler (2011: 6) also said “it may be quite surprising to see how different spoken language is from written” based on transcript data which contains

many incomplete sentences, false starts, repetitions, self-corrections and back channelling (um/er). When PT is examined by writing tasks, an antecedent explanation which shows the difference between speaking and writing conditions is needed. In addition, PT has recommended multiple tasks to elicit spontaneous production from learners. Håkansson and Norby's translation and composition tasks were not different from spontaneous production and they were not PT tasks. In fact, they used writing tasks to test PT validity under two different conditions, namely, speaking and writing. However their study showed a possibility of PT validity with writing.

On the other hand, Michimoto (2015a) tried to test PT with six writing tasks based on Pienemann and Keßler (2011) picture description task, habitual actions task, story-writing task, communication task, introduction task, and composition. From the data derived from Michimoto's study of 45 Japanese EFL learners with writing tasks, PT developmental stages were not able to be predicted. However, some problems were revealed. The first problem was how to deal with pseudo inversions and three analyses were attempted in the study. The problem concerned "formulaic usages (or chunks)" which the participants produced. The first two analyses strictly followed Pienemann (1998) by including pseudo inversions in stage 4. The third analysis which removed pseudo inversions also did not show the validity of PT. As mentioned above, pseudo inversion was in developmental stage 4 in the table of Pienemann (1998: 178). In the next version of Pienemann and Keßler (2011), pseudo inversion was moved to the margin of a page; however its stage was indicated in stage 4 (Pienemann and Keßler, 2011: 54). On the other hand, the examples of "How are you?" or "Where's the toilet please?" are shown as "chunks" in the early stages of SLA (Pienemann and Keßler, 2011: 5). This minor change may have been made because it is not clear whether an utterance is a pseudo inversion or a "chunk".

The second problem relates to the emergence criterion. According to Pienemann and Keßler (2011), the emergence criterion identifies the point of first emergence of a structure in an interleague system. However, we need to distinguish "formulaic usages" from learners' systematic production, so some researchers took the emergence of the target structure as several times' usage of the structure by learners (e.g., Spada and Lightbown, 1993; Spinner, 2013). Michimoto (2015a) also took the same criteria: her study used the emergence criterion of "two different types", that is each target structure needed to be used two different ways in two different contexts for syntactic structures and morphological structures respectively.

Pienemann and Keßler (2011:95) illustrate the application of the emergence criteria to morphology: based on their work lexical variation and morphological variation should be observed. For example, in the case of the 3rd person singular –s, we need not only the examples of "goes, eats, sleeps, walks (lexical variation)" but also goes, go, going, went (morphological variation). According to this, Michimoto's criteria of "two different types" was too lenient for a PT criterion and the amount of data was also insufficient for the criteria in some target structures. However as Eguchi and Sugiura (2015) pointed out, because early EFL learners do not produce sufficiently large numbers of valid grammatical forms, the criteria have two problems. One is relating to the variation of each morpheme. Although verbal morphemes can have three types of variation (e.g., progressive *–ing*, past *–ed*, and

third person –*s*), nominal morphemes per se have two types (plural marker –s and possessive –s). Because of the limited morphological variation, the real emergence can still be unclear. The second problem is that of evaluating the variation. For example, can we consider "walks" as stage 5 and "walking" as stage 2 because PT predicts these two will emerge at different stages? We must continue to consider how to solve the problems of the emergence criterion for morphology.

Recently some PT studies have proposed that analysis should be done by separating morphology and syntax, (Yamaguchi and Kawaguchi, 2014; Eguchi and Sugiura, 2015). In fact, Sakai, 2008, did not deal with morphology and found syntactic development to be in accordance with PT. On the other hand, Yamaguchi and Kawaguchi (2014) disregarded syntactic development and found morphological development to be in accordance with PT. However, both these studies do not resolve an important problem regarding PT which was also pointed out in Eguchi and Sugiura (2015). The original PT stated that L2 learners acquire processing procedures incrementally based on the processability hierarchy including the five processing procedures. As processing is incremental, a learner acquires morphological and syntactic structures simultaneously as shown in table 1.

However, do these studies give us another possibility with respect to Michimoto's analysis (2015a) which did not find PT validation with writing tasks? If analysis is done by dividing syntactic structures and morphological structures for Michimoto's (2015a) data, the results may be different from the previous conclusion.

My research questions are

1) When syntactic development alone is analyzed does the study show developmental patterns in accordance with PT?
2) Can we test PT with writing tasks? This is the most fundamental question.

3 Study

3.1 Data

The data from Michimoto (2015a) is reanalyzed for this study. 45 Japanese EFL learners participated in the study and data from 30 participants was extracted from the data for the current study. A limitation of implicational scaling was shown meaning that differences in the language levels of participants who are at the developmental level cannot be caught in a scale because the language levels are so close (Hatch and Lazaraton, 1991: Michimoto, 2015b). We needed to make a clear difference in participants' language ability.

