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## Using Pienemann's Processability Theory to explore the development of Scandinavian language structures

### Introduction

Comparing languages can be rather difficult, especially if the languages are largely unrelated. How can someone who has no knowledge of a language understand anything about its acquisition? These are but a few of the concerns that Manfred Pienemann hoped to address in his 1998 book *Language processing and second language development*, in which he laid out his theory for a universal process that every language learner follows when learning any language. In the following literature review, multiple studies are examined that have been conducted with the aim of testing the validity of Pienemann's theory. Using the theory as a tool to examine Scandinavian language acquisition, many studies point out the main strength in Pienemann's structural processes, while illuminating the shortcomings of its evaluation of certain grammatical morphemes.

### Background: Outlining Pienemann's Processability Theory

As Pienemann writes himself, Processability Theory (PT) mainly serves to “formally [predict] which structures can be processed by the learner at a given level of development” (Pienemann, 1998). Boiled down, PT essentially consists of four to five steps in regards to the structural acquisition of the grammar of a language: “(a) the lexical categories of lemmata (word classes); (b) grammatical features such as tense, number, and gender attributed to words in the sentence; (c) syntactic procedures that build constituent structures using such grammatical information; and (d) word order rules” (Glahn, Håkansson, Hammarberg, Holmen, Hvenekilde, and Lund, 2001). In other words, the steps are: acquisition of words without any grammatical information, grammatical information applied to these words, phrasal procedures like adjective agreement or correct usage of a verb tense within a phrase, grammatical

information exchanged across phrases, like subject-verb agreement or subject-predicate agreement, and finally, different handlings of main and subordinate clauses. Pienemann posits that because these steps are dependent on the previous step, and because they are placed in a hierarchical order, that a learner must follow these steps during language acquisition.

He does specify that his theory applies to “structural properties only” and is a general idea with a concept of leeway, or Hypothesis Space (Pienemann, 1998). Pienemann’s theory is meant to be applied to any language, with the idea that the hierarchy would apply to any first language (L1) or L2 learner. The aforementioned Hypothesis Space can be applied to the “teachability of languages,” or the ability for a learner to learn a language within a formal setting (Pienemann, 1998). According to Pienemann, this can change the details of the hierarchy and its order, but does not disrupt the main structure.

Because some of the studies discussed in this review focus on the acquisition of lemmata, primarily the usefulness of the first two stages, Pienemann’s discussion of how grammatical information is applied to words in the first stage is relevant to visit. In the case of a word like Peter, the learner must place the word into several categories, including number, person, tense, and aspect, which would return the following assignments: “NUMBER = singular PERSON = 3 TENSE = present ASPECT = non-continuous” (Pienemann & Keßler & Itani-Adams, 2011). In the second stage, each word is endowed with specific grammatical information. In Scandinavian languages, this information would also include grammatical gender.

Before comparing the studies, one must take into account the lack of a large base of research that has been done on L2 learners of Scandinavian languages. Not much is known about its acquisition, primarily because there are many more first language (L1) speakers of Scandinavian languages that go on to learn other L2s, not the other way around. Unfortunately, research in this field “only dates back a few decades,” primarily brought about by the arrival of “major influx of immigrants who would soon be acquiring the language of the host country” (Bohnacker & Westergaard, 2010). In regards to PT, there are several studies of Swedish alone, mainly in regards to L1 acquisition. However, there are few studies that look at Scandinavian languages as a whole or as an L2. Because of this limitation, there is a need for more

research to be done before any definitive conclusions can be drawn. In this review, PT is used to examine Scandinavian languages through studies which illuminate the applicability of this hierarchy.

