



# Applicability of processability theory to Japanese adolescent EFL learners: A case study of early L2 syntactic and morphological development



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## ARTICLE INFO

### Article history:

Received 31 March 2014

Received in revised form 16 May 2015

Accepted 26 May 2015

Available online 20 June 2015

### Keywords:

Processability theory

Syntactic development

Morphological development

EFL learner

Speech production

Emergence criterion

Communicative task

## ABSTRACT

Processability theory (PT) predicts that all L2 learners follow fixed developmental schedules due to psycholinguistic constraints, accounting for the development of syntax and morphology within the same framework. Recent studies, however, report some counter-evidence on morphological development. The theory has not been tested sufficiently in EFL contexts. This study examined the applicability of PT to Japanese adolescent EFL learners. Through four communicative tasks, we elicited spontaneous spoken data from 14 Japanese secondary students and cross-sectionally analyzed 15 syntactic and 6 morphological structures using implicational scaling. The study identified four major findings. First, PT prediction is applicable to early EFL learning. Second, there are two different developmental paths and language learners' syntactic development tends to emerge before morphological development. Third, morphological development, particularly phrasal plural-marking, is not always well-mapped to PT prediction. Fourth, formulae seem to play an important role in scaffolding productive use of grammatical structures. These findings indicate that PT needs to be modified to account for the developmental gap between syntax and morphology. They also suggest that L2 instructors should consider language learners' morphological development more in task-based language teaching. Further research should include elaborate analyses of morphological development and the role of formulae in acquiring grammatical structures.

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## 1. Introduction

Processability theory (PT) (Pienemann, 1998, 2005; Pienemann & Keßler, 2011) predicts that all second language (L2) learners follow cross-sectionally valid developmental schedules as a result of human psycholinguistic constraints on language processing in real time, irrespective of their backgrounds. Previous discussions of PT, including Pienemann, Di Biase, and Kawaguchi (2005), assumed that syntax and morphology develop following the same processing procedure (Pienemann, 1998). For instance, Pienemann and Keßler (2011) explain English L2 syntactic arrangements and morphological information within the same framework, and present the structures of syntax and morphology in the same or adjoining columns of the developmental stages in their implicational tables. However, the latest PT publications have explicitly hypothesized that

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the development of syntax and morphology has two separate motivations (Di Biase & Kawaguchi, 2013; Pienemann & Keßler, 2012; Yamaguchi, 2013). In this context, recent cross-sectional and longitudinal studies on English L2 learners have demonstrated the effects of L1 influence and individual variation on morphological development (Charters, Dao, & Jansen, 2011; Dao, 2007; Dyson, 2009; Zhang & Widyastuti, 2010). Meanwhile, other longitudinal child L2 studies have confirmed PT prediction (Yamaguchi, 2013; Yamaguchi & Kawaguchi, 2014). These contradictory findings may imply that the development of L2 morphology can be influenced by research methods or learners' backgrounds, whereas English L2 syntactic developments were found to be well-mapped to PT in Sakai (2008) and Yamaguchi (2013). Thus, a near-universal hierarchy in English L2 syntax has been revealed; however, the morphological development is not yet empirically clear, let alone the relationship between the development of syntax and morphology.

Another unresolved issue concerns whether PT is applicable to learners of English as a foreign language (EFL), who rarely use the target language in their daily lives. The PT hierarchy was originally constructed in the context of ESL question formation (cf. Larsen-Freeman & Long, 1991) and regards question formation as critical for its measurement. However, not only quantity but also quality of exposure to the L2 evidently differs between ESL and EFL learners. According to findings in classroom research (Sinclair & Brazil, 1982; Sinclair & Coulthard, 1975), there is a fixed pattern in classroom discourses referred to as "initiation-response-feedback." That is, the teacher initiates a statement, command, or question; students respond to it; and the teacher provides some feedback. In this pattern, students rarely produce question forms. Thus, we need to confirm whether EFL learners, who have less or no opportunity to produce spontaneous questions, also follow PT prediction. To date, Sakai (2008) has been the only study to test the validity of PT for Japanese EFL learners whose L1 is a typologically distant language, and to prove the validity of PT for stages 5 and 6. This means the validity of stages earlier than 5 remains unknown. Moreover, compared to the large number of accuracy-based studies on English L2 morphology, empirical studies within PT perspectives among EFL learners are limited to Dao (2007), Charters et al. (2011), and Lenzing (2013).

