# TESTING PROCESSABILITY THEORY IN L2 SPANISH: CAN READINESS OR MARKEDNESS PREDICT DEVELOPMENT?

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**TESTING PROCESSABILITY THEORY IN L2 SPANISH: CAN READINESS OR MARKEDNESS PREDICT DEVELOPMENT?**

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The goal of this dissertation is to test the five stages of Processability Theory (PT) for second language (L2) learners of Spanish and investigate how instruction can facilitate the development through the stages. PT details five fixed stages in the acquisition of L2 morphosyntax based on principles of speech processing (Levelt, 1989) and modeled on Lexical-Functional Grammar (LFG) (Kaplan & Bresnan, 1982; Bresnan, 2001). In addition, two models that predict how instruction can affect staged language development are tested: the Teachability Hypothesis (Pienemann, 1984, 1989), which says that instruction will only be effective if aimed at the next developmental stage and Projection Model (Zobl, 1983, 1985), which claims that instruction on more marked items can project to less marked, related items.

In Study 1, the specific stages for L2 Spanish morphology and syntax were proposed and tested on a cross-sectional corpus of conversational data by learners ($n$=21) with L1 English. Implicational scaling confirmed the five stages for the syntax and morphology with 100% scalability. Syntax was also found to emerge before morphology at all five stages.

Studies 2 and 3 tested the effect of instruction aimed at Stages 3, 4 and 5 for beginning (first and second semester) learners of Spanish (*N=57)*. Learners' oral production and stage gains were measured between a pre-test, a post-test two days after instruction, and a delayed post-test three weeks later. Learners' production of the target structures increased after instruction on the *next, next + 1* or *next + 2* stages, while the control groups made no significant

changes. These results present counter-evidence to the prediction of the Teachability Hypothesis that instruction only on the *next* stage can aid learners to advance to subsequent developmental stages. Overall, the results offer further cross-linguistic support for the PT hierarchy, while refuting one of its corollaries, the Teachability Hypothesis.

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# PREFACE

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# 1.0 INTRODUCTION

The sequence of instruction in the beginning foreign language classroom often does not follow the sequence of language acquisition. For example, in a second language (L2) Spanish classroom, the concept of number and gender agreement appears in the first few chapters of a typical Spanish language textbook, yet students may struggle into the intermediate and advanced levels to produce properly inflected nouns and adjectives in conversation. Even the most seemingly simple rules, e.g. match nouns and adjectives for gender and number, can be difficult to produce in conversation. The goals of this dissertation are to look at the stages of acquisition of several basic grammatical rules typically presented to beginning L2 learners of Spanish, such as number agreement and word order in questions, and investigate the effect of instruction on these stages for classroom learners. Specifically, this dissertation aims to establish the stages of acquisition of syntax and morphology based on Processability Theory (PT) (Pienemann, 1998, 2005) and to teach these stages to beginning learners of L2 Spanish.

PT (Pienemann, 1998, 2005) offers a psycholinguistic explanation as to how and why learners' morphosyntactic development follows predictable routes: it claims that processing constraints on spontaneous oral language predict a hierarchical order of development of morphosyntactic features for language learners. The hierarchy predicted by PT has been widely accepted as a valid theory of second language development, e.g. in German (Pienemann, 1998,

2005; Jansen, 2008), Italian (Di Biase & Kawaguchi, 2002), and Chinese (Zhang, 2005), but the stages have not been established for L2 Spanish.

Recent studies on PT have tested its typological plausibility (e.g. Mansouri, 2005; Zhang, 2005) or attempted to provide an empirical basis for several of its basic assumptions; namely that of the independent nature of each stage (Jansen, 2008) and that of whether the syntax and morphology develop jointly or separately (Dyson, 2009). This dissertation will contribute to typological plausibility of PT by applying the processing stages to the acquisition of L2 Spanish. In addition, this dissertation will test these two issues raised in recent studies: whether the syntax or the morphology emerge separately or together (Dyson, 2009) and whether the stages are discrete stages as proposed by PT (Jansen, 2008).

Given the robustness of the PT hierarchy, a vital question that follows is how instruction in the classroom should target these hierarchically acquired structures. Logically, this question has been raised in previous research, but no satisfactory answer has yet to be empirically validated. A corollary to PT, Pienemann (1984, 1989, 1998) proposed the Teachability Hypothesis: that instruction can only be effective if targeting the stage for which the learner is psycholinguistically ready. The Teachability Hypothesis is widely mentioned in conjunction with PT in textbooks on second language acquisition and teaching (Larsen-Freeman & Long, 1991, p. 251-69; Mitchell & Myles, 2004, p. 115-16; Cook, 2008, p. 28-33; Ellis, 2008, p. 861). However, unlike PT, the Teachability Hypothesis has a limited empirical basis. The hypothesis developed from Pienemann's (1984, 1989) studies over the acquisition of German word order; subsequent studies testing its predictions have been limited to those analyzing the development of question formation in English as a second language (Spada & Lightbown, 1999; Mansouri & Duffy, 2005) or German word order (Ellis, 1989; Boss, 1996). In addition, a single study has

addressed the effect of different kinds of instruction on the development of two structures in L2 Spanish (Farley & McCollam, 2004).

An alternative viewpoint on sequence of instruction is offered by Zobl (1983, 1985) in the form of the Projection Model, which says that teaching learners more difficult, or marked, items allows them to project that knowledge to less difficult, or unmarked items. The Projection Model has been tested and observed only in research on the acquisition of relative clauses (e.g. Eckman, Bell & Nelson, 1988; Doughty, 1991), possessive pronouns (Zobl, 1985), and different types of subjunctive clauses (Pereira, 1996). Overall, both the Teachability Hypothesis and the Projection Model make important assertions about the role of instruction, but empirical research has been limited to certain structures and few languages. A comprehensive study testing a variety of morphosyntactic structures is needed in order to address the claims of both the Teachability Hypothesis as well as the Projection Model, which is an issue this dissertation will address.

Three studies have been conducted for this dissertation. In Study 1, the general stages predicted by PT were applied to specific elements of Spanish morphosyntax in order to answer the following research questions: (1) Are the stages predicted by PT present for L2 learners of Spanish?, (2) Is there evidence that five discrete stages exist for the development of syntax and morphology as predicted by PT?, and (3) Do the syntax and morphology emerge separately or together? The stages predicted were tested on a corpus of data from L2 classroom learners ($n$=21) of Spanish.

Studies 2 and 3 investigated the effect of teaching the PT stages to beginning learners of Spanish. The research questions are: (1) Does instruction on the *next* stage facilitate development?, (2) Does instruction on the *next + 1,* i.e. marked, stage facilitate development to that stage?, (3) Is instruction more effective when focused at the *next* or *next + 1* stage?, and (4)

Can instruction facilitate that learners skip a stage? Participants of Study 2 were three intact classes ($n$=36) of Elementary Spanish II, the second semester beginning Spanish class offered at the University of Pittsburgh, while the participants of Study 3 are from two intact classes ($n$=21) of Elementary Spanish I, the first semester Spanish language class. Both studies followed the same procedure: first, participants took a pre-test, followed by an instructional period with immediate post-test, then a delayed post-test three weeks later. The instructional period targeted morphological items and syntactic structures at stages past the participants' current stages.

The organization of this dissertation is as follows. Chapter 2 presents a review of relevant previous literature. The application of the PT hierarchy to the acquisition of L2 Spanish (Study 1) is presented in Chapter 3. In Chapters 4 (Study 2) and 5 (Study 3), the results of teaching the stages established in Study 1 to beginning L2 Spanish learners are discussed. Chapter 6 discusses the theoretical implications of the results and summarizes and concludes the dissertation.

# 2.0 LITERATURE REVIEW

In this chapter, the principles of PT will be described and discussed in relation to the acquisition of L2 Spanish in the language classroom. PT will first be described in detail in Section 2.1, from its theoretical tenets to the predictions it makes for second language acquisition. The acquisition of L2 Spanish morphology and syntax are described in Section 2.2, including the specific predictions of the stages for L2 Spanish. Section 2.3 discusses how instruction on elements in the PT hierarchy can influence progress through the hierarchy. The research questions for Studies 1, 2, and 3 are presented in Section 2.4.

## 2.1 PROCESSABILITY THEORY

### 2.1.1 Overview of PT

PT is a theory of second language acquisition centered on the premise that the ability to produce speech in a second language is limited by the one-by-one acquisition of five speech processing procedures, all of which are the same procedures by which a mature L1 speaker generates grammatical utterances. The current framework for PT has emerged as the result of several decades of research on order of acquisition of syntax and morphology, beginning with the

research conducted by the ZISA[1] research project in Germany in the late 70's and early 80's. PT originally developed as a theory to address the developmental problem (Felix, 1984) of language acquisition, i.e. why learners of various L2s follow similar routes of acquisition.

The main claim of PT is that learnability is restricted by computational constraints of the language processor: as such, learning a language requires the gradual acquisition of language-specific processing procedures based on Levelt's (1989) speaking model (Pienemann, 2005, p. 2). This view of language performance is complemented by a theory of grammar; PT is based on Lexical-functional grammar [LFG] (Bresnan, 1982), a model of grammar that reflects many of the psycholinguistic principles prominent in Levelt's (1989) theory of production. The integration of these characteristics of Levelt's (1989) speaking model and LFG will be seen in the following sections, which detail the basic structure and predictions of PT.

### 2.1.2 Levelt's Speech Processing Model

PT assumes several characteristics of language production based on Levelt (1989): namely, that processing is autonomous, automatic and incremental, that the underlying meaning may not be linear while the output is, and that processing can utilize grammatical memory storage (Pienemann, 2005, pp. 3-7). Levelt's (1989) model of speech production encompasses language production from the formation of the message, i.e. the *Conceptualizer*, to constructing message with the *Formulator*, to the physical production of the message with the *Articulator* (Levelt, 1989, p. 55). PT focuses on one aspect of this model: that of grammatical encoding in the

[1] See Meisel, Clahsen and Pienemann (1981) for a description of the research conducted by the ZISA (Zweitsprachenerwerb italienisher und spanischer Arbeiter) research group.

Formulator, whose role is to take the concept of a message and apply the necessary grammatical procedures and phonological encoding before the message is sent to the Articulator. The following processes are followed in message generation for fully competent speakers as discussed by Pienemann (2005, pp. 7-9). First, a lemma is activated in the Conceptualizer. A lemma contains information, such as semantic roles and grammatical functions, which is needed for further syntactic procedures. Next, syntactic procedures work to build constituent structure. For example, for a speaker to produce the phrase *una manzana* 'an apple', the lemma "manzana", is activated in the Conceptualizer. Since the lemma is annotated for grammatical category, in this case, N (Noun), the categorical procedure NP (Noun Phrase) is called. The categorical procedure assures that the NP then has the necessary determiners and diacritic features necessary. Free and bound grammatical morphemes are inserted through Functorisation Rules. Values of diacritic features are merged by the conceptual structure of the constituents that must match through phrasal procedure. To link a lemma with the rest of the message, e.g. *una manzana es verde* 'an apple is green', the categorical procedure also calls for the functional destination of the phrase through language Appointment Rules, for example, for the NP *una manzana*, it would be appointed subject (Pienemann, 1998, p. 69). The functional specification of the category is then sent to S-procedure. The final procedure is to mark embedded clauses, i.e. matrix and subordinate clauses. These procedures are implicational by nature. For instance, in order for s-procedure to determine the function of the phrase, the category of the phrase must be determined through phrasal procedure. This procedure – from lemma activation to subordinate clause procedure – highlights the basic architecture of Levelt's model of incremental message generation from conceptualization to formulation of a message with internal structure. As mentioned previously, these procedures are considered to be active for mature language

speakers; what PT addresses is how second language learners acquire these procedures. In order to apply the PT hierarchy to languages of varying typology, a unification grammar, LFG, is used. The next section describes the basic principles of LFG as relevant to PT.

### 2.1.3 Lexical-functional Grammar

LFG in PT serves as a means by which syntactic and morphological structure of languages of various typologies can be exemplified in terms of the main processing procedures depicted by PT. An important component of LFG integral to the processing perspective of PT is the mechanism of feature matching or unification as discussed by Pienemann (1998).

> …the unification of lexical features, which is one of the main characteristics of LFG, captures a psycholinguistically plausible process that involves (1) the identification of grammatical information in the lexical entry, (2) the temporary storage of that information and (3) its utilization at another point in the constituent structure. (p. 73)

Feature matching provides a plausible explanation for the "linearization" problem in language generation; this problem is related to the mismatch between the actual order of events and the surface order, e.g. *Before the man rode off, he mounted his horse,* or to the need for information already produced to be used at a later point in the same utterance (Pienemann, 2005, p. 5). Pienemann (2005) uses subject/verb agreement as an example: a speaker needs the information about the subject at a later point in the utterance in order to correctly inflect the verb.

A brief sketch of the main principles of LFG as pertinent to PT follows. The main components of LFG are the lexicon, c-structure (constituent), f-structure (functional) and a-structure (argument). F-structure links the grammatical information with the semantic interpretation to give the sentence meaning. A-structure specifies which argument roles are

needed for a given predicate. C-structure represents the surface structure of constituents. In the lexicon, each lexical entry is annotated with various features as seen in Figure 1, such as number, person, or tense that has varying values (e.g., singular, plural, present), which are used to generate sentences.

| | | | |
|---|---|---|---|
| **Luis** | N | PRED | =”Luis” |
| **tiene** | V | PRED | = “tiene” (SUBJ, OBJ) |
| | | TENSE | =present |
| | | SUBJ PERSON | =3 |
| | | SUBJ NUM | =SG |
| **un** | DET | SPEC | =”un” |
| **perro** | N | PRED | =”perro” |
| | | NUM | =SG |

**Figure 1. Lexical entry for *Luis tiene un perro ‘Luis has a dog’***

Each lemma includes the information not only as to which arguments it needs and which grammatical roles those arguments have, but also diacritic features such as tense. As seen in Figure 1, specific values are assigned to features; for example, TENSE assigns the value “present”. Phrase structure rules generate c-structure, as shown in Figure 2.