#### Article 1: Gender and number agreement in adult L2 learners of Scandinavian languages

The first study examined looks at adult learners of Scandinavian languages and their acquisition of gender and number agreement. In Scandinavian languages, nouns are given one of three articles: neuter, feminine, and masculine. In order for an utterance to be grammatically correct, the determiner, adjective, and noun must all be in agreement, or be conjugated the same. In some cases, there is no article, only a morpheme attached to the end of the noun, even when the noun is in its determined form. These morphemes can be complex. For example, in Norwegian, the words “yellow” and “car” are “gul” and “bil”. However, saying “the yellow car” would translate to “den gule bilen”. The gender is masculine, as indicated by the determiner and the morpheme on the end of the noun. The adjective takes on the determined form.

The researchers conducting this study based their theory off of Pienemann’s PT, as outlined previously. In order to apply PT, researchers chose to examine “adjective agreement in [noun phrases] NPs, agreement between noun and predicative adjectives, and placement of negation in subordinate clauses” in Swedish, Norwegian, and Danish (Glahn et. al, 2001). They studied 47 participants with enough knowledge of a Scandinavian language to be able to produce what the researchers were after. Participants included 16 speakers of L2 Danish, 10 speakers of L2 Norwegian, and 21 speakers of L2 Swedish, “23 men and 24 women, all of them adults taking part in language classes” (Glahn et, al, 2001). They had a variety of first languages (L1s), including a majority of Indo-European languages as an L1, including: 19 Germanic languages, 12 Slavic languages, 9 Romance languages, and 1 Farsi. The remaining 6 speakers spoke Turkish, Japanese, Arabic, or Tagalog. Because of the grand variety of L1s present in this study, interesting conclusions were drawn based on the similarities between the language development of these learners.

The tasks were all based on oral production, and included a task for attributive adjectives, one for predicative adjectives, and a third for negation placement. The first task involved color identification, in

order to ensure that participants could assign color adjectives to nouns without agreement. The second task involved “many small, scattered color illustrations” where participants were asked both to find and describe the color of objects on the page (Glahn et. al, 2001). This way, they had to hold both the lexical item and the adjective in memory while responding. The final task involved card identification, in which participants played a game where they had to match illustrations of performance with nonperformance of an action. They had to describe the actions using placement of negation. As discussed earlier, these three tasks should go from easiest to hardest for the learner based on the hierarchy of learning. First, they would have acquired the word, then the grammatical information of the word, and then phrasal and interphrasal information.

The researchers hypothesized that learners would acquire information in this order, and that because of this that the tasks would get more difficult for the learners as they went along. Though Pienemann tends towards the one-token approach, or counting the learner as having acquired the step when they are able to use the process correctly once, the researchers found that this approach is not completely accurate. Students may tend to go back towards incorrect forms as they are learning the new form. Because of this, they rated participants on the criterion of “(a) one occurrence, (b) 50% use, and (c) 80% use of the structure in question” (Glahn et. al, 2001). Their findings initially supported Pienemann, as the tasks showed the “predicted implicational relationship: attributive agreement > predicative agreement > subordinate-clause word order” (Glahn et. al, 2001).

However, they noticed a glaring issue: rather than all of the grammatical information like number, gender, and part of speech being all acquired at once, there was a separate and parallel hierarchy of agreement that learners were acquiring. First was correct agreement of plural nouns and adjectives, then masculine nouns and adjectives, and finally, neutral nouns and adjectives. They theorized that this was because “number agreement and gender agreement present the learner with different tasks... whereas learners can intend singular or plural,” they must simply know the gender of a noun (Glahn et al, 2001). Additionally, unlike other language families, like Romance languages, the gender of a noun is not easily decipherable by looking at the noun. Many Romance languages have morphological and/or phonological

clues that allow for a good guess as to the gender of a noun, while the gender of nouns in Scandinavian languages “are mostly vague and to a large extent inconclusive” (Glahn et al, 2001). Their findings strongly indicated that because plural agreement was achieved with so much more regularity, “the achievement of neuter agreement implied the achievement of plural agreement” (Glahn et al, 2001). Learners also tended to overgeneralize, choosing the masculine gender when they did not know the gender of a noun. Understandably, the gender of a noun is less of a priority for L2 learners; the researchers inferred that “it has little relevance, if any, for the meaning of the utterance” (Glahn et al, 2001). Ultimately, learners made many errors when attempting to produce gender agreement. However, as number agreement is intended by the learner, this was more frequently correct.

