Processability Theory Revisited: A Critical Approach

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Abstract: In order to revisit Processability, the theory which links psychology and linguistics in a very direct way to demonstrate what we know about languages, this paper primarily glances over the Achilles’ heel of the error analysis in delineating the developmental patterns in the language learners. It also refers to the second way in which samples of learner language are collected over a period of time so as to identify when specific linguistic features emerge; this is what the Processability theory (PT) does. By addressing the concepts such as property and transition theories as well as the developmental and logical problems of the learners, the paper then magnifies the central hypothesis of the theory holding that at any stage of development, learners can produce and comprehend only those L2 linguistic forms which their current state of mind can handle. Later, the criticisms leveled at the theory are put forth. And finally concluding remarks wrap up the issue.

Index Terms: acquisition, interlanguage, processability theory, property theories, transition theories

INTRODUCTION

There are varying ways through which scholars can investigate and explain developmental patterns in language acquisition. One of these ways is to examine whether the learners’ errors change over time. There is some evidence to suggest that this does happen, but error analysis has not been able to provide clear and conclusive evidence of developmental patterns in the learners (Brown, 2000; Ellis, 1985). A second way is to study samples of learner language collected over a period of time so as to identify when specific linguistic features emerge. According to this approach, acquisition is defined as first occurrence. It has been used extensively in first language acquisition research (for example, Wells, 1985) and to a lesser extent in SLA acquisition (for example, Pienemann, 1984, as cited in Ellis, 2008).

The purpose of this study is to introductorily but very briefly review the cognitivists, innatists, transition, and property theories on language acquisition and their pertinence to the Processibility Theory (PT) which claims to make predictions around language development with the possibility of its empirical testing. Criticisms of the PT will follow suggesting that there is no explanatory evidence as to the manner in which production procedures will be transferred from L1 to L2 as well as dependence on emergence as the measure of language acquisition.

COGNITIVISTS AND INNATISTS

In order to find the threads of connection between Pienemann’s (1994) theory and other theories, here it is important to note that, as Mitchell and Myles (2004) state, the question of the specificity and innateness of the language faculty in both the first and second language acquisition fields is not yet resolved, and the opposition between cognitivists and innatists should be seen more in terms of the two ends of a continuum rather than a dichotomy. Even within frameworks concentrating firmly on the processing component of language learning, such as Pienemann’s (1994) Processability theory, the possibility of an innate linguistic module is not rejected completely; "the author does not pronounce himself, and deals ex-
clusively with the growth of the computational mechanisms required to process second languages. These two approaches are increasingly seen as complementary rather than conflictual” (Mitchell & Myles, 2004, p. 96).

**TRANSITION AND PROPERTY THEORIES**

Mitchell and Myles (2004) further observe that cognitive theorists fall into two main groups: there are theorists such as Pienemann, or Towell and Hawkins (1994) who assert that language knowledge might be ‘special’ in some way, but who are concerned to develop transition or processing theories to complement property theories such as Universal Grammar or Lexical Functional Grammar (LFG) (for more information on LFG see also Kaplan & Bresnan, 1982).

On the other hand, theorists such as N.C. Ellis, MacWhinney, or Tomasello (cited in Mitchell & Myles, 2004) do not consider the separation between property and transition theories legitimate as they believe one can explain both the nature of language knowledge and how it is processed through general cognitive principles. In fact, they do not generally make the distinction between competence and performance, as they view these as being one and the same thing. In this view, the learner is seen as operating a complex processing system that deals with linguistic information in similar ways to other kinds of information. And it is for ease of presentation that Mitchell, Myles, and Marsden (2013) see the first group of linguists belonging to processing approaches, and the second group to emergentist or constructionist approaches.

**PROCESSABILITY THEORY (PT)**

Processing approaches (Ellis, 2008), as their name indicates, observe how second language learners process linguistic information, and how their ability to process the second language develops over time. They are focused primarily on the computational dimension of language learning, and might or might not believe that language is a separate innate module.