S -> NP $_{subj}$ VP

NP -> (det) N

VP -> V ($NP_{obj}$)

**Figure 2. Phrase structure rules for *Luis tiene un perro* ‘Luis has a dog’**

Figure 2 shows that categories, e.g. NP, are assigned grammatical functions, e.g. subject, in the phrase structure rules. The overall relationship between c-structure, a-structure and f-structure is illustrated in Figure 3.

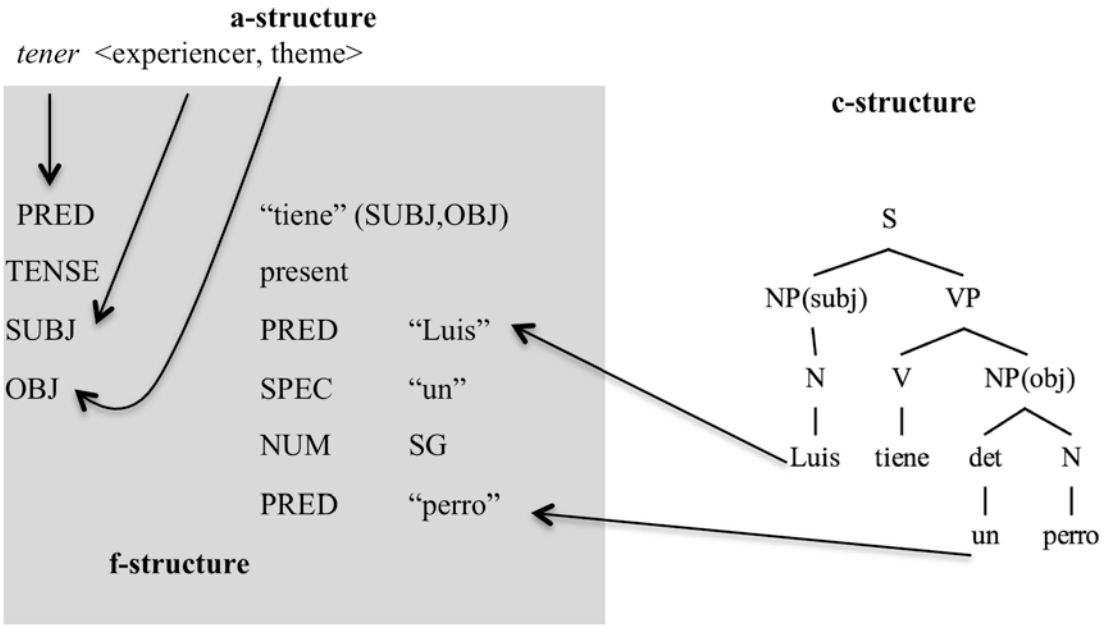


**Figure 3. LFG structure for *Luis tiene un perro* 'Luis has a dog'**

C-structure represents the ordered relationship between constituents in the phrase. F-structure lists attributes, such as TENSE with values, such as present, as illustrated in Figure 3. A-structure indicates the necessary thematic roles for the predicate in the utterance. Other properties of LFG are that there are no intermediate levels of representation, or transformations. Well-formedness conditions act on the three components to ensure that features are unified properly and that all of the features necessary are present. One of these conditions is the uniqueness condition, which ensures that the values given to a constituent are compatible. For example, the following examples in (1) and (2) would not be allowed to surface.

(1) *Ellos va.
They-pl go-3sg
'They go.'

(2) *las manzana

the-pl apple-sg

The first is a mismatch of 3rd person plural subject and 3rd person singular verbal marking, and the second is a mismatch of plural and singular. In summary, LFG is the reference point for interpreting grammars of various languages in the PT hierarchy. The stages of acquisition predicted by PT will be detailed in the next section.

### 2.1.4 Stages of Acquisition Predicted by PT

The main procedures involved in the Grammatical Encoder—lemma activation, category procedure, phrasal procedure, s-procedure, and subordinate clause procedure—and the mechanism of feature matching form the basis for the PT hierarchy of acquisition for second language learners. PT predicts that while second language learners have access to all procedures in their first language (L1), they must learn language specific procedures for the L2. Regardless of their L1 or L2, PT predicts that L2 learners acquire the five procedures in the same incremental order in which they are accessed for mature speakers.

The five procedures are implicationally ordered: learners first produce words at Stage 1, then as a learner progresses, he or she moves up the scale through the stages, acquiring each stage one-by-one. Table 1 illustrates the processing procedures that are proposed to be acquired at various times (T) of a learners' interlanguage development (Pienemann, 2005, p. 14).

**Table 1. Hierarchy of processing procedures**

| Procedures and Stages | T1 | T2 | T3 | T4 | T5 |
|---|---|---|---|---|---|
| **S'-procedure (EmbeddedS) (Stage 5)** | - | - | - | - | Inter-clausal agreement / Subordinate clauses |
| **S-procedure (Stage 4)** | - | - | - | Inter-phrasal agreement / Target word order | + |
| **Phrasal procedure (Stage 3)** | - | - | Phrasal agreement / XP-adjunction | + | + |
| **Category procedure (Stage 2)** | - | Lexical morphemes / Canonical word order | + | + | + |
| **Word / lemma (Stage 1)** | 'words' | + | + | + | + |

A description of each stage in Table 1 follows. First, learners are limited to producing lemma, i.e. words or formulaic expressions, at Stage 1. No exchange of information is possible, and thus no feature matching, or unification. At Stage 2, category procedure, the ability to assign a category to the lemma, develops. Pienemann (1998, p. 114) proposed the tense marker *–te* in German to occur here, as did Di Biase and Kawaguchi (Di Biase & Kawaguchi, 2002) for the past marker *–to* in Italian. Di Biase and Kawaguchi also discussed that the plural marking on nouns – by alternating the final vowel of a word – is a local lexical operation. These markers require no feature unification as they can be found in the lexical entry for the verb. In terms of

syntax, at Stage 2, learners begin to produce strings based on canonical word order, which involves a prototypical mapping of the most prominent thematic role, i.e. agent, to the initial position in c-structure, i.e. subject (The Unmarked Alignment Hypothesis; Pienemann, Di Biase, & Kawaguchi, 2005, p. 229). This analysis assumes a one-to-one correspondence between a-(argument) structure, f-(functional) structure and c-(constituent) structure; the process of producing SVO then is a linear process that requires no exchange or storage of information. This is possible because it is assumed that learners are able to define categories such as 'verb' and 'subject', but mapping is restricted by the inability to unify features.

At Stage 3, phrasal procedure emerges, which involves the ability to merge features as well as the ability to determine "positions" in terms of phrases instead of just words (Pienemann, 2005, p. 27). At this point, in terms of morphology, features such as plurality can be matched across other elements within the same constituent, e.g. noun phrase agreement. At the same stage, the syntactic phenomenon that emerges is the fronting or post-positioning of elements, such as adverbs, prepositional phrase or wh-question words, to canonical utterances. According to Pienemann, this is possible because learners are able to add adjuncts to the initial position in c-structure although they still do not have the ability to modify canonical word order (The Topic Hypothesis, Pienemann et al., 2005, p. 239).

At Stage 4, s-procedure develops: that is, at this stage, the function of the phrase is determined through appointment rules and sent to s-procedure, where the information is stored as the sentence is developed. Through s-procedure, feature matching can occur across constituent boundaries, and more target-like word order phenomena are found based on language-specific syntactic rules. For example, at this stage, as demonstrated by Jansen (2008), L2 German learners begin to produce clauses with an inverted subject and finite verb, such as *heute habe ich*

*sie geshen* 'today have I her seen'. In terms of morphology, inter-phrasal information can be exchanged, which involves the exchange of information across constituent boundaries, e.g. subject-verb agreement in English. Predicative adjective agreement is also an inter-phrasal procedure (cf. Pienemann & Håkansson, 1999 for Swedish; Dewaele & Veronique, 2001 for French; Alhawary, 2009 for Arabic). In the extended version of PT, S-procedure also entails mapping between a-structure and f-structure (Lexical Mapping Theory, Pienemann et al., 2005), as explained by Kawaguchi (2005): "The identification of the phrases' grammatical functions and their functional assignments in passive, causative and benefactive constructions requires the learner to unify information from different sources: the V and N phrases. This calls for an interphrasal process" (p. 270). At the final stage, Stage 5, s-procedure is able to call 'S' as a procedure, which means that subordinate clauses can be formed.

Regarding language transfer, PT proposes that learners may transfer some, but not all, properties of the L1 to the L2, i.e. the developmentally moderated transfer hypothesis (Pienemann, 1998, p. 81; Pienemann, Di Biase, Kawaguchi, & Håkansson, 2005). Transferred properties are always subject to the processability constraints that restrict the L2 grammar at any given point. In other words, transfer of L1 knowledge to the L2 could occur as long as the property in question is processable. Likewise, learner variation is considered to be constrained within the learner's current processing stage. Pienemann proposed the 'steadiness hypothesis' (1998, 2005) which claims that the "basic nature of the grammatical system of an IL does not change in different communicative tasks as long as these are based on the same skill type in language production" (2005, p. 44). Many studies have used more than one kind of communicative task besides a conversational interview in order to verify the proposed stages of PT (Pienemann, 1998; Di Biase & Kawaguchi, 2002; Sakai, 2008), and no differences in tasks

have been noted. However, Kawaguchi and Di Biase (in press) found differences in production of passives for L2 Japanese learners between a time constrained task and a self-paced task. These issues—of L1 transfer and task differences—will be discussed in detail below in Section 2.1.6, along with other criticisms and counter-evidence for PT. First, a full discussion of previous empirical studies that have found support for the PT hierarchy in L2 acquisition by speakers of varying L1s follows in the next section.

### 2.1.5 Support for PT

Studies over PT have tested whether the predictions for each stage hold for learners of typologically diverse languages. In 1998, Pienemann presented the framework for PT along with a re-analysis of data from previously published studies over the acquisition of morphosyntax in various L1s using the emergence criteria for PT and implicational scaling (Pienemann, 1998, pp. 165-214). Overall, this review found evidence for the PT stages in syntax and morphology in the L2 acquisition of German, English, Swedish, and Japanese by speakers of various L1s and various ages and contexts of acquisition, i.e. children and adults in naturalistic or classroom settings. Subsequent studies have mostly found support for the PT stages. Table 2 summarizes studies that have addressed the stages of acquisition of syntax or morphology from the PT framework.

**Table 2. Summary of previous PT studies**

| Study | L2 | L1 | Type of study | Structures tested | Results |
|---|---|---|---|---|---|
| Pienemann 1998 | German, English, Swedish, Japanese | Varied | Review of 18 studies | Syntax / morphology | PT stages supported |
| Pienemann and Håkansson 1999 | Swedish | Varied | Review of 14 studies | Syntax / morphology | When data was comparable, PT stages supported |
| Glahn et al. 2001 | Swedish, Danish, and Norwegian | Varied | Adults in SL classes (*n*=47) | Phrasal, interphrasal and subordinate clauses | Stages upheld with differing measures of emergence |
| Di Biase and Kawaguchi 2002 | Italian | English | Cross-sectional FL classroom study (*n*=6) | 3 kinds of morphemes | 100% scalability |
| " | Japanese | English | Longitudinal / cross-sectional FL classroom study (*n*=1 / *n*=9) | 3 kinds of morphemes | 100% scalability |
| Kawaguchi 2005 | Japanese | English | Longitudinal FL classroom learners (*n*=2) | Syntactic development | PT stages supported |
| Zhang 2001, 2005 | Chinese | English | Longitudinal FL classroom study (*n*=3) | 3 kinds of morphemes | PT stages supported |
| Mansouri 2005 | Arabic | English | Longitudinal FL classroom learners (*n*=2) | Phrasal and interphrasal morphemes | 100% scalability |
| Jansen 2008 | German | English | Cross-sectional FL classroom study (*n*=21) | Word order | 100% scalability |
| Sakai 2008 | English | Japanese | Cross-sectional FL classroom study (*n*=7) | Syntax | 79.9% scalability |
| Dyson 2009 | English | Mandarin Chinese | Longitudinal SL classroom study (*n*=2) | Syntax and morphology | PT stages supported; emergence of syntax before morphology |
| Baten 2011 | German | Dutch | Cross-sectional FL classroom study (*n*=704) | 3 kinds of morphemes for case marking | Results for fill-in-the-blank task supported PT sequence |
| Kawaguchi and Di Biase (in press) | Japanese | Varied | Cross-sectional FL classroom study (*n*=23) | Passive constructions | Varied automatization of Stage 4 |

*Note.* SL is for second language learning, i.e. the language is spoken widely outside the classroom, and FL is for foreign language, i.e. the language is mainly used only in the classroom (Ellis, 2008, p. 6)

Early PT studies looked at acquisition of syntax and morphology in various languages. Pienemann and Håkansson (1999) found further support for the PT stages in the L2 acquisition of Swedish syntax and morphology based on a corpus of data from 14 previous studies on the acquisition of Swedish morphosyntax. Glahn, Håkansson, Hammarberg, Holmen, Hvenekilde, & Lund (2001) applied the PT hierarchy to the L2 acquisition of Danish, Norwegian, and Swedish attributive and predicative adjectives and subordinate clause syntax. Implicational scaling of the order of emergence of these three items showed phrasal (attributive) adjectives to be acquired before interphrasal (predicative) adjectives and subordinate clauses. Scalability was upheld when considering a structure emerged by counting just one occurrence, or by claiming emergence for a structure when supplied in 50% of possible contexts for the structure or 80% of the possible contexts. However, the authors noted that gender, a lexically-based feature of nouns, did not follow the same implicational pattern as number, a conceptually-based feature, given that number agreement was acquired before gender agreement. The authors sum up the difference between gender and number: "whereas learners can *intend* singular or plural, they have to *know* whether the noun is uter or neuter" (Glahn et al., 2001, p. 402). The results of the study suggest that although learners in principle could process number agreement, gender agreement at the same stages remained far from automatized. That gender agreement would be acquired later is to be expected in PT theory; as discussed by Pienemann (2005), gender must be acquired for individual lexical items, therefore a learner may be able to unify features within or across grammatical boundaries, but the determination of which gender to use is a gradual process based on the acquisition of individual lexical items and their featural specifications.