45 participants were arranged according to their TOEIC (IP) score and the 10 participants on the bottom were extracted as the lower (A) group and the top 10 participants as the upper (C) group. Secondly, the 10 participants were extracted as the intermediate (B) group based on the median scores of all participants. As a result, Group A contained participants who had a TOEIC (IP) score from 225 to 300, Group B participants had a score from 370 to 415, and Group C participants had a score from 430 to 505.

The 30 participants are studying in a national college of technology in Japan, Their ages range from 17 to 20 and

they are all Japanese learners of English. They had mainly studied English as a foreign language in junior high school and then in a national college for 6-10 years[2]. Nine participants had studied abroad for 2-5 weeks in a language learning program. 17 were women and 13 were men. A native speaker also participated as a control in these tasks.

Six writing tasks were used in Michimoto (2015a) and the study was carried out for two days. As mentioned above, they were (a) picture description task, (b) habitual actions task, (c) story-writing task, (d) communication task, (e) introduction task, (f) composition (See the details for Michimoto, 2015a).

3.2 Data analysis

An arrangement which was based on the original PT (Pienemann, 1998) shown in Table 1 was used for this study. Implicational scaling has often been used for PT studies following Hatch and Lazaraton (1991). This study also adopted it and two calculations were needed to judge whether the data revealed valid developmental stages. If the figure of the coefficient of reproducibility (Crep) is over .90 and the figure of the coefficient of scalability (Cscal) is over .60, the set of data will be scalable (Hatch and Lazaraton, 1991: 210-214). Because Michimoto (2015a) had a problem regarding the emergence criterion for morphology, only the syntactic data are considered for reanalysis.

Table 2. Implicational scaling for syntax

Participant (No. - Level)	PT Stage Syntax	2 SVO	3 Adv, Do fro	4 Y/N, Cop, Pse Inv	5 Do, Aux 2nd	6 Can Inv
3031	A	+	+	+	−	/
3082	A	+	+	+	−	/
4241	B	+	+	+	−	−
4312	B	+	+	+	−	−
4262	B	+	+	+	−	/
4272	C	+	+	+	−	/
4102	A	+	+	+	+	−
4041	A	+	+	+	+	/
3011	A	+	+	+	+	−
4142	A	+	+	+	+	/
4022	A	+	+	+	+	−
3061	A	+	+	+	+	−
4071	A	+	+	+	+	/
3092	A	+	+	+	+	/
3222	B	+	+	+	+	−
3472	B	+	+	+	+	−
3232	B	+	+	+	+	−
4251	B	+	+	+	+	/
4282	B	+	+	+	+	−
4292	B	+	+	+	+	/
4302	B	+	+	+	+	−
3381	C	+	+	+	+	/
4441	C	+	+	+	+	/
4412	C	+	+	+	+	−
4451	C	+	+	+	+	−
3461	C	+	+	+	+	/
3392	C	+	+	+	+	−
3401	C	+	+	+	+	/
4422	C	+	+	+	+	−
4431	C	+	+	+	+	/
NS		+	+	+	+	+

Note. SVO = canonical word order. Adv, Do 1st= Adverb, Do first. Y/N, Cop, Pse Inv = Yes/No, Copula, Pseudo inversion. Do, Aux 2nd = Do, Auxiliary second. Can Inv = Cancel inversion. + = acquired. – = not acquired. / = no obligatory context the form.

4 Results

Table 2 shows 30 Japanese English learners' syntactic developmental patterns according to PT as shown in Table 1. In Table 2, there are no errors and two calculations were not done for the table; the coefficient of reproducibility (Crep) is 100%; the coefficient of scalability (Cscal) is 100%. From just these figures, in accordance with Hatch and Lazaraton (1991), we can say Table 2 shows the developmental pattern of PT. However, there is insufficient morphological data to meet the criterion for

morphology regarding the emergence of lexical and morphological variation. This forced us to give up the analysis.

Here, the hypothesis was that, if analysis is done by dividing syntactic structures and morphological structures for Michimoto's (2015a) data, the results will be different from the previous conclusion. The results followed my hypothesis, that is, when the analysis is divided into syntactic structures and morphological structures, PT prediction is supported.

5. Discussion

With Michimoto's study (2015a) using writing tasks, the results do not present evidence of predictive ability; however, when the re-analyses were done in the current study, syntactic development and morphological development showed PT predictions respectively, the same as in other empirical PT studies (Yamaguchi and Kawaguchi, 2014; Eguchi and Sugiura, 2015). Unfortunately, the same problems as in Michimoto (2015a) remain.

First, the analyses were done with insufficient data including data concerning cancel inversions which were not elicited sufficiently and could not be done for all morphemes.

Second, it is still not clear how to deal with pseudo inversion sentences from the viewpoint of "chunks". Because of the insufficient data regarding stage 4, the possibility of a pseudo inversion being a chunk cannot be discarded.

A third problem concerning "writing tasks" also remains. Michimoto's tasks using pictures in forming the tasks tried to make the settings nearly natural in order to elicit learners' spontaneous production. However, there is nothing in Michimoto (2015a) to confirm that her tasks really elicited learners' language ability based on PT. Moreover, this is related to the problem of "time control". In Håkansson and Norby (2006)'s writing tasks, there was inevitably some planning time, time which allowed learners to correct their production if they wished. According to Håkansson and Norby (2006), it will be possible to more correctly measure the true ability of language learners if an appropriate explanation for the role of time in language production can be found and if time pressure can be introduced into writing tasks. If this can be done, it will be possible to decide whether PT applies or not. Time must be controlled in writing tasks in order to replicate as nearly as possible the situation in PT speaking tasks.