The present study is part of a larger research project that ultimately aims to clarify EFL developmental sequences and construct a development index focusing on early EFL learning. PT regards the emergence of a grammatical structure, not accuracy, as acquisition on the grounds that each learner develops grammatical accuracy at different rates for each grammatical structure. To investigate grammatical development in early EFL learning, this study attempts to test the applicability of PT prediction to syntax and morphology for 14 Japanese adolescent EFL learners by analyzing speech data elicited through communicative tasks.

## 2. Background

### 2.1. Theoretical framework of PT

PT is used to explain why second language learners follow certain schedules of acquisition. In speaking, L2 learners' language processors are affected by psycholinguistic constraints such as working memory and access speed to processing components. Hence, based on Levelt's (1989) speech production model, PT predicts that L2 learners follow a universal developmental path. To account for language formulation for a typologically plausible grammar, PT draws on Lexical Functional Grammar (LFG) (Bresnan, 2001). LFG presupposes three independent and parallel levels of representation: argument structure (a-structure), functional structure (f-structure), and constituent structure (c-structure). The word order in sentences is determined by mapping among these three levels of representation and the morphemes are appropriately used only within the forms that the learners are able to process (i.e., the word, phrase, or sentence) using feature unification. Thus, the extended PT (after Pienemann et al., 2005) hypothesizes a hierarchy of six grammatical processing procedures that are incrementally activated: (1) word/lemma, (2) lexical category procedure, (3) phrasal procedure, (4) VP-procedure, (5) S-procedure, and (6) S'-procedure.

In the first procedure, lexical items in memory are accessed (word/lemma access) without such grammatical information as categorization (e.g., noun and verb) or diacritic features (e.g., tense and number). This one-to-one mapping includes formulaic use of sentences (e.g., *I beg your pardon?*). In the second procedure, grammatical categorization and diacritic features of lexical items are identified. The learners can produce lexical morphemes such as past *-ed*, progressive *-ing*, and plural *-s* without quantifiers (e.g., *apples*, *dogs*) and possessives (e.g., *Ken's*, *witch's*) where grammatical information is exchanged within the words. In addition, the learners can utilize the canonical word order (e.g., *I played soccer yesterday.*), which is processed with unmarked alignment. In the third procedure, the learners can unify the stored diacritic features of lexical items between the head of a phrase and the modifiers where grammatical information is exchanged within the NPs (noun phrases) such as plural-agreement (e.g., *two dogs*, *three apples*). Additionally, the learners develop the ability to add a variable phrase over categories, by topicalization of core arguments, such as focal question words (e.g., *\*What you want?*) or negation forms (e.g., *I don't play baseball.*) as well as arrangements of the position of *do* (e.g., *Do you have breakfast?*) or adverbs (e.g., *Yesterday I played soccer.*). In the fourth procedure, the learners can invert the subject and copula (e.g., *Where is my bag? Is he at home?*), where grammatical information is exchanged within the VPs (verb phrases). In the fifth procedure, S (sentence)-procedure allows the learners to use subject-verb agreement (e.g., *He goes to school.*) and produce syntactic structures according to the word order rules in the target language with topicalization and lexical mapping where grammatical information is exchanged across the phrases but within the sentences (e.g., *What do you want? What is the boy doing?*). Finally, the subordinate clause procedure enables the learner to distinguish between main clauses and subordinate clauses (e.g., *Do you know what she wants?*).

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