Subsequent studies have shown strong support for the PT stages in various languages by a mixture of cross-sectional and longitudinal studies. Di Biase and Kawaguchi (2002) analyzed

cross-sectional data of formal learners of Italian and Japanese in Australia and found the sequence of morpheme acquisition predicted by PT (lexical (category procedure) > phrasal (phrasal procedure) > interphrasal (S-procedure). Implicational scaling for both languages was 100% for the cross-sectional Italian data and for the longitudinal and cross-sectional studies data for Japanese. Kawaguchi (2005) applied the PT stages to Japanese word-order phenomena such as topicalization as well as non-canonical structures such as passives and found the implicational sequence predicted by PT for learners of Japanese in Australia: word/lemma > lexical (category) procedure > phrasal procedure > S-procedure. Zhang (2001, 2005) and Mansouri (2005) further contributed to typological plausibility of PT by hypothesizing and showing the development of lexical, phrasal and interphrasal morphemes by classroom L1 English learners of Chinese and Arabic in Australia respectively. Sakai (2008) tested acquisition of English word order with classroom learners with L1 Japanese in Japan and showed the implicational sequence predicted by Pienemann for English (Pienemann, 1998). Baten (2011) applied German case marking to the PT stages of morphology, and then measured Dutch native speakers' from Belgium (ages 15-18 in grades 10, 11 and 12) use of case marking in a time-constrained fill-in-the-blanks task. Comparisons of proportions of case assignments in different case contexts showed that learners marked lexical case marking first, followed by phrasal and interphrasal.

Other studies have focused on the nature of the stages themselves and the interaction between syntax and morphology. Jansen (2008) tested the stages of German word order development in a cross-sectional study of classroom learners of German with L1 English in Australia. She found that while implicational scaling confirms the order and cumulative nature of the stages, there were many 'gaps' in the data whereby a learner's stage could not

conclusively be determined given a lack of sufficient contexts for the rule in question.[2] This result garners the question of whether the stages predicted by PT exist as stages in their own right; Jansen (2008) noted that more data are needed in order to test for potential nonacquisiton of structures given that her results did confirm acquisition of the structures.

Dyson (2009) investigated the acquisition of English by two Mandarin-speaking classroom learners, Philomena and Daniel, over one academic year in Australia. Dyson tested whether the acquisition of the morphology is a precursor to the acquisition of the syntax at stages 1-4. Results showed that the stages of PT are upheld in terms of the order of acquisition of each stage. However, the development of the syntax and morphology was largely disjointed. The only stage at which the morphology and syntax was shown to emerge together for both learners was Stage 2 at the first data collection; otherwise, the syntax was shown to emerge before the morphology or together with the morphology without exception for both learners at the other data collections. The issue of order of development of syntax and morphology will be discussed further below in Section 2.1.6.

Kawaguchi and Di Biase (in press) highlight a gap in the explanatory nature of PT by exploring the production of Stage 4 passive constructions in L2 learners of Japanese. While the learners in this study have all shown emergence of Stage 4, Kawaguchi and Di Biase point out that the degree of automatization of these structures varies greatly between the participants. Data from two kinds of tasks were collected: a profiling task in order to determine whether passives had emerged and an experimental task to determine how learners handled voice alternations with greater time constraints. The profiling task was for learners to tell a story at their own pace based on a series of pictures with contexts for passivization. The experimental task was to view a short

[2] Less than four contexts were considered insufficient.

film that involved producing sentences with passive structures to describe the eventualities on the screen, which involved two fish (one agent, one patient) eating each other. Of the 12 learners at Stage 4 who produced passive structures on the profiling task, which shows that Stage 4 passives had emerged, their performance on the experimental task varied greatly. Kawaguchi and Di Biase delimited three kinds of learners that represent a progression from emergence of a structure to automatization of that structure. First, "novice users" did not produce Stage 4 passives on the time-constrained task; instead, they were limited to producing lower-stage structures. The next group, "intermediate users" could produce some Stage 4 mapping, but their performance was less accurate. "Expert users" were shown to produce Stage 4 structures consistently regardless of task differences. As discussed by Kawaguchi and Di Biase, these results indicate a need for a connect between the ability to process syntactic structures as described in PT and automatically produce them under time constraints in order to offer a more complete picture of the production abilities of second language learners at varying stages.

In summary, most empirical research has centered on the development of lexical, phrasal or interphrasal morphemes (Glahn et al., 2001; Di Biase & Kawaguchi, 2002; Zhang, 2001, 2005; Mansouri, 2005; Baten, 2011), on word order rules (Glahn et al., 2001[9]; Kawaguchi, 2005; Jansen, 2008; Sakai, 2008), or on both syntax and morphology (Dyson, 2009). Overall, empirical studies have largely found the PT hierarchy to be representative of stages through which learners pass in producing spontaneous language. The next section discusses criticisms of PT.

### 2.1.6 Criticisms of PT

PT arose to address the similarities in L2 German word order acquisition found in the ZISA project in the early 1980s; however, Pienemann contributed to two other theoretical models that used processing strategies as the explanatory basis for stages of word order development: the Multidimensional Model (Meisel et al, 1981), and the Predictive framework (Pienemann & Johnston, 1987). The Strategies Approach (Clahsen, 1984) was also a key theory that developed from the ZISA research. First, the Multidimensional Model claimed that two dimensions explain the nature of interlanguage development: developmental stages of linguistic criteria (measured through emergence criteria and implicational scaling) and inter- or intra- learner variation due to socio-psychological variables, such as a person's origin or education level. The variational dimension had some serious methodological flaws, e.g. where data was missing (coded as 0) or non-applicable (coded as 1) were both counted on an ordered scale of integration from 0 to 4 (cf. Hudson, 1993; Mellow, 1996), and plays no role in PT. Next, Clahsen (1984) proposed that L2 learners have access to language processing strategies that explain the development found for the ZISA group: canonical order strategy, initialization/finalization strategy and subordinate clause strategy. The third model, the Predictive Framework, applied the Strategies approach of processing resources to the L2 acquisition of English syntax and morphology. While elements of PT are recognizable in these early theories—namely, the notion that L2 learners need to acquire processing strategies to account for sequences of word order development—PT developed in 1998 as a novel theory. However, criticisms of the three models mentioned above that retain relevance to PT will be discussed briefly along with a discussion of other limitations of PT.

First, the limited scope of PT to just production data has been questioned in several reviews (Gregg, 1999; Jordan, 2004, p. 227; Ellis, 2008, p. 465). PT's explanatory value is

limited to the acquisition of speech processing procedures: it makes no claims as to how learners comprehend and intake novel utterances into their interlanguage, i.e. the construction of an internal grammar is left unexplained. In response to these criticisms, Pienemann (1998, 2005) invokes the perspective from Kaplan and Bresnan (1982): "…the skill of language processing is included as an object of enquiry along with competence" (Pienemann, 2005, p. 69). Furthermore, PT, according to Pienemann, is a modular theory that could be complemented by a theory of learner-constructed grammar (Pienemann, 2005, p. 70; Jordan, 2004, p. 227). A related argument noted the limited generalizability of PT given its focus on the emergence of structures (Mellow, 1996): PT makes no claims regarding the development of a structure past emergence up to the point of mastery. All in all, the predictions of PT are limited to the emergence of five ordered stages of processing: the source of knowledge for these procedures is left unspecified, as well as the development beyond emergence of structures of these stages.

Hudson (1993) pointed out a problem with the applicability of the developmental stages to assessment or pedagogy by comparing learners' developmental stages in ESL from Johnston (1985) with the rating from the Adult Migrant Education Service (AMES) scale, which runs from 0.5 (lowest ability) to 7 (native-like). Hudson noted that learners at Stage 4 or below rated 2+ or below on the AMES scale (Hudson, 1993, p. 484). Stage 4 learners only had one remaining stage to acquire, but according to other measures of proficiency measured by the AMES scale, were far from native-like. While Hudson's observation is based on data from one study on stages of L2 English acquisition that predate the PT predictions, Spinner (2007, 2011) noted a similar trend comparing two methods of proficiency testing, Organic Grammar and Rapid Profile, a means of analyzing learners' developing stage in PT in a 15-minute interview. Spinner found that when learners' PT structures in syntax and morphology were organized into

implicational scaling using Rapid Profile, it was difficult to distinguish between intermediate and advanced learners because they had acquired most of the elements. Rapid Profile mostly served to distinguish the beginning learners. This issue raises issues of applicability of PT to the pedagogical realm: if learners at beginning stages of language learning can produce most of the PT stages, then a wide range of grammatical phenomena acquired at later stages are left unexplained by the theory.

Other problems with PT are empirical in nature: operationalization of the emergence criteria, gaps in the data, intra-stage variation, and the challenges of applying PT criteria to typologically diverse languages. Studies on PT stage development rely on the emergence, or onset, of stages, a criterion that has been variably interpreted and operationalized in PT studies. Pallotti (2007) addressed this issue by laying out the criteria to consider for the emergence criteria for syntax and morphology, which are the criteria that this dissertation will follow (See Section 3.1.2.1 for full discussion). A related issue are formulaic chunks—i.e., treating a leaner utterance as an analyzed lexical unit such as *cómo te llamas* 'what's your name' rather than a productive use of a structure. These criteria for these chunks, as noted by Ellis (2008, p. 464) must be laid out or listed by the researcher. Gaps in the data—e.g. a learner shows neither contexts for a structure nor production of a structure—make the determination of a learners' stage problematic given that acquisition or non-acquisition cannot be decided in these cases (Fetter, 1996; Jansen, 2008). Another issue is variation between learners at the same stage, an issue which was also raised by Kawaguchi and Di Biase (in press) in terms of differences in production of Stage 4 structures for Stage 4 learners on two tasks. In a similar manner, Alhawary (2009) showed that L2 learners of Arabic with L1 English and French learning Arabic as a foreign language in their home countries did not show simultaneous emergence of Stage 4

demonstrative-predicate gender agreement and verb agreement. While PT does not predict that all structures at a given stage will be acquired at one time, it is not clear in PT theory why learners varyingly acquire different structures at the same stage once it becomes processable. Part of this issue of stage variability is addressed further in the next section in terms of whether syntax or morphology emerges first in PT. A final point is the challenge of relating languages to the processability hierarchy; the theory originally developed to explain variations in c-structure, for languages such as German and English, and has been successfully expanded to related languages, such as Danish and Swedish. One of the goals of the extended version (Pienemann et al., 2005) is to extend the concepts of feature unification and transfer of grammatical information beyond c-structure to include the mapping of information between a-structure, f-structure, and c-structure, i.e. the Unmarked Alignment Hypothesis, the Topic Hypothesis, and Lexical Mapping Theory. Both Kawaguchi (2005) and Baten (2011) applied the extended version to Japanese syntax and German morphology, but this remains an area for future research on PT typological research.

### 2.1.7 The interface between syntax and morphology

The interaction between the development of syntax and morphology—i.e. whether syntax emerges before morphology or morphology before syntax—has been relatively unexplored in PT research although it has been widely studied from other perspectives in second language acquisition research, namely, whether and how properties of Universal Grammar (UG) from a learner's L1 can transfer to a learner's L2. The debate of whether morphology or syntax emerges first comes from the variability well known in L2 learners' production of morphology; that is, underproduction or overproduction of forms (White, 2003, p. 179). The question that theoretical

accounts have attempted to answer is whether this variability in overt morphological forms is due to the absence of syntactic categories to produce such items, for example, the Minimal Trees Hypothesis (Vainikka & Young-Scholten 1994, 1996) and the Valueless Features Hypothesis (Eubank, 1993, 1994), or rather due to a fundamental problem in marking these items even though the syntactic categories are represented on an abstract level, namely, the Missing Surface Inflection Hypothesis (Haznedar & Schwartz, 1997; Lardiere, 1998a, b; Lardiere & Schwartz 1997; Prévost & White, 2000, and Ionin & Wexler, 2002).

Dyson (2009) argued that the PT procedures are morphological in nature with simplified syntactic procedures at Stages 2 and 3, while at Stages 4 and 5 the main procedures are syntactic. (see Section 2.1.4 for detailed discussion of the stages). Table 3 summarizes the order of syntax and morphology predicted to emerge at each stage.

**Table 3. Order of emergence of syntax and morphology at Stages 1-5**

| Stage | Processing procedure | Structures predicted |
|---|---|---|
| Stage 5 Morphology<br>↑<br>Stage 5 Syntax | Inter-clausal morphemes<br>S'-procedure | Inter-clausal morphemes<br>Target word order in subordinate clauses |
| Stage 4 Morphology<br>↑<br>Stage 4 Syntax | Inter-phrasal morphemes<br>S-procedure | Inter-phrasal morphemes<br>Target word order |
| Stage 3 Morphology<br>↓↑<br>Stage 3 Syntax | Phrasal procedure<br>Simplified S-procedure | Phrasal morphemes<br>XP-adjunction |
| Stage 2 Morphology<br>↓↑<br>Stage 2 Syntax | Category procedure<br>Simplified S-procedure | Lexical morphemes<br>Canonical word order |

Stage 1 is simply production of isolated words, and no processing procedures are yet available, as so it is not represented in Table 3. Stages 2 and 3 are where Dyson (2009) found syntax to emerge before morphology, which calls into question whether morphology is produced before syntax, as indicated by the two-sided arrows in Table 3. At Stage 2, category procedure becomes available, which allows for lexical morphemes to emerge. The syntactic procedure at Stage 2 is a simplified one-to-one mapping of argument structure and functional structure; no L2 specific syntactic procedures are yet available. Phrasal procedure becomes processable at Stage 3; again, a procedure by which features within a phrase can be unified. Syntactic procedures remain

simplified at this stage, although mapping can now be based on phrases not just on one-to-one mapping, which allows for topicalization before canonical word order. At Stage 4, S-procedure develops, which is a syntactic procedure that allows for the function of a phrase to be determined, e.g. 'subject of', as well as allows for information to be stored for exchange between constituents, which in turn allows for morphological marking across the sentence, such as subject-verb agreement. Stage 5, subordinate clause procedure, is also syntactic in nature; the nature of the Stage 5 procedure is that of annotating features in the lemma to allow subordinate clauses to form, i.e. the feature ROOT, which in turn will allow for inter-clausal information to be exchanged, such as gender and number agreement across clauses. In sum, as discussed by Dyson (2009, p. 360), "morphological processing fuels development" up to the point that the S-procedure develops at Stage 4;[3] however, as Dyson (2009) found, syntactic development preceded morphological development for learners in her study. In the same manner, at Stages 4 and 5, syntactic procedures allow for the processing of morphological ones, such as inter-phrasal and inter-clausal morphemes.