As Ellis (2008) furthers, the order and sequence in L2 acquisition have a general pattern in L2 grammatical development. The research for this originated in a project by Pienemann et al., focusing on the naturalistic acquisition of German by learners with a Romance language background, and later was reported by these scholars in a series of articles. Pienemann and his colleagues claim that the pattern they have detected in L2 acquisition ”is now probably one of the most robust empirical findings in SLA research... The pattern does allow for some variation, however” (Ellis, p. 96).

Processability theory (PT) is in fact a universal framework that has the capacity to predict developmental trajectories for any second language. The notion of ‘developmental trajectory’ implies a developmental dimension known as ‘staged development’ as well as a variational dimension which addresses individual learner differences as well (Pienemann, 2008).

Pienemann (1998) explains the logic underlying PT in this way. At any stage of development, the learner can produce and comprehend only those L2 linguistic forms which the current state of the language processor can handle. It is therefore crucial to understand the architecture of the language processor and the way in which it handles a second language. This enables one to predict the course of development of L2 linguistic forms in language production and comprehension across languages.

The architecture of the language processor, Levelt's (1992) model, accounts for language processing in real time and within human psychological constraints such as word access and human memory. The incorporation of the language processor in the study of second language acquisition therefore brings to have a set of human psychological constraints that are crucial for the processing of languages (Pienemann, 1998, p. 52).

It follows that predictions can be made for language development which can be tested empirically. According to Pienemann (1998), the original version of the PT focused solely on what is known as the ‘developmental problem’ (that is, ‘why do learners follow universal stages of acquisition?’). It was termed (Cook, 2008) multidimensional model stressing that L2 learners have a series of interim grammar of English—interlanguage. Their first grammar is just words; their second grammar uses words in an SVO order. Their third grammar uses word order with some elements moved to the beginning or end. And all learners learning any L2 go through these overall stages in the same order.

The recent development of the multidimensional model, based on Mitchell et al. (2013), was called Processability
model due to the fact that it explains these sequences in terms of the grammatical processes involved in the production of a sentence which are roughly as follows:

1. Acquisition of the individual words, for example, “play. piano.”
2. Getting access to grammatical structures “play. the piano.” (category procedure)
3. Assembling these into “I play. the piano.” (phrasal procedure)
4. Putting the phrases together within the sentence “I will play the piano.” (the S-procedure)
5. Working with both main clauses and subordinate clauses: "if I work hard, I can play the piano." (the subordinate cause procedure). (p. 28)

In the late 1990’s, Pienemann’s thinking evolved into a processing-sensitive but largely linguistic framework that he called Processability theory…In a nutshell he proposed that in the beginning L2 learners are limited in their capacity for what syntactic information they can hold in memory during processing…They need to gradually develop the psycholinguistic capacity to match grammatical information contained within and across units in the linguistic material they encounter, and they are capable to do so gradually with more distant elements in linguistic units…Remarkably, the current formulation of Processability theory has offered explanations for a variety of word order phenomena across several target languages, including morphosyntactic aspects of typology distant languages such as Arabic, Chinese and Japanese (Pienemann, 2005, as cited in Ortega, p. 132).

Processability is a theoretical term coined by Pienemann (1998) and is a further development of his teachability hypothesis (1984). PT links psychology and linguistics in a very direct way as it examines what we know about languages, through their description, with the mechanisms that the human brain has for dealing with linguistic information. In that sense, it is a truly ‘applied linguistics’ theory. The theory posits that the human brain has a linguistic processor which has constraints in its ability to perform certain processing routines (Macaro, Vanderplank, & Murphy, 2010).

The extended version of PT (Pienemann, 2005) also attempts to address the so called ‘logical problem’ (that is, ‘what is the origin of linguistic knowledge?’ For instance, how do learners know that there are such things as nouns and verbs?). Processability theory addresses in a modular fashion the developmental and the logical problem that are the key issues of any theory of language acquisition.