6. Conclusion

In the current study, the data from Michimoto (2015a) were reanalyzed. When syntactic development alone is analyzed, the study shows developmental patterns in accordance with PT. Though reanalyzing occurred, some problems still remained. Although we need to consider how to deal with morphology separately from syntax, we can say PT validity using writing tasks was shown.

For many Japanese students writing tasks are more familiar than speaking tasks. With writing tasks they can

probably display their real language ability. I think that PT studies using writing tasks are more useful than speaking tasks because much data can be collected at once if a suitable method is established for testing. The framework and methodology of PT with writing will be applicable to all languages and can be used for contributing to education programs. Studies with Japanese participants may help develop understanding of language learning in general.

Acknowledgement

This study is part of the research supported by JSPS KAKENHI Grant Number 2587104.

Notes

1. This study has taken the PT indices based on Pienemann (1998) which showed pseudo inversion in stage 4.
2. National colleges of technology in Japan include students who are from 16 to 20 years old, after graduating from junior high schools. In addition, some participants of this study had studied English as extra lessons (e.g. Juku (cram schools), English conversation classes) before entering junior high schools.

References

Baten, K. (2011). Processability Theory and German Case Acquisition. *Language Learning*, *61* (2), 455-505.

Di Biase, B. and Kawaguchi, S. (2002). Exploring the typological plausibility of processability theory: Language development in Italian second language and Japanese second language. *Second language Research, 18*, 274-302.

Dyson, B. (2009). Processability Theory and the role of morphology in English as a second language development: a longitudinal study. *Second language Research*, *25* (3), 355-376.

Eguchi, A. and Sugiura, M. (2015). Applicability of processability theory to Japanese adolescent EFL learners: A case study of early L2 syntactic and morphological development. *System,* 52, 115–126.

Håkansson, G. and Norby, C. (2006). Processability Theory applied to Written and Oral Swedish. In Mansouri, F. (ed.), *Second Language Acquisition Research Theory-Construction and Testing* (pp. 81-94). Newcastle upon Tyne: Cambridge Scholars Publishing.

Håkansson, G., Salameh, E and Nettelbladt, U. (2003). Measuring language development in bilingual children: Swedish-Arabic children with and without language impairment. *Linguistics, 41* (2), 255-288.

Hatch, E. and Lazaraton, A. (1991). *The research manual: Design and statistics for applied linguistics*, New York: Heinle & Heinle Publishers.

Itani-Adams, Y. (2011). Bilingual first language acquisition. In Pienemann, M. and Keβler, J. (eds.), *Studying Processability Theory: An Introductory Textbook (*pp. 121-132). Amsterdam: John Benjamin.

Kawaguchi, S. (2009). Acquiring Causative Constructions in Japanese as a Second Language. *Japanese Studies*,

29(2), 273-291.

Kawaguchi, S. (2011). Japanese as a second language: A test case for typological plausibility of PT. In Pienemann, M. and Keßler, J. (eds.), *Studying Processability Theory: An Introductory Textbook* (pp. 99-105). Amsterdam: John Benjamin.

Levelt, W. J. M. (1989). *Speaking. From intention to articulation*. Cambridge, MA: The MIT Press.

Michimoto, Y, (2015a). Michimoto, Y (2015). Morphology and syntax acquisition by Japanese EFL writers: a study of their developmental course based on Processability Theory. Nidaba, Linguistic Society of West Japan, 43, 70-78.

Michimoto, Y, (2015b). Research into Syntactic Development: A Study Using Implicational Scaling, Research Reports of Ube National College of Technology, 60, 33-40.

Pienemann, M. (1998). *Language processing and second language and second language development: Processability Theory*. Amsterdam: John Benjamin Publishing Company.

Pienemann, M. and Keßler, J. (eds.) (2011). *Studying Processability Theory: An Introductory Textbook*. Amsterdam: John Benjamin.

Pienemann, M., Keßler, J. and Itani-Adams, Y. (2011) Comparing levels of processability across languages. *International Journal of Bilingualism*, *15* (2), 128-146.

Sakai, H. (2008). An analysis of Japanese university students' oral performance in English using processability theory. *System, 36,* 534-549.

Spada, N. and Lightbown, P. M. (1999). Instruction, First Language Influence, and Developmental Readiness in Second Language Acquisition. *The Modern Language Journal, 83*, 1-22.

Spinner, P. (2011). Second Language Assessment and Morphosyntactic Development. *Studies in Second Language Acquisition*, *33*, 529-561.

Spinner, P. (2013). Processability Theory: Production and Reception. *Language Learning, 63 (4)*, 704-739.

Yamaguchi, Y., & Kawaguchi, S. (2014). Acquisition of English morphology by a Japanese school-aged child: a longitudinal study. *Asian EFL Journal, 16*, 89-119.