To explain how clausal procedures could precede morphological ones, Dyson proposed the Universal Properties Hypothesis, based on the morphological procedures in PT and the gradual acquisition of functional UG categories. The syntactic categories developed by the two ESL learners in Dyson's study began with lexical categories, followed in order by the functional categories Inflection (I) and Inflection Phrase (IP), for example, Neg+V, then Complementizer (C) and Complementizer Phrase (CP), such as Wh-fronting (Dyson, 2009, p. 373). Dyson argued that this order of emergence of syntactic clauses, coupled with the order of morphological

[3] Dyson's (2009) Stage 5 is S-procedure for ESL development, while in this dissertation Stage 5 is always considered subordinate clause procedure, and Stage 4 is S-procedure.

acquisition predicted by PT (lexical > phrasal > interphrasal), shows that UG and the processing procedures predicted by PT both play a role: the syntax develops relatively independently from properties available from UG, which in turn provides contexts for the PT processing procedures for the morphology to follow. Dyson also suggested that learner orientation plays a rule as one learner, Daniel, was more adept at marking morphology, while the other leaner, Philomena, seemed to focus more on syntactic development. The question of whether syntax and morphology emerge in the order predicted at each stage by PT will be addressed in this dissertation.

## 2.2 L2 ACQUISITION OF SPANISH MORPHOSYNTAX

In this section, the relevant typology of Spanish will first be discussed. The stages of PT predicted for L2 Spanish will then be presented after a brief description of one previous study, Johnston (1995) that made predictions for L2 Spanish based on an early version of PT. Finally, research from other theoretical perspectives on the L2 acquisition of Spanish morpho-syntax will be examined.

### 2.2.1 Typological description of Spanish

Spanish is a pro-drop language with rich inflectional morphology. Gender and number are marked on nouns, demonstratives, determiners, quantifiers, personal pronouns, interrogative and relative pronouns, reflexives and reciprocals, adjectives, passive participles and absolutive past

participles (Zagona, 2002). Two genders, masculine and feminine, are marked, as are singular and plural number, as shown in (3) and (4).

(3) las manzanas rojas

The-fem:pl apples-fem:pl red-fem:pl

'the red apples'

(4) los tomatoes verdes

The-masc:pl tomatoes-masc:pl green-masc:pl

'the green tomatoes'

As seen in the examples, the definite determiners *los* and *las* are marked for gender and number, as are the adjectives *rojas* and *verdes*. Relative pronouns are also marked for gender/ number with their referent, as shown in (5).

(5) esos son los **chicos** a **quienes** debes dar el dinero

boys-masc:pl who-masc:pl

'Those are the boys you should give the money to.'

Also of interest for PT are the syntactic and morphological characteristics of dative and accusative pronouns, as illustrated in (6) and (7).

(6) ¿Quién tiene las manzanas?

Who has-2sg the-fem:pl apples-fem:pl

'Who has the apples?

(7) Luis las tiene

Luis them-fem:pl has-3sg

'Luis has them.'

In (6), the accusative pronoun *las* has replaced *las manzanas.* The pronoun agrees in number and in gender with the noun it has replaced. In the following examples, we can see the interaction between dative and accusative pronouns.

(8) Luis le da las manzanas a su madre
Luis her-dat:fem gives the apples to his mother-fem
'Luis gives the apples to his mother.'

(9) Luis se las va a dar.
Luis to her-dat:fem them-acc:fem,pl going to give-3sg
'Luis is going to give them to her.'

In (8), the dative clitic precedes the accusative. It can either morphologically attach to the end of the verb, or precede it. The dative *le* has an allomorph *se* when it is combined with the accusative *lo, la, los or las,* as seen in (9).

Although Spanish is pro-drop, personal subject pronouns are often present for clarification (e.g. when switching references) or for pragmatic emphasis (e.g. for contrastive focus) (Zagona, 2002, p. 25). Word order in finite declarative sentences and subordinate clauses pattern similarly. The order may be: SVO, VOS, or VSO, as shown in (10) and (11) from Zagona (2002).

(10) Luis comió la manzana. (S-V-O)
Comió la manzana Luis. (V-O-S)
?Comió Luis la manzana. (V-S-O)
'Luis ate the apple.'

(11) La manzana que comió Luis

La manzana que Luis comió

'the apple that Luis ate'

The acceptability and naturalness of VSO sequences in (10) varies by speaker and by the lexical and semantic properties of the utterance, i.e. certain verbs such as *sufrir* 'to suffer' may more naturally admit V-S-O sequences (Zagona, 2002, p. 27). As demonstrated in the next two examples, (12) and (13), when the subject is present, its position is variable, but governed by the content of information in the constituents, i.e. whether the information is old, or new, i.e. Topic vs. Focus or presupposed vs. asserted (Zagona, 2002, p. 49). A declarative sentence could have the word order shown in (12) and (13) depending on which information is old or new.

(12) $[\text{Luis}]_{\text{TOPIC}}$ [comió la manzana] $_{\text{FOCUS}}$.

'Luis ate the apple.'

(13) $[\text{Ayer}]_{\text{FOCUS}}$ [comió Luis la manzana]$_{\text{TOPIC}}$

'Yesterday Luis ate the apple.'

The topic or the focus can be a sentence-initial subject, as seen in (12) or an XP-phrase, as shown in (13). In the first example, the information that Luis ate the apple is new; for example, in response to the question "who ate the apple?". In the second example, the information of when the apple is eaten is the new information; for example, in response to the inquiry "When did someone eat the apple?". Intonation serves to distinguish between the two meanings of (12) and (13); the Focus constituent, i.e. the new information, is stressed regardless of the word order (Zagona, 2002, p. 49). Intransitive verbs such as unaccusatives and unergatives also require certain word order patterns depending on the focus. As described by Lozano (2006), in unfocused contexts, i.e. to answer the question "what happened?" unaccusative verbs require VS

word order, e.g. *llegó la mujer* 'arrived the woman', while unergatives require SV word order, e.g. *una mujer gritó* 'a woman screamed'. However, when new information is presented, i.e. presentational focus, VS word order is preferred for both unaccusatives and unergatives.

Interrogatives in Spanish can be formed either as yes/no questions or wh-questions, which involve movement of the constituent in question to the clause-initial position. Yes/no questions pattern like declarative sentences. As in non-declarative finite clauses in general, in wh-questions, the subject is normally required to be post-verbal, as in (14). Preposition stranding is not allowed; the constituent including the preposition moves to the beginning before the wh-word, as in (15).

(14) ¿Qué comió Luis?

*¿Qué Luis comió?

'What did Luis eat?'

(15) Luis habló con la doctora.

¿Con quién habló?

Luis spoke to the doctor.

With whom did he speak?

If the wh-phrase is a modifier, pre-verbal subjects are allowed, as in (16).

(16) ¿Por qué Esther dice eso?

¿Por qué dice Esther eso?

Why is Esther saying that?

Word order in subordinate clauses in Spanish follows the same guidelines as main clauses (Zagona, 2002, p. 29). Finite clauses generally require the complementizer *que* 'that'. The distinction between main and subordinate clauses also potentially involves a change in mood in

the subordinate clause. Mood can be either subjunctive or indicative in the subordinate clause, which is indicated by a change in morphology on the verb. The presence of a subordinate clause is the minimal structural requirement for the use of the subjunctive mood, but the actual use of either subjunctive or the indicative is dependent on the semantics of the main clause. If the main clause expresses any of the following modalities, then the subjunctive is used: command, demand, request, proposal, suggestion, desire, emotion, feeling, impersonal expression, denial, doubt, indefinite relative, exception, concession, temporal clause of futurity, permission, negative result, supposition, proviso, imperative, exclamatory wishes, conditions of implied negation, approval, preference, prohibition, or hindrance (Whitley, 2002). Example (17) illustrates a sentence with subjunctive morphology.

(17) [Sugiero ]$_{\text{MAIN CLAUSE}}$ [que vayas a clase]$_{\text{SUB CLAUSE}}$

Suggest-1$^{st}$/Indicative Go-2$^{nd}$/Subjunctive

'I suggest that you go to class.'

In (17), the suggestion in the main clause necessitates subjunctive morphology in the dependent clause. This brief sketch of Spanish grammar illustrates some of the syntactic and morphological phenomena that L2 learners encounter when acquiring Spanish; in the next two sections, these target structures will be discussed in terms of the five stages of PT.

### 2.2.2 Stages of PT predicted for L2 Spanish

Johnston (1995) proposed a hierarchy of processing for Spanish that predates the current and extended versions of PT. Johnston´s hierarchy has never been empirically tested; however, the stages are based on principles that are no longer relevant to the current version of PT, one of which is the principle of perceptual saliency, which essentially said that learners at the beginning

stages recognize the initial or final position in the phrase as more salient than the interior. The concept of saliency was present in the 1998 version of PT, but has been discarded in the extended version of PT (Pienemann et al., 2005, pp. 65-69) and as such is not considered for L2 Spanish in this dissertation. Based on Pienemann's description of the stages of PT and the typology of Spanish, the following stages are hypothesized for Spanish morphology and syntax, which will be discussed in detail below.

**Table 4. Processing procedures predicted for L2 Spanish**

| Stage | Exchange of information | Procedures | Word order | Morphology |
|---|---|---|---|---|
| 5 | Interphrasal | Subordinate clause procedure | | Subjunctive<br>Relative clause agreement |
| 4 | Interphrasal | S-procedure | SV-inversion<br>Clitic placement | Object agreement<br>Predicative agreement |
| 3 | Phrasal | Phrasal procedure | XP-adjunction | NP (attributive) agreement |
| 2 | None | Category procedure | SVO | Plural *–s* marking |
| 1 | None | Lemma access | | 'words' |

#### 2.2.2.1 Stage 1 (lemma access)

Stage 1 for all learners is lemma access; at this stage, learners have the ability to produce strings of words but no feature unification is possible.

#### 2.2.2.2 Stage 2 (category procedure)

Stage 2 is characterized by canonical word order, which for L1 speakers of English learning Spanish is hypothesized to be SVO. The rationale for predicting SVO word order is based on Pienemann et al. (2005, p. 231): "The Unmarked Alignment Hypothesis implies that L2 learners

know the basic architecture of syntax with its 3 parallel levels of structure. In other words, it implies that L1 knowledge is transferred at an abstract level". As discussed in Section 2.1.4, the Unmarked Alignment Hypothesis predicts that learners start with a default mapping of the subject to the initial position in the phrase. The following c-structure rule (R) in LFG shows the rule.

(R1) S -> NP $_{SUBJ}$ V ($NP_{obj1}$) ($NP_{obj2}$)

At this stage, lexical morphemes are also predicted to occur. I will propose that at Stage 2 plural marking *-s* on nouns will occur, for example, in *manzanas* 'apples'. No feature matching is necessary to produce plural *–s,* given that the features are present in the lexical entry, as shown in Figure 4.

| | | |
|---|---|---|
| manzanas | N | (PRED)= 'apple'<br>(GEN)=FEM<br>(NUM)=PL |
| manzana | N | (PRED)= 'apple'<br>(GEN)=FEM<br>(NUM)=SG |

**Figure 4. Lexical entry for *manzanas* 'apples'**

### 2.2.2.3 Stage 3 (phrasal procedure)

For the syntax of Stage 3, PT predicts that learners will be able to front prepositional phrases, wh-words or adverbs before canonical word order. As seen in Section 2.2.1, topicalization and focalization of prepositions or adverbs is common in Spanish; in L2 Spanish, learners at this stage are predicted to front XP-phrases before canonical word order. This stage is illustrated in (18) followed by the rule in LFG (R2).

(18) *Las tardes a veces vamos al cine

The afternoons sometimes we go to the movies.

'Sometimes in the afternoons we go to the movies.'

(R2) S' -> (XP) S

wh $=_c$ +

adv $=_c$ +

NP$=_c$ +

PP$=_c$ +

In this example, taken from the results of Study 1, the utterance is not target-like; rather, in target-like Spanish it requires a preposition: *por las tardes* 'during the afternoons'. Regarding morphology, phrasal procedure should be available at this stage, which means, for example, to produce a phrase such as *las manzanas* 'the apples', the plurality feature of the noun can be stored in the NP-procedure and matched with the determiner phrase. In L2 Spanish at this stage, then agreement should be possible within the same constituent, for example, in attributive adjectives as shown in (19).

(19) tengo los pantalones rojos

Have-I the-masc:pl pants-masc:pl red-masc:pl

'I have the red pants.'

In (19), the determiner *los* and the adjective *rojos* must agree in number and gender with the noun it modifies. The following shows the c-structure for the sentence.