According to Pienemann (2008), one module deals with the developmental problem, and a separate, but a connected module deals with the logical problem. Both modules are based on Lexical-Functional Grammar (LFG) because LFG is designed to account for linguistic knowledge in a way that is compatible with the architecture of the language processor, and both these components are needed for PT to address the developmental and the logical problem. The developmental problem is addressed by describing the constraints the language processor places on development, and the logical problem is addressed using specific components of LFG.

The commitment of LFG to the interface between linguistic knowledge and language processing is illustrated very clearly in the following quotation:

"[Children] acquire knowledge and skills that enable them to produce and comprehend an infinite number of novel utterances .... The major goal of psycholinguistic research is to devise an explanatory account of the mental operations that underlie these linguistic abilities’ (Kaplan & Bresnan, 1982, p. 177).

In Pienemann’s (2005) perspective, ”once we can spell out the sequence in which language processing routines develop in the learner, we can delineate those grammars that are processable at different points of development” (p. 204).

According to Pienemann (2008), the architecture of the language processor accounts for language processing in real time and within human psychological constraints such as word access and human memory. The incorporation of the language processor in the study of second language acquisition therefore brings to bear a set of human psychological constraints that are crucial for the processing of languages.

The view on language production followed in PT is largely described by Levelt which overlaps to some extent with the computational model of Kempen and Hoenkamp (1987). The basic premises of that perspective are as the following:
- Processing of the components transpires largely automatically;
- Processing has an incremental feature;
- The processor has a linear output, though its mapping onto the underlying meaning may not be in a linear way;
- A temporary memory stores grammatical processing.

The central hypothesis of the PT holds that “procedural skills” are needed to process the language acquisition. Processability theory further states that these procedures constitutes a sequence through which the lower level processing procedures are essential for the functioning of the higher level ones. This accounts for the phenomenon which is often observed that even learned rules, morphology, etc., may fail to appear in learner speech for some time. Thus a learner’s interlanguage (IL) can be described as “the sum of all the rules the learner has acquired up to a certain point (Pienemann, 1998, p. 48).

Processability in fact repudiates the “serial processing view” of linear language production, underscoring that while speaking, processing operations occur “automatically and in parallel” (57-8). PT demonstrates, for example, that the acquisition of morphology from the standpoint of a single lexical entry (cat, cats; woman, women), a phrase (these cats), and across phrasal boundaries (these cats eat) is formulated in the sequence implied in the hierarchy. That is, ‘these cats eat’ is more complex than ‘these cats’ and thus follows in the process of language acquisition. This principle predicts learner progress, thereby being of interest to curriculum designers, and renders criteria for quantitative acquisition (counting mistakes and assigning per cent values) as well as learning assessment (Pienemann, 1998).

To Pienemann (1998), Processability argues instead that a “distributional analysis” of learner performance data can bring about a “dynamic description” of IL development. For instance, overuse and underuse of English plural (-s), are not merely counted; each error is analyzed for the rule involved in the context of its occurrence, and then assigned a position in the hierarchy of language acquisition. A correct supply of only 60% of the plural (-s) may take place by the learner in a sample; analysis can reveal that most of the errors occur in the context of subject-verb agreement, e.g., *These cats eat. These data can show that the learner has acquired plural (-s) rules in lexemes and noun phrases but not in subject-verb concord. Such analysis is essential in evaluating learner speech data and assessing the competence of the learner.

Other important contributions within PT include the Steadiness hypothesis and Hypothesis space. The Steadiness hypothesis argues that each level of IL processing in the hierarchy appears in the learner’s language production and its steadiness is maintained until the fundamental processes are acquired, yet levels of accuracy in speech may fluctuate due to the specific lexical requirements produced by the communicative task” (Pienemann, 1998, p. 308). A learner may have acquired English plural (-s), yet supply it inappropriately, as in *milks. Plural (-s) has been acquired; the sub-category, non-count noun, for ‘milk’ has not (Pienemann, 1998).