However, the evidence found supported Pienemann in that “the Neg placement in subordinate clauses comes later than the various types of morphological agreement” (Glahn et. al, 2001). Because Pienemann only briefly discussed his conceptualization of number and gender, “we cannot see that this aspect is really addressed in PT,” according to Glahn et. al (2001). Therefore, though this hierarchy is present in Scandinavian languages and pushes against a part of PT, Hypothesis Space could account for this. As Glahn wrote in a later review, PT is a very strong theory in regards to the “purely structural phenomena on which it has been developed... though... there is more to SLA than just acquiring the formal structures” (Glahn, 2001). Structurally, this study supports Pienemann’s steps, though it produces limitations to the extent at which it may be applied here upon uncovering an implied hierarchy of the acquisition of agreement.

#### Article 2: Pienemann’s evaluation of studies on Swedish and their application to PT

In this article, Pienemann and Hakansson review 14 different studies done on L1 and L2 learners of Swedish. Because these studies predate the development of PT, the interest here is in reexamining old studies in order to take a look at how they might support PT. Pienemann once again reiterates that “the sole objective of processability theory to determine the sequence in which procedural skills develop in the learner” and that the theory is structural in nature (Pienemann & Hakansson, 1999). He also goes on to say that when an element is missing in the implicational hierarchy, that the hierarchy will be “cut off in

the learner grammar” and that instead, there will be a “direct mapping of conceptual structures onto surface form” (Pienemann & Hakansson, 1999). In terms of applying PT to Swedish morphology, we see the five stages as such: (1) word or lemmata access, invariant forms; (2) category procedure, plural, definiteness on nouns, tense on verbs; (3) phrasal procedure, definiteness agreement, markings in NPs, tense markings in VPs; (4) word order predicative constructions, adjective agreement; (4) clause boundary, main and subordinate clauses.

Getting into the studies, one that is called on here comes from Andersson’s 1992 study on “semantic aspects of definiteness” (Pienemann & Hakansson, 1999). This study focused on four groups: L1 learners of Swedish, early L2 learners of Swedish (under three years old), late L2 learners of Swedish (older than three), and adult L2 learners of Swedish. The study was longitudinal and took place over the course of one to three years. Data was collected from interviews and retellings among the 4 adult participants (whose L1s were Finnish and Spanish), and via conversation with the 12 children. Researchers were interested in finding occurrences of “morphology as a marker of gender” (Pienemann & Hakansson, 1999). Andersson found that the acquisition of gender in Swedish is closely related to the system of definite-and indefiniteness of nouns. He chose to hone in his focus on one child, Lien, who began to produce gendered nouns and later agreement, which lends support to PT. Overall, Andersson concluded that “learner who acquires nouns with definite suffixes gets an entrance into the Swedish gender system” (Pienemann & Hakansson, 1999). Because the application of grammatical structures onto lexical items comes before agreement in Pienemann’s hierarchy, this study provides evidence for PT.

Another impactful study that Pienemann and Hakansson analyze in this article is one from Hammarberg in 1996. The study examined 6 adult learners of Swedish, in which the L1s were Chinese, Greek, and Portuguese. The study was longitudinal, taking place over the course of one to five years. Data was collected throughout interviews with participants. Much like Glahn et. al, Hammarberg’s earlier study examined “ the acquisition of adjective agreement in attributive position within the noun phrase to adjective agreement in predicatives,” or, in simpler terms, phrasal and interphrasal morphemes (Pienemann & Hakansson, 1999). Hammarberg found that agreement for plural morphemes was acquired

in the order predicted by Pienemann, while gendered morphemes were in a different order. Hammarberg attributed this to “the notion of Perceived Communicative Value (PCV)” that overrides PT. Like Glahn et al. described, gender does not carry a lot of semantic value, and is therefore less important to the speaker when seeking to achieve agreement. Pienemann’s description of these studies further elucidate the relevance of PT to Scandinavian languages. Though there is substantial evidence supporting PT, there are certain weaknesses not addressed by Pienemann himself.