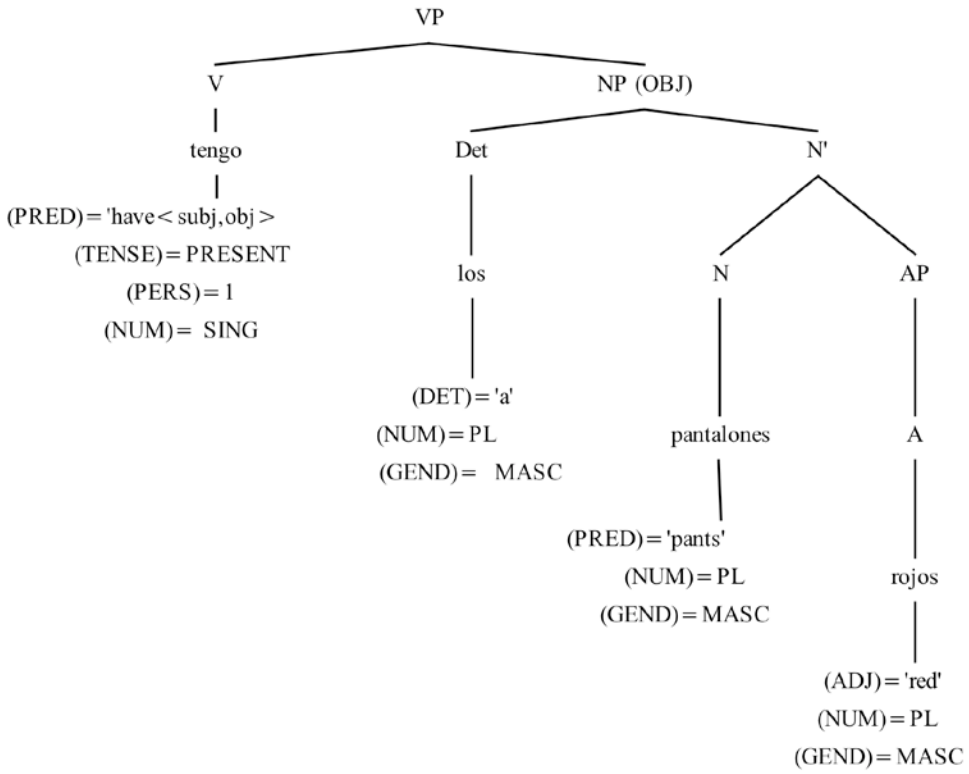


**Figure 5. C-structure for *tengo los pantalones rojos* 'I have the red pants'**

As seen in Figure 5, the items under the NP share the same value for NUM (number) and GEN (gender). Spanish also morphologically marks masculine or feminine gender; however only plurality will be considered, given that gender is considered to be dependent on each learner's lexical entry (Pienemann, 1998, p. 159, Pallotti, 2007), which makes the determination of gender marking ambiguous. For example, a learner may produce an item, such as *la manzana* 'the apple', but it is indeterminate whether he or she has learned the phrase as a lexical unit, or is explicitly marking gender grammatically.

#### 2.2.2.4 Stage 4 (S-procedure)

Variable word order beyond the canonical SVO pattern is found at Stage 4. Since the canonical word order is SVO, examples of VOS or VSO in declarative finite sentences are the target word order phenomena of interest at this stage, as proposed in (R3) and (R4). For wh-questions, post-verbal subjects will also be analyzed, as shown in (R5).

(R3) S -> V ($NP_{OBJ}$) $NP_{SUBJ}$

(R4) S -> V $NP_{SUBJ}$ ($NP_{OBJ}$)

(R5) S -> (XP) V $NP_{SUBJ}$ ($NP_{OBJ}$)

Wh= $_{c}$+

For morphology in Stage 4, inter-phrasal agreement procedure emerges. At this stage, S-procedure is available, which allows for S to hold information about separate constituents in order for the appropriate features to merge. At this stage, clitic agreement would be possible as shown in (20).

(20) Luis le da las manzanas a su madre
Luis her-dat:fem gives the apples to his mother-fem
'Luis gives the apples to his mother.'

This procedure involves feature agreement across constituent structures between the clitic *le* and its referent *a su madre.* In (20) the dative clitic *le* must precede the verb; the referent *a su madre* 'to his mother' is variably present in the sentence. Since the dative pronoun and its referent are both present in the utterance, this exemplifies a case of inter-phrasal agreement (as suggested by Di Biase & Kawaguchi, 2002 for Italian). As seen in (20), the dative clitic precedes the verb; this is also where accusative clitics are placed. The characteristics of dative and accusative clitics

are relevant to both the acquisition of syntax in terms of their word order requirements as well as to the acquisition of morphology given their agreement requirements.

Predicative object agreement is also considered to emerge at Stage 4 for Spanish, as shown in (21).

(21) Los pantalones son rojos

The-mas:pl pants-mas:pl are red-maspl

'The pants are red.'

The c-structure follows in Figure 6.

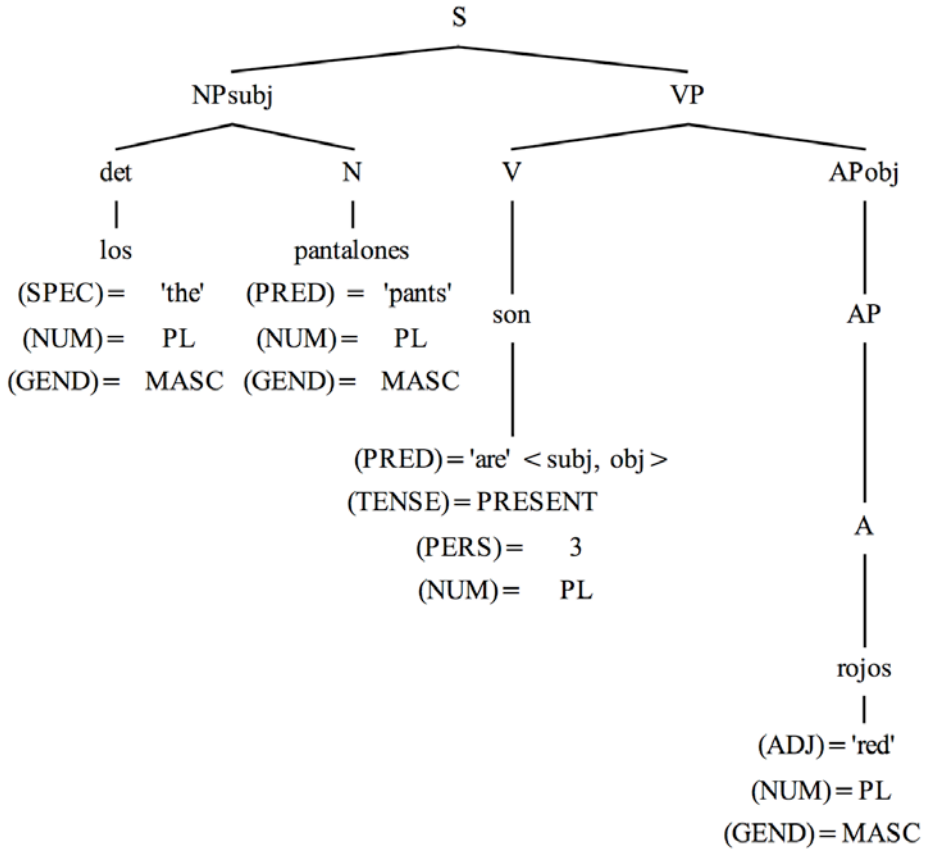


**Figure 6. C-structure for *los pantalones son rojos***

As seen in Figure 6, the number and gender features of the subject *pantalones* match those of the object *rojos*. In sum, two examples of morphology are considered as Stage 4 interphrasal agreement in this study: object agreement and predicative adjectives. As for syntax, post-verbal subjects in declarative sentences or questions and pre-verbal object clitics are considered at Stage 4.

It should be noted that subject/verb agreement, although obligatory in Spanish, is not considered interphrasal agreement. This is in line with Di Biase and Kawaguchi's analysis for Italian that did not include subject/verb agreement as interphrasal because of its "structural ambiguity" (Di Biase & Kawaguchi, 2002, p. 284). This ambiguity arises from the interpretation of the subject marker as a bound pronoun to the verb in a pro-drop language such as Spanish; it has been said of these pronouns that they do not need to "inherit" features from other nodes but that the features are derived through feature unification (cf. Vigliocco, Butterworth & Garrett, 1996; Di Biase & Kawaguchi, 2002; Mansouri, 2005). In terms of LFG, the verb is considered to have a feature "person" with varying values, but, importantly, does not need to exchange information with other constituents (Di Biase & Kawaguchi, 2002, p. 282), which suggests that it may not be an inter-phrasal procedure.

#### 2.2.2.5 Stage 5 (Subordinate clause procedure)

At Stage 5, learners should be able to perform the S' procedure, which allows for main and subordinate clauses to merge. This involves learners annotating the feature ROOT to complementizers. ROOT distinguishes between subordinate and main clauses, expressed as (ROOT=+) in the main clause and (ROOT=-) in the subordinate clause (Pienemann, 1998, p. 107, 192). The following rules reflect the distinction between main and subordinate clauses.

(R6) S -> (V) S

[ROOT = $_{C}$ +]

(R7) S -> $(COMP)_{ROOT=-}$ ($NP_{subj}$) VP ($NP_{OBJ}$)

In (R6), main clauses are marked as such in order to distinguish between themselves and subordinate clauses. In (R7), complementizers are introduced as being (ROOT = -). At this point, in subordinate clauses the feature MOOD emerges to mark either subjunctive or indicative mood. Figure 7 shows an example sentence with subjunctive morphology.

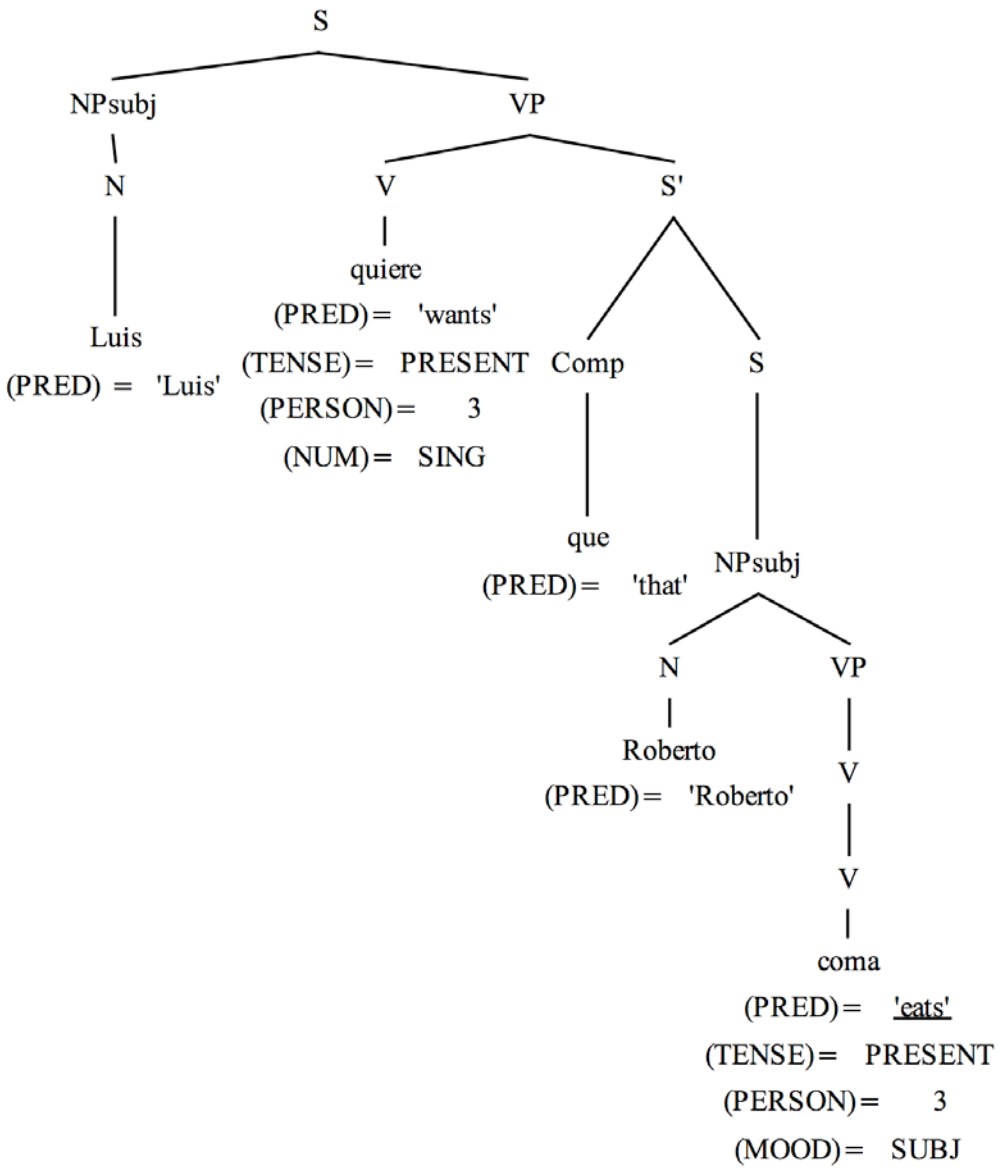


**Figure 7. C-structure for *Luis quiere que Roberto coma* 'Luis wants Roberto to eat'**

Given that there are no specific word order phenomena differentiating main clauses from subordinate clauses in native Spanish, for Stage 5, subordinate clause procedure, tokens of subordinate clauses themselves will be analyzed for syntax production in order to determine

whether learners can produce subordinate clauses or not. A qualitative analysis will also be given of which kinds of subordinate clauses learners produce and whether any specific word order permutations are associated with subordinate clauses vs. main clauses produced by these learners. It is also of particular interest in L2 Spanish acquisition whether learners can produce subordinate clauses themselves, given that previous research has shown that learners of L2 Spanish often have trouble producing the syntactic structure required to be able to produce subjunctive morphology (Collentine, 1995). This issue also speaks to whether syntax emerges before morphology, or whether morphology precedes syntax. In sum, Stage 5 syntax focuses on word order differences between main and subordinate clauses. For morphology, at this stage learners should be able to mark subjunctive mood in subordinate clauses, or gender and agreement between the main and subordinate clause. To sum up, the five stages discussed represent a first application of PT structures at each stage of syntax and morphology to L2 Spanish; a subsequent step would be to apply the extended version (Pienemann et al., 2005) to Stage 4 grammatical structures in Spanish, such as verbs with non-canonical mapping like *gustar* 'to like' or passives.

### 2.2.3 Alternative perspectives on the acquisition of L2 Spanish morphosyntax

#### 2.2.3.1 Syntax

While no other study besides Johnston (1995) has looked at the L2 acquisition of Spanish syntax from the perspective of PT, many studies have looked at the acquisition of some of the syntactic phenomena predicted by PT—namely, canonical word order, target word order, and subordinate clauses—from alternative theoretical perspectives. Much research on acquisition on word order that has predominated has been from the framework of UG. A review of previous research from

this framework and others highlights the gradual acquisition by L2 learners of Spanish of varying word order rules.