A rich discussion of background and development across the disciplines such as philosophy, logic, physiology, biology, cognitive and developmental psychology, and linguistics and SLA is provided by Processability.

The key idea behind PT is that language acquisition is constrained by language processing (Pienemann, 2008).

PT has the same objective as the Strategies Approach (Clahsen, 1984) to account for trajectories of L2 development. However, it pursues this objective using an entirely different theoretical ‘machinery’ using an explicit theory of language (for example, LFG) that is compatible with an overall model of language production. In this way PT is applicable to a wide array of grammatical phenomena in any language. A detailed account of the history of PT is also available in Pienemann (2005).

**CRITICISM OF THE PROCESSABILITY THEORY**

Even though PT provides much evidence for a predictable hierarchy of learning, it cannot function solely on its own as a theory of language learning. Carroll (1998) criticizes PT’s account of skills development, stating that “there is more to be said than that learners develop new processing procedures and ‘automatise’ them” (p. 23). As Carroll adds, “nothing in
PT explains which production procedures will be transferred from the L1 to L2 speech production” (p. 23). However, in defending his theory, Pienemann (1998; cited in Doughty & Long, 2003) notes that the “bulk transfer” of the L1 processor cannot occur, since some features of nouns vary among languages, and even rules that are similar often must be learned in the L2. Also De Bot (1992) notes that since Pienemann’s theory is not designed to explain how linguistic input is converted into linguistic knowledge, the full consequences of the model are not easy to interpret. PT also does not account for “psychologically real learning conditions” (Carroll, 1998, p. 23) or “the contents of the learner’s representations” (p. 23). These ideas refer to the ongoing debates on the scope of SLA, promulgated in part by Firth and Wagner’s (1997) manifesto calling for SLA’s “reconceptualization” (p. 286), meaning that theory should not only attend to the cognitive dimensions of L2 acquisition; social dimensions of L2 use are also crucial to be considered (p. 286). Processability theory also makes no claims as to how long students must remain at each stage before they can advance to the next. What PT does do, however, is push SLA researchers to “clarify their thinking about how L2 learners perceive, encode, parse and understand L2 speech, and how they produce, monitor, and self-correct it” (Carroll, 1998, p. 24).

Furthermore, there are other problems with Processability theory. One of them refers to the reliance on emergence as the measure of acquisition, especially as this entails excluding formulaic sequences which cannot be easily and reliably identified. If a learner, supposedly at stage 2, produces an utterance like “where does he live?” which belongs to stage 5, to what extent does this falsify the theory. The second problem concerns the operational definition of acquisition. Another problem concerns the limited range of grammatical phenomena that this theory has addressed. Still another problem is that this theory only provides an explanation of acquisition in term of learner production. It tells us nothing about how learners come to comprehend grammatical structures, nor do they inform us about how comprehension and production interact, and finally, in particular, this theory does not address how learners obtain intake from input and how this is then used to reconstruct internal grammar. It is in this respect that this theory is limited.

**CONCLUDING REMARKS**

By formulating an empirically supported theory of incremental language processing which is based on Levelt’s (1992) model of speech generation and explainable theory of grammar such as Lexical Functional Grammar (LFG), Pienemann attempts to elucidate how learners acquire the computational mechanisms that operate on the linguistic knowledge they construct. Of course acquiring computational mechanisms seems to be inadequate for second language acquisition, but with this clearer understanding of L2 learners’ hierarchy of acquisition, new types of investigation can be created that take into consideration learnability and form-focused instruction in a more precise manner.

The basic claim of the original version of PT is that language development is constrained by Processability. This affects first and second language development (albeit in different ways). It also affects interlanguage variation and L1 transfer. On the strengths of this theory it can be pointed out that it affords an explanation of how both syntactic features such as word order and morphological features are acquired. Another strength of this theory is that it has predictive and explanatory power (Pienemann, 2005). As for the outstanding and thus tangible demerit of the PT, perhaps one can refer to the fact that this theory addresses a limited range of grammatical features thereby lacking comprehensiveness as a learning theory.

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