### Article 3: Comparing PT in Scandinavian languages to PT in L1 Japanese and English

In this article, Pienemann, Keßler, and Itani-Adams utilize PT as a way to compare L1 acquisition of Japanese and English. In order to get a better understanding of how PT works within Scandinavian languages, we must get a glimpse of other languages and the accuracy of PT within those. Before discussing the supporting study in this article, an English as a Second Language (ESL) scale and Japanese as a Second Language (JSL) scale are created using PT. The researchers created a table which picks apart the acquisition of each of these languages and the stages to which each step belongs within PT. For example, the first step of the English scale is words and formulae (Hello, Central, What is your name?, etc.), while the first step of the Japanese scale is invariant form and formulaic expression.

After outlining the application of PT to English and Japanese, the article goes on to discuss a study done by Itani-Adams in 2007 on an emergent English-Japanese bilingual known as Haru. Haru was studied from the time she was one year and eleven months old to the time she was four years and ten months old. During this time, her acquisition of both languages was measured using PT as a comparability scale. Haru was born in Australia, had an Australian father whose first language was English, and a Japanese mother whose first language was Japanese. She was exposed to both at home from the time of her birth. Much like Andersson’s 1992 study, one child’s individual development was the focus of the study. Haru was recorded monthly for 45 minutes per language. At the time that the study began, Haru was in the lemmata stage of both languages. Over time, researchers found that both of her language development processes were following the order outlined by PT, but that they were not developing in tandem. Different procedures were acquired at different times depending on the language.

For example, the phrasal level emerged first in Japanese, while the S-level (sentence structure) emerged first in English. As the researchers put it, “Haru’s Japanese and English both developed according to the sequence predicted by PT” (Pienemann & Kefler & Itani-Adams, 2011). Because they developed separately, the Separate Development Hypothesis was also supported.

In comparing this study to the studies done on Scandinavian languages, a few difficulties arise. For example, this study was only on an L1 learner, not an L2 learner as many of the other studies were. Additionally, PT was used more as a comparative tool than anything else in the case of Haru. However, it seems as though PT was strongly supported in many cases involving L1 learners. In Andersson’s study with Lien and in Itani-Adams’ study, the children followed the order given by PT, much like Haru. As intended by Pienemann, PT can be applied to a multitude of languages and yield accurate consistencies between them.

### Conclusion

Pienemann’s theory proved a good tool to examine Scandinavian language acquisition, and is an effective method of comparison across languages. However, a few of the studies brought up discrepancies with PT, something that should be investigated further by continuing research. The two studies that contradict parts of PT involve gender and number, which seems to follow a separate hierarchy. In the study conducted by Glahn et. al, it was found that number and gender are not acquired at the same time, the way that Pienemann would suggest. Hammarberg’s earlier study on Swedish found that gender morphemes were acquired later than plural morphemes. Because of these findings, more research should be conducted in order to conclude whether or not there is a definitive hierarchy of gender and number morphemes in Scandinavian language acquisition. That is not to say that the research does not support PT. On the contrary, much of the evidence in the given studies shows that in terms of structure, PT is fairly accurate. In comparing PT in Scandinavian languages to PT in Japanese and English, we see little discrepancies in other languages. Learners do tend to follow this structural pattern the way that Pienemann predicted in his 1998 book. More research should continue to be conducted in order to strengthen the theory, as it is still relatively new. It is also worth mentioning that many of these articles



were written by Pienemann himself, who of course is a proponent of his theory. All in all, PT has its weaknesses when it comes to Scandinavian gender and number, but the main structure of the theory is certainly supported by the research.

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