From the beginning stages of language learning, learners of L2 Spanish have been shown to be sensitive to the pro-drop parameter as evidenced by the fact that learners variably express the subject as a subject pronoun, pronominally, or as a null subject (Liceras, Maxwell, Laguardia, Fernández, & Díaz, 1997**;** Liceras & Díaz, 1999). Liceras et al. (1997) and Liceras and Díaz (1999) report on results garnered from a longitudinal study analyzing the spontaneous oral production by beginning learners of Spanish. Liceras et al. (1997) analyzed production of 11 beginning learners of Spanish (5 high school students and 6 university students) with L1 English and French. Liceras and Díaz (1999) also analyzed a story re-tell task by 15 advanced L2 learners of Spanish with various L1s (Chinese, English, French, German and Japanese). Both the beginners and the advanced learners were found to produce null subjects in matrix and subordinate clauses. Learners also used subject pronouns, but not in a native-like manner; for instance, many learners appeared to use the subject pronoun as a means to retrieve the verbal form necessary for the given subject, as evidenced by the fact that learners often repeated the subject pronoun several times before producing the verb (Liceras et al., 1997, p. 114). Likewise, Liceras and Díaz (1999) compared production of null subjects and subject pronouns by the beginning and advanced learners with production by native speakers, and found that the L2 learners produced non-native like null subjects and pronominal subjects that were not attributable to either the learners' L1 or the L2, a fact to which the authors propose that learners rely on a default procedure for licensing and identifying subjects that is neither L1 nor L2 specific.

Research on target word order in L2 Spanish has shown that advanced learners are capable of producing native-like word order with intransitives, which require specific word order

in Spanish depending on the lexical class of the verb (Hertel, 2003; Lozano, 2006). Hertel (2003) administered a written production task to five groups of learners (beginning, low intermediate, high intermediate, advanced, and native) of Spanish with L1 English in the US. Learners had to produce unergatives and unaccusatives in the context of answering the question of "what happened". The beginning learners used SV word order for all structures, the intermediate learners produced some subject-verb inversion, and the advanced learners showed a preference for VS with unaccusatives compared to unergatives, although their production of subject-verb inversion was relatively low compared to native speakers. The resulting pattern shows a progression from SV word order, to some subject-verb inversion, to production of VS structures according to lexical class. Lozano (2006) further investigated the knowledge of advanced learners of Spanish regarding word order and lexical class. Participants were native speakers of British England studying Spanish in the UK ($n$=17), native speakers of Greek studying Spanish in Greece ($n$=18), and a control group of native Spanish speakers studying in the UK ($n$=14). A contextualized acceptability judgment test showed that the advanced learners showed similar judgments as native speakers regarding formal syntactic properties of subject / verb inversion, but the advanced learners diverged with the native speakers in varied discursive contexts where the choice of word order is dependent on the focus of the utterance.

Regarding the formation of subordinate or complex sentences, much research has focused on the acquisition of the subjunctive by L2 learners of Spanish (cf. Collentine, 2003; Collentine, 2010); only Collentine (1995) and Collentine, Collentine, Clark and Friginal (2002) have conducted several studies explicitly regarding the interface between complex syntax and morphology in the acquisition of the subjunctive. Collentine (1995) conducted two oral tasks– one a conversational interview and another a picture task designed to elicit the subjunctive—with

intermediate Spanish learners in the US in order to analyze whether the learners were capable of producing complex syntax. In the conversation task, Collentine found that 65% of learner utterances were single clauses, and 36% were bi-clausal, connected by a coordinator. Only a small percentage consisted of NP clauses or adverbial clauses. Participants did use the indicative in all obligatory contexts, but the subjunctive was only used in 13% of obligatory contexts. In the picture task, participants produced nominal clauses in 64% of all the utterances. Significant simplifications (e.g. missing "que" 'that' as a subordinator) in the context for the subjunctive (46%) were found compared to contexts for the indicative (26%) (Collentine, 1995, p. 128). Collentine concluded that learners at an intermediate stage do not have the "linguistic foundation" to learn subjunctive structure, i.e. they have yet to master producing complex syntax, which is the grammatical prerequisite to the production of the subjunctive. A subsequent study by Collentine et al. (2002) tested whether instruction on the subjunctive alone or complex syntax and subjunctive would be more effective for Spanish learners in the US. A pre-test, treatment, and post-test design showed that both groups improved at recognition and production of the subjunctive compared to a control group. However, the group that received instruction on subjunctive morphology alone overgeneralized the subjunctive more to the main clause or the subordinate clause, while the syntax and subjunctive group rarely overgeneralized, which shows that the subjunctive group clearly misunderstood the syntactic context required by the subjunctive. Likewise, the subjunctive group tended to overgeneralize the subjunctive to contexts where the indicative was required more than the syntax and subjunctive group. Overall, the studies by Collentine (1995) and Collentine et al. (2002) highlight that instruction on complex syntactic structures may be necessary or more beneficial to L2 Spanish students than instruction on morphology alone.

#### 2.2.3.2 Morphology

While the acquisition of the subjunctive has been the subject of much research in L2 Spanish, the acquisition of number agreement within and across constituent boundaries has received little attention in L2 research. Most studies have investigated the acquisition of gender, especially regarding L2 acquisition of Romance languages (Vigliocco & Frank, 1999; McComen & Alvord, 2006; Tight, 2006; Montrul, Foote, & Perpiñán, 2008). While the acquisition of number agreement has been discussed less frequently, White, Valenzuela, Kozlowska-MacGregor, and Leung (2004) analyzed gender along with number agreement in four production and interpretation tasks by native speakers of French and English with three levels of proficiency of Spanish in Canada. Overall, number agreement received relatively accurate marking for all proficiency levels for both language groups. Number marking was also more accurate than gender marking for the low proficiency learners, while the intermediate and advanced learners of both language groups matched gender and number as well as the native speakers. In sum, learners from the lowest proficiency group were relatively accurate at marking number.

Regarding the difference between agreement in the noun phrase and across constituents, Dewaele and Veronique (2001) found no evidence that pre-advanced and advanced French learners had more difficulty marking gender across constituent boundaries than within boundaries. An analysis of oral interviews with trilingual Dutch-English-French speakers, French or English being the L2 or L3 variably among the participants, showed no significant differences in accuracy between gender agreement within a phrase or across a constituent boundary. However, this is not contrary to PT because these advanced learners have already acquired phrasal and interphrasal procedures; PT does not make predictions about when gender marking

can occur since it depends on the correct annotation of the lexical entry and not the processing ability.

Along with the studies mentioned in the previous section, other studies over the acquisition of the subjunctive have looked at the effect of instructional techniques, e.g. processing instruction (Collentine, 1998; Farley & McCollam, 2004), or the differences in context of learning, e.g. study abroad learners and learners in American universities (Collentine, 2004; Isabelli & Nishida, 2005), on the acquisition of the subjunctive. Overall, these studies have found the subjunctive to be a complex item with low communicative value that develops at an advanced stage (Collentine, 2010). In sum, research on acquisition of number agreement or the subjunctive points to that number agreement is produced relatively early by beginning learners, while the subjunctive is acquired later by more advanced L2 speakers.

Overall, research from other theoretical frameworks on the PT structures in L2 Spanish syntax and morphology reflects some of the stages predicted for Spanish. Learners initially produce SVO structures, but are also capable of producing null subjects from an early stage. Likewise, number marking is marked with high accuracy rates by beginning learners. Intermediate to advanced learners can produce target word order based on syntactic properties but not pragmatic ones. Advanced learners are able to produce the subjunctive, while beginning to intermediate learners may struggle to produce the appropriate syntactic structure along with the correct mood, subjunctive or indicative. In terms of PT, similarities can be seen in the stages predicted for L2 Spanish syntax. Initially, canonical word order emerges with null subjects being produced early. Then, at an intermediate to advanced stage, target word order emerges, such as SV-inversion. Finally, learners can produce appropriate syntax with subjunctive morphology. The development of lexical, phrasal, and interphrasal morphemes proposed for Spanish has not

been clearly addressed for number agreement in previous studies. Previous research, however, has shown the subjunctive to be clearly an item acquired more by advanced learners of Spanish and number marking to be accurate for beginning learners, which suggests to a certain extent that more local morphology, e.g. phrasal morphemes, are acquired before more complex non-local morphology, such as the subjunctive.

## 2.3 ROLE OF INSTRUCTION ON STAGE CHANGE

The question of whether instruction on the stages may aid learners to advance has been addressed in few PT studies, although instruction by and large has been found to be beneficial to language learning (Ellis, 1985; Larsen-Freeman & Long, 1991; Norris & Ortega, 2000; Spada & Tomita, 2010). The nature of grammatical instruction has been the subject of extensive debate in SLA. Explicit teaching techniques that have been researched in classroom L2 acquisition have focused on the following four types: input manipulation (e.g. processing instruction), direct metalinguistic instruction, output-based techniques aimed at producing target structures, or corrective feedback (e.g. recasts) (Ellis, 2008, pp. 869-91). This dissertation does not intend to address whether any particular teaching method is more effective; instead, the questions raised are the following: 1) is there an effect of instruction on the PT stages, and 2) where should instruction be targeted to be most effective? Two theories on the role of instruction will be tested: the Teachability Hypothesis (Pienemann, 1984, 1989, 1998) and the Projection Model (Zobl, 1983, 1985).

### 2.3.1 Teachability Hypothesis

Regarding the acquisition of processing procedures by formal, or classroom learners, Pienemann (1984, 1989, 1998, p. 250) made the following predictions, known as the Teachability Hypothesis:

1. Stages of acquisition cannot be skipped through formal instruction.
2. Instruction will be beneficial if it focuses on structures from the 'next stage'.

The Teachability Hypothesis arose through Pienemann's (1984) research on the naturalistic acquisition of German word order by Italian children (7 to 9 years old) in Germany. Ten children determined to be at stages *X* (canonical order), *X +1* (ADV, adverb preposing), or *X + 2* (SEP, verb separation) were exposed to two instructional periods targeting stage *X + 3* (INV, subject/verb inversion after preposed elements) over a total of two weeks. Interviews and hidden recordings before and after each instructional period showed that learners who were at the stage preceding the object of instruction (*X* + 2) did indeed gain the subsequent stage, while those who were not at the preceding stages (*X* or *X* + 1) did not advance. Pienemann measured language gain in terms of the "first systematic use of a structure" (Pienemann, 1984; p. 191), i.e. the emergence criteria; this means that Pienemann noted when the structure in question was applied in optional contexts, left unapplied in obligatory contexts, applied in less than 5 contexts, and the relative frequency of application in obligatory contexts. For example, Teresa is considered to have acquired Stage 2, adverb-fronting, because she applies the rule consistently in all of the interviews and recordings. Furthermore, instruction aimed at stages beyond the *next* stage resulted in learners regressing: learners Monica and Teresa were both at the stage of producing ADV before being taught the *next + 1* stage, INV. The frequency with which they applied both ADV and INV after instruction decreased after instruction, e.g. for Monica, the relative

frequency of application of ADV went from 0.53 to 0.11 (Pienemann, 1989 p. 74). To that end, Pienemann concluded that premature teaching of stages beyond a learner's current level can actually be detrimental to the natural progression of stage acquisition. Furthermore, Pienemann (1987, 1989) followed the word order development of three classroom learners of L2 German with L1 English in Australia over a year and found that the learners showed the same stages of emergence of word order even though instruction did not follow that same order. Pienemann (1989) sums up the basic claim of the Teachability Hypothesis:

> …the Teachability Hypothesis does not predict that teaching has no influence whatsoever on acquisition. Rather, it maintains that the influence of teaching is restricted to the learning of items for which the learner is 'ready'. This claim has at least one important consequence for teaching: namely, that teaching can only promote acquisition by presenting what is learnable at a given point in time. (p. 63)

To illustrate, the Teachability Hypothesis predicts that instruction will only advance a learner to the next stage or stages; for example, it is predicted that instruction on a Stage 5 structure cannot advance a Stage 3 learner to Stage 5. In this scenario, a learner could potentially acquire Stage 4 and Stage 5, but it is contrary to the predictions of both PT and the Teachability Hypothesis that a learner could show emergence of Stage 5 without also acquiring Stage 4. This prediction is based on the lack of advancement to Stage $X + 3$ of the learners not at Stage $X + 2$ in Pienemann (1984). While the Teachability Hypothesis is based on empirical data prior to PT, Pienemann maintains the same position with respect to the role of instruction on the progression through the PT stages: "…the Teachability Hypothesis defines CONSTRAINTS on Teachability. It does not predict sufficient conditions for teaching to be successful" (Pienemann, 2005, p. 73). In other words, formal learners are constrained by the same processability constraints as for naturalistic

learners: if formal learners are ready to learn a structure, i.e. at the preceding stage to produce that structure, then they can—but not necessarily will—learn it. On the other hand, if formal learners are not ready to learn a structure, then instruction should not have an effect on learners' stage development. The Teachability Hypothesis is a key corollary to PT—and one that remains to be summarily addressed in empirical studies. Table 5 shows a summary of studies that have addressed the Teachability Hypothesis in L2 acquisition.

**Table 5. Summary of studies on Teachability Hypothesis**

| Study | L2 | L1 | Type of study | Structures tested | Results |
|---|---|---|---|---|---|
| Pienemann 1984, 1989 | German | Italian | SL elementary school children *n=10* | German word order | Learners at *X+2* gained *X +3* |
| Pienemann 1987 | German | English | Beginning FL classroom learners *n=3* | German word order | Learners gained stages in order regardless of classroom instruction |
| Ellis 1989 | German | Varied (e.g. Spanish and English) | Beginning FL classroom learners *n*=39 | German word order | Learners gained stages in order regardless of classroom instruction |
| Boss 1996 | German | English | Beginning FL classroom learners *n=8* | German word order | Learners gained stages in order regardless of classroom instruction |
| Dyson 1996 | English | Spanish | Longitudinal FL classroom learners *n=3* | English word order | Learners acquired *next* stage |
| Mackey 1995, 1999 | English | varied (e.g. Korean, Japanese) | Beginning and lower-intermediate SL learners *n=34* | English questions | Interaction facilitated stage gains and increased production |
| Spada and Lightbown 1999 | English | French | FL children *n=144* | English questions | Stage 2 learners gained one stage after instruction on *next +1* and *next + 2* |
| Farley and McCollum 2004 | Spanish | English | Intermediate FL classroom learners *n*=29 | Spanish personal *–a* and subjunctive | Unready learners improved at marking subjunctive |
| Mansouri and Duffy 2005 | English | Varied (e.g. Thai, Korean) | Beginning SL classroom learners *n=6* | English word order | Predicted order group higher accuracy |

*Note.* SL is for second language learning, i.e. the language is spoken widely outside the classroom, and FL is for foreign language, i.e. the language is mainly used only in the classroom (Ellis, 2008, p. 6)

Overall, the studies on the Teachability Hypothesis have mostly confirmed that learners in classroom settings follow the same proposed sequence of language acquisition as naturalistic learners, but the notion of whether instruction must be aimed at the *next* level remains in

question. Ellis (1989) conducted a classroom study on the L2 acquisition of German word order in England. Ellis noted the order of presentation of German word order rules (inversion → participle → verb-end (SEP) in the teaching syllabus. He elicited oral data from students after 11 weeks of instruction and 22 weeks after instruction. Implicational scaling of emergence of the three word order structures showed the order of emergence to follow the progression suggested by the ZISA project (verb-end → inversion → particle) despite the fact that instruction followed a different word order, to which Ellis claims that learners must be developmentally ready in order to acquire subsequent structures. Boss (1996) conducted a similar study: eight L2 German beginning students in Australia participated in paired oral tasks at two midpoints of a 28-week semester. Implicational scaling of rule application (a rule was considered acquired if applied 3 out of 4 contexts) found the rules to be acquired in the same order as in Pienemann (1984, 1989), ADV → SEP → INV even though the instruction in the classroom did not follow that order.

Dyson (1996) looked at the effectiveness of teaching do-fronting, to three adult learners of English in Australia, two of whom were at the preceding stage to do-fronting, SVO. After three hours of instruction over three weeks, the two learners who were ready to acquire it did consistently use do-fronting in a communicative task as well in the classroom (as measured informally by the researcher). The more advanced learner had already acquired the object of instruction and continued to gain subsequent stages after instruction.

Mackey (1995, 1999), while not directly addressing the Teachability Hypothesis, analyzed the developmental sequence of English questions as a result of interaction with native speakers in the classroom. Mackey's treatment of consisted of five groups of native speaker and learner pairs: Interactors (learners participated in interactive tasks with a native speaker),

Unready (same as Interactors but at a lower developmental stage), Scripted (native speakers followed a script instead of spontaneous answers), Observers (watched interaction between a learner and native speaker) and Control (did not participate in any tasks). The initial stage of the learners varied anywhere from Stage 2 to 4, and learners were deemed unready if they had been in Australia less than 3 months or if they were enrolled in a lower proficiency language class. The tests (pre- and three post-tests) and treatments were information-gap tasks designed to elicit questions from the learners. Overall, Mackey (1995, 1999) found that interaction facilitated stage increases, as 6/7 participants who were *not* ready for instruction did sustain a stage increase after the interaction sessions, as well as 5/7 participants in the group who were *ready* for a stage increase (Mackey, 1999, p. 571). That the unready learners also advanced a stage contradicts the prediction of the Teachability Hypothesis that learners must be *ready* for the next stage in order to advance. In terms of production frequency, those groups that took part in interaction showed the most widespread gains in production of question types: they produced more Stage 2 and 3 questions on the post-test, more Stage 4 on the final post-test, and more Stage 5 questions on the second post-test. On the other hand, the Observer group and Unreadies group produced more Stage 2 and 3 questions on the first post-test and the first and final post-test respectively.

Spada and Lightbown (1999) also found counter-evidence to the same prediction in the acquisition of English: the *ready* stage 3 learners in their study did not advance more than *unready* stage 2 learners when both were given implicit instruction on Stage 4 and 5 questions. L1 French children learning English in the classroom in Quebec were given an "input flood" of Stage 4 and 5 questions, one hour a day, over a period of two weeks. The pre-test showed that most students were at Stage 2 ($n$=79): by the post-test, 29% (23/144) of the Stage 2, i.e. unready, learners gained one stage, 18% (7/44) of the Stage 3, i.e. ready, learners gained one stage, and

none of the Stage 4 (0/144), i.e. ready, learners gained a stage on the oral production task even though they were given Stage 5 input.

Farley and McCollam (2004) investigated whether different kinds of instruction (explicit, structured input, or Processing Instruction) for intermediate college learners of Spanish in the United States would advance the learners to a higher level in the hierarchy for Spanish proposed by Johnston (1995). The structures tested were the personal *–a* (Stage 4) and the subjunctive (Stage 7). Learners' stages were tested by means of a Grammaticality Judgment Test (GJT) and a picture description task where learners were given the matrix clause and asked to complete the sentence to describe the pictures. They found that *readiness* failed as a predictor of acquisition: less than half of learners who were ready for personal *–a* learned it, while none of the learners were ready for the subjunctive, yet many showed improvement in the subjunctive (Farley & McCollam, 2004, p. 58). However, the criteria for emergence—i.e. how learners' stages were assigned—is not stated. Given the variability in emergence criteria for various studies, this makes generalizability of these results questionable. In addition, the picture description task used to elicit the subjunctive gave the students a choice of two matrix clauses that require either subjunctive or indicative (for example, *es dudoso que* 'it's doubtful that' or *es cierto que* 'it's true that'). This kind of task undermines the interclausal nature of subjunctive morphology: if students are provided the initial phrase and merely completing the sentence, it cannot be considered a productive example of inter-clausal morphology.

Mansouri and Duffy (2005) looked at the effect of order of instruction on the acquisition of processing procedures for six L2 English learners through a pre-test, post- and delayed post-test. Two groups, three students in each group, were taught English word order structures in either the predicted order (Stage 2 → Stage 6, the Predicted group,) or the reversed order (Stage

6 → Stage 2). Instructional sessions were approximately one hour a week over a period of six weeks. Written and oral post-tests one week and three weeks after instruction were analyzed for production of the target forms and grammatical accuracy. Descriptively, those in the predicted order had higher grammatical accuracy than the reversed order group, but no inferential statistics were presented.

In sum, the handful of studies that have purportedly addressed the Teachability Hypothesis have been based on a variety of experimental methods and measures of language development. Ellis (1989) and Boss (1996) mainly contributed to the fact that instruction cannot alter the sequence of acquisition of German word order based on processing procedures. However, given that they did not explicitly focus instruction on the *next* or *next* + x stages, it is not clear what effect instruction could have on advancement through the hierarchy. Subsequent studies have raised the issue that instruction directed at the next stage is not a necessary prerequisite for learners to advance (Mackey, 1995, 1999; Spada & Lightbown, 1999; Farley & McCollam, 2004). However, measures of language development and determination of learners' stages are exceedingly diverse: Farley and McCollam (2004) measured language development as accuracy, the GJT task and emergence (although no definition of emergence was given). Mansouri and Duffy (2005) looked at grammatical accuracy; other studies looked at frequency of rule application (Boss, 1996; Dyson, 1996, Ellis, 1989). As for defining learners' stages, Mackey (1995) defined learners as unready because of their proficiency placement in their language program. Farley and McCollam (2004) did not explain which criteria were used to assign learners to developmental stages. Only Spada and Lightbown (1999) offer specific criteria consistent with PT: a student was "assigned to the highest stage at which he or she had two different questions" (p. 8).

To sum up, these studies have answered part of the prediction of the Teachability Hypothesis: learners do not 'skip' stages as a result of instruction; instead they continue to acquire stages in order regardless of the target of instruction. This part of the Teachability Hypothesis is a logical fall-out of PT: it reflects research on PT (see Section 2.1.5) that has shown that learners acquire the stages one-by-one. However, the other prediction of the Teachability Hypothesis—that instruction is only effective if aimed at the stage for which the learner is psycholinguistically ready—has yet to be summarily addressed. The only study that has shown that ready learners advanced, while unready did not, is Pienemann's original teaching experiment in 1984 (Pienemann, 1984, 1989). On the other hand, other studies that have tested the Teachability Hypothesis have suggested that unready learners can also advance due to instruction (Mackey, 1995, 1999; Spada & Lightbown, 1999; Farley & McCollam, 2004). However, *unready* learners were not clearly classified in terms of PT in Mackey (1995, 1999) and Farley and McCollam (2004). In addition, these studies focused on subsequent stages, i.e. Mackey (1995) and Spada and Lightbown (1999) both offered instruction on multiple stages: Mackey instructed questions from all stages, and Spada and Lightbown instructed Stages 4 and 5. Delimiting whether instruction is geared at the *next* or *next +x (*e.g. *next + 1)* is necessary to test the prediction of the Teachability Hypothesis that only ready learners can advance through instruction. Studies 2 and 3 will address precisely this claim: whether instruction on the *next* or *next + 1* stage is more effective. In the next section, a different proposal for the optimal order of instruction will be presented.

### 2.3.2 Projection Model

An alternative viewpoint on the most effective order of instruction has proposed that instruction on more marked items on a hierarchy leads learners to project that knowledge to related, less marked, items. Zobl (1983, 1985) proposed the Projection Model to explain how learners gain extensive linguistic knowledge based on limited input. The Projection Model claims that learners are able to glean linguistic elements or structures, e.g. element 'z', that are not part of the set of input, e.g. x, y and w (Zobl, 1985, p. 331). Markedness conditions allow learners to acquire these items, through markedness implications or through correlations between related structures. Markedness is defined by Zobl (1985) as the following: " …the marked vs. unmarked values defined by these procedures have in common an opposition between, respectively, what is more restricted and specific, on the one hand, and what is distributionally more frequent and general, on the other" (p. 330). To test the Projection Model, Zobl (1985) discusses the results of three experiments (henceforth E): E1, E2 and E3. E1 looked at control of the possessive determiners *his* and *her* by French-speaking learners of English. These learners who controlled the rule for human objects also controlled the rule for inanimate, or non-human, objects, but not vice-versa. Learners also overgeneralized *his* in contexts requiring *her*. Zobl concluded that this scale of difficulty, i.e. human > nonhuman, results from markedness contrasts: human is [+concrete, +animate, +human], while nonhuman is [+concrete]. In other words, human nouns are more specific and thus more marked than nonhuman.

E2 ($n$=36) and E3 ($N$=40) looked at the effect of input on *his* and *her* with human (marked) vs. non-human (unmarked) objects with native French speakers learning ESL in Canada. Both studies followed the same procedure. A pre-test and post-test consisted of an oral interview that involved producing possessive pronouns to describe actions in 15 pictures. For the

15-minute input session, immediately after the pre-test, participants participated in a similar picture description task with different pictures. No explicit instruction took place, but the researcher repeated a form correctly if the participant misused a determiner. One experimental group was exposed to human objects, such as *mother,* and the other to non-human objects, e.g. *ring*. An analysis of errors and gains in use of the determiners in new human or nonhuman domains (i.e. rule output strength) showed greater benefits for the [+human] group at marking of human and non-human objects compared to the [-human] group at marking either human or non-human objects. In sum, learners who were exposed to the marked form improved on both unmarked (e.g. *his/her desk*) and marked (e.g. *his/her mother*) forms while learners who were only exposed to the unmarked form did not show much improvement.

Other than Zobl's studies, research showing an effect of teaching marked items projecting to unmarked items has been mainly limited to the acquisition of relative clauses based on Keenan and Comrie's (1977) Noun Phrase Accessibility Hierarchy (NPAH). The hierarchy proposed a universal order of accessibility of relativizing elements: subject > direct object > indirect object > object of a preposition > possessive > object of a comparative particle. The hierarchy represents the spectrum of relativization across languages: a language that relativizes an element, e.g. object of a preposition, also relatives all elements to the left of that in the hierarchy, e.g. subject, direct object, and indirect object. This hierarchy also represents a hierarchy of markedness: the left-most item being the least marked and the right most the most marked. Multiple experimental studies over the L2 acquisition of relative clauses in various languages have concluded that instruction targeting marked elements on the hierarchy leads to learners learning less marked elements on the hierarchy (English: Gass, 1982; Eckman et al.,

1988; Doughty, 1991; Hamilton, 1994; Italian: Croteau, 1995; Japanese: Yabuki-Soh, 2007; French: Mitchell & Shirai, 2007).

Eckman et al. (1988), a replication of Gass (1982), tested the notion whether teaching less difficult, i.e. less marked items, on the hierarchy or teaching more difficult, i.e. more marked items, would maximize generalizability of relative clauses. The experiment consisted of teaching relative clauses to ESL learners (*n*=36) in the United States with L1 Arabic, Spanish, Japanese and Korean. A sentence combining test was given as a pre-test and post-test two days after the instructional session. Four groups were divided by object of relative clauses instruction: subject (least marked), direct object (more marked), object of a preposition (most marked), and a control group. Instruction lasted one hour and consisted of teacher-led instruction on the clauses, oral practice at combining sentences, and a written exercise combining sentences. Comparison of group scores on the post-test showed that the object of a preposition group (i.e. the most marked formation) scored the highest, followed by the direct object group, the subject group, then the control group.

Doughty (1991) conducted a similar teaching experiment on relative clauses with ESL students (*n*=20) in Philadelphia with little knowledge of relativization. Written and oral tasks were administered for pre-tests and post-tests. The written test consisted of grammatical judgment tasks and sentence combining tasks, and the oral task elicited relative clauses in a series of pictures. The instructional period consisted of learners individually completing one-hour training modules over a period of 10 days. Three groups differed by kind of instruction: the meaning-oriented instructional group (MOG), rule-oriented instructional group (ROG) and control group (COG). Both instructed groups were instructed on object of a preposition relative clauses, while the control group was exposed to relative clauses with no explicit instruction.

Analysis of the pre-test and post-test scores found that the instructed groups improved more than the control group, although the control group also improved on relativization. In other words, exposure alone did result in some improvement on relative clause formation, but the meaning-oriented and rule-oriented instruction was more beneficial. Regarding markedness, learners improved at marking not only object of a preposition clauses, but other kinds of relative clauses as well.

Pereira (1996) also tested the predictions of the Prediction Model on the acquisition of the subjunctive by third semester university students (*N*=68) of Spanish in the United States. Pereira taught evaluation constructions, e.g. *es bueno que vayas (SUBJ) a clase* 'it's good that you go (SUBJ) to class', a marked use of the subjunctive, to one group of learners (*n=33)*, while another group (*n*=35) received no instruction on the subjunctive. Pereira uses a hierarchy of subjunctive based on acquisitional and typological literature: volition / purpose > poss (doubt and possibility), tem (temporal anticipation), eval (evaluative) > concessive (p. 74). Pre, post, and delayed post-tests consisted of grammaticality judgment tasks with correct and incorrect uses of the subjunctive and a dialogue completion task, which consisted of learners filling in the blanks of a dialogue with the correct verb in subjunctive or indicative. The experimental group participated in two forty-minute sessions of processing instruction over the subjunctive—that is, structured input and activities designed for students to figure out the input but not produce it. Comparisons of scores on the pre and post-tests showed no significant differences between the control and instructed group. Still, descriptively, the students who were instructed on the marked forms of the subjunctive did improve on volition and purpose forms, which are the least marked forms, as well as the object of instruction, evaluative constructions, on the post-test. The most marked form of the hierarchy, concession structures, showed little improvement. Pereira (1996,

p. 39) suggested that these learners might not be ready to learn the subjunctive, which is why little improvement was found, or that their notion of grammatical subordinated clauses may be transferred from their L1 (English) given the differences in English and Spanish subordination (e.g. the requirement for subordination in Spanish and infinitivization in English: *necesito que **te vayas*** 'I need you **to leave'**).

The studies reviewed here (Zobl, 1983, 1985; Eckman et al. 1988; Doughty, 1991; Pereira, 1996) have all shown some evidence that teaching more marked structures can lead to generalization of those structures to less marked structures. However, further research over more structures is needed, as the Projection Model has been observed only for possessive determiners in English and the NPAH hierarchy. In addition, given the diversity of teaching methods used to teach marked items—Zobl's implicit 15-minutes of corrected feedback-only, Eckman et al.'s explicit methods, Doughty's meaning or form based instructed groups, and Pereira's implicit input-based processing instruction—it is difficult to gain a clear picture of the role that instruction has played for the results found vs. the role of instruction on marked or less marked items. In this dissertation, these issues will be addressed by expanding the field of role of markedness in instruction to PT's processing hierarchy and by focusing on teaching items of varied markedness in the hierarchy.

The developmental hierarchy predicted by Pienemann is based on psycholinguistic processing prerequisites, while the developmental sequence as implicated in Zobl's Projection Model is based on *markedness* relationships. Zobl (1985) defines markedness relationships in terms of an implicational hierarchy of general to more specific characteristics. For example, he considers [+human] objects to be more marked than [-human] objects because [+human] objects are animate and concrete, in addition to being human. Inanimate nouns however, are just

[+concrete] (Zobl, 1985). Therefore, human is more specific, therefore marked, while inanimate nouns are unmarked. Likewise, PT predicts that the progression through each stage requires compiling successively more complex and specific rules. For example, for a learner to progress from Stage 3 phrasal morphemes (e.g. *los perros* 'the(pl) dogs(pl)'), to Stage 4 interphrasal morphemes (e.g. *los perros son blancos* 'the(pl) dogs(pl) are white(pl)', the S- procedure has developed, enabling matching of features *outside* of constituent boundaries (Pienemann, 2005, pp. 27-28) whereas at Stage 3 feature matching was only possible *within* constituent boundaries, and at Stage 2 feature matching is only possible for lexical items. Thereby, the learner must generate a more complex rendering of feature matching: number must be matched and checked at the lexical level, the phrasal level, the interphrasal level, and eventually the interclausal level. Therefore, the progression of lexical > phrasal > interphrasal morphemes predicted by PT will be considered to be in a relationship of markedness. On the other hand, the PT hierarchy of syntax (e.g. in Spanish, VO > XP-adjunction > SV-inversion > Subordinate clauses) does not as clearly correlate to a hierarchy of markedness as described by Zobl; in other words, the relationship between the first two stages (Stage 2 category procedure and Stage 3 phrasal procedure) is based on simplified S-procedures, while stages 4 (S-procedure) and 5 (subordinate clause procedure) relate to the development of two syntactic procedures. However, these procedures are considered to be in a hierarchy of difficulty, as are the morphological procedures, e.g. Stage 2 is easier than Stage 5, by virtue of the fact that earlier stages are acquired before later stage. This is also markedness: that is, easier items are less marked and more difficult items are more marked (Shirai, 1997). In that sense, the PT hierarchy is considered to correspond to a hierarchy of markedness: items at the beginning of the hierarchy (Stage 1) are easiest to acquire while items to the right are harder (Stage 5).

## 2.4 RESEARCH QUESTIONS

The goals of this dissertation are two-fold: (1) to test whether PT is supported and if so, to establish the stages of PT for L2 Spanish and (2) to investigate the role of instruction on the advancement through these stages and test the validity of the Teachability Hypothesis vs. the Projection Model. In Study 1, the stages predicted for L2 Spanish discussed in Section 2.2.3 will be analyzed in a corpus of learner data, the Spanish Learner Language Oral Corpus [SPLLOC] (Mitchell, Myles, Dominguez, Marsden, Arche, & Boardman, 2008). In Studies 2 and 3, instructing Stages 4 and 5 to advanced beginning learners of Spanish and Stages 3 and 4 to beginning learners will be investigated in order to see the effect of teaching learners the *next* or *next + 1* stages.

### 2.4.1 Study 1

As the review of literature has shown, the five hierarchical PT stages in syntax or morphology for a variety of typologically distinct languages have been established through empirical studies (e.g. German, Pienemann, 1998; Chinese, Zhang, 2001, 2005; Italian, Di Biase & Kawaguchi, 2002). However, no study has looked at a range of syntactic and morphological structures for each stage predicted by PT for a single language after Pienemann's (1998) and Pienemann and Håkansson's (1999) original corpus-based studies. Empirical research has centered on the

development of lexical, phrasal or interphrasal morphemes (Baten, 2011; Di Biase & Kawaguchi, 2002; Glahn et al., 2001; Mansouri, 2005; Zhang, 2005) or on word order rules (Glahn et al., 2001;[9] Jansen, 2008; Kawaguchi, 2005). Only one recent study – Dyson (2009) has addressed the question of the interaction between the development of syntax and morphology in learners; his results, as discussed previously, suggest that syntax may emerge prior to the morphology. It remains to be seen how the syntax and morphology develop together: as Dyson (2009) questioned, does the acquisition of the morphology drive the acquisition of the syntax or vice-versa? In other words, once a processing stage has been acquired, does the syntax and morphology emerge together, or does syntax precede morphology? In addition, if one develops before the other, does the hypothesized order and cumulative nature of the stages still hold? Furthermore, establishing the PT stages for L2 Spanish is of importance given that no previous study has analyzed the acquisition of syntax of a Romance language from the current PT framework, although morphology of Italian, another Romance language, has been analyzed by Di Biase and Kawaguchi (2002). This study then will be the first to test the existence of the stages of PT not only for L2 Spanish, but also for the syntax of a Romance language. Furthermore, establishing the PT stages in L2 Spanish will also allow for testing the role of order of instruction of subsequent stages for classroom learners of Spanish, which is the topic of Studies 2 and 3.

In sum, Study 1 will look at whether the PT stages for L2 Spanish are acquired in the order predicted as shown in Table 4, and, as questioned by Jansen (2008), in a stage-like fashion, i.e. that evidence exists that learners are at each of the five stages. In addition, this study will analyze syntactic and morphological development independently and then as a whole in order to determine whether the implicational nature of the stages is upheld when the morphology and

syntax are analyzed together. Theoretical contributions of this paper include adding typological plausibility to PT, as well as testing the stage-like nature of the hypothesized stages and contributing to the discussion on how the syntax and morphology develop. In Study 1, the following questions will be addressed:

1. Are the stages predicted by PT present for L2 learners of Spanish?
2. Is there evidence that five discrete stages exist for the development of syntax and morphology as predicted by PT?
3. Do the syntax and morphology emerge separately or together?

### 2.4.2 Studies 2 and 3

As discussed in the review of previous studies, research on the influence of instruction on known developmental sequences has claimed that instruction is most effective when targeting the next developmental stage (the Teachability Hypothesis), or when targeting more marked items on a hierarchy of difficulty based on markedness (the Projection Model). Support for the Teachability Hypothesis is limited to Pienemann's (1984) study that showed that learners who were instructed on the *next* + 1 or *next* + 2 stages did not gain stages, while those instructed on the *next* stage did. However, several previous studies (Mackey, 1999; Spada & Lightbown, 1999; Farley & McCollam, 2004) have suggested that learner readiness is not a limiting factor as to whether learners advance or not. As for the Projection Model, the advantage for teaching more marked items has been limited to research on acquisition of relative clauses (e.g. Eckman et al. 1988; Doughty, 1991) and possessive determiners (Zobl, 1983, 1985).

In sum, the effect of instruction on subsequent PT stages is unclear. If learners do not have to be ready for instruction—i.e. at the preceding stage—in order to advance stages, then exposure to more advanced items on the hierarchy can lead to acquisition of lower items on the hierarchy – which is exactly what the Projection Model predicts and is contrary to the prediction of the Teachability Hypothesis that instruction should be targeted at the *next* developmental stage. This dissertation aims to address whether either of these two contradictory claims on language instruction can account for language development through the stages of the PT hierarchy. While other researchers have noted this apparent contradiction in these two theories (Shirai, 1997; Pienemann, 1998, p. 260; Spada & Lightbown, 1999), a study designed to address both theories simultaneously is needed. Whether the Projection Model can account for the role of instruction on advancement through PT's processing hierarchy of language acquisition—i.e. whether teaching items that are more difficult to acquire, i.e. higher up in the hierarchy, can lead to gains at items lower in the hierarchy—or whether instruction must be focused on the *next* stage are important questions for the role of instruction on syntactic and morphological development for classroom language learners. Given that the PT hierarchy has been strongly established for the acquisition of a multitude of second languages for classroom or naturalistic learners, establishing how instruction can aid classroom learners in advancing through the hierarchy is an important contribution not only to theoretical literature but also to L2 pedagogy.

In sum, this dissertation will investigate the effect of instruction on the syntax and morphology of the five PT stages of classroom learners of L2 Spanish to address the question as to whether the hierarchal progression through the stages can be accelerated or altered via instruction targeted at specific PT stages. The questions addressed in Studies 2 and 3 follow.

1. Does instruction on the *next* stage facilitate development?
2. Does instruction on the *next +1*, i.e. marked, stage facilitate development to that stage?
3. Is instruction more effective when focused at the *next* stage or at the *next + 1* stage?
4. Can instruction facilitate learners 'skipping' a stage?

The first two questions address the predictions of the Teachability Hypothesis as well as the Projection Model. In order to address these questions, two studies will be conducted. The participants of Study 2 are students from Elementary Spanish II, a second semester Spanish course, in order to address the later stages (Stages 3, 4, and 5) of PT. The participants of Study 3 are students of Elementary Spanish I, the most basic Spanish class offered at the University of Pittsburgh, in order to address the emergence of earlier stages (Stages 2, 3 and 4) of PT. Both studies followed the same methodology, but the testing and teaching materials used for each group were tailored to each level. These two levels were chosen specifically because many of PT's five stages of development are taught in the first two semesters of study, from Stage 2 to Stage 5, although not in the order that PT predicts. The procedure largely follows Mackey (1995, 1999) as well as Spada and Lightbown (1999), two studies that have tested the effect of instruction on the PT hierarchy. The experiment consisted of a pre-test to establish each learner's developmental stage, an instructional period to teach the target grammatical items, and both a post-test and delayed post-test to measure each learner's developmental stage after instruction.

## 2.5 CHAPTER SUMMARY

In this chapter, the principles of PT were first laid out, including a description of Levelt's Speech Processing Model (1989) and LFG (Bresnan, 1982), followed by the specific stages of

acquisition of processing procedures predicted by PT. Studies that have found cross-linguistic support for the five PT stages were reviewed, along with a brief description of important criticisms and counter-support for PT. In the second section, a description of the relevant grammatical structures in Spanish first highlighted the syntactic and morphological phenomena that learners encounter when acquiring Spanish. Next, the general processing stages predicted by PT were applied to the relevant morphosyntax in Spanish in LFG terms. Finally, a discussion on other perspectives on the acquisition of Spanish morphosyntax highlighted some of the syntactic and morphological structures that Spanish learners produce at the beginning, intermediate, and advanced stages.

The next section presented two hypotheses that have postulated how instruction can affect development through the stages: the Teachability Hypothesis and the Projection Model. Both models offer opposing viewpoints on the role of order of instruction: the Teachability Hypothesis says that instruction can only be effective if targeting stages for which learners are ready, while the Projection Model says that instructing later, or more marked stages, can lead that knowledge to project to earlier, or less marked, stages.

The research questions for Study 1, Study 2 and Study 3 were then presented; namely, Study 1 aimed to test the PT stages for L2 Spanish. The latter three stages were then taught to groups of beginning L2 Spanish learners in Studies 2 or 3. The next chapter continues with the presentation of Study 1.

# 3.0 STUDY 1

In this chapter, the first study of this dissertation will be described. The objective of Study 1 is to test whether the predicted stages for PT in L2 Spanish are present for learners of L2 Spanish of three different proficiency levels (beginner, intermediate, and advanced) through an analysis of a corpus of oral learner data. Section 3.1 details the methodology, followed by the results in Section 3.2 and a discussion of the results in Section 3.3.

## 3.1 METHODOLOGY

### 3.1.1 Description of corpus

The data to be analyzed in this study come from SPLLOC (Mitchell et al., 2008), a corpus of learner data collected by the universities of Southampton, Newcastle and York in the United Kingdom and available in CHILDES (MacWhinney, 2000). It consists of oral data from 60 instructed learners with L1 English. All of the participants have learned L2 Spanish in an instructional setting in the UK. Data from three levels of learners were analyzed: Beginners (*N*=7), Intermediate (*N*=7) and Advanced (*N*=7). The beginning learners (13-14 years old) had experienced approximately 180 hours of Spanish instruction, the intermediate (17-18 years old) 750, and the advanced learners (21-22 years old) had received 895 hours, plus a year abroad.

The beginning (Year 9) and intermediate learners (Year 13) were in secondary school, while the advanced were Year 4 university students. Most of the participants were female ($n$=17), which according to the authors of the database is representative of the fact that most language learners at the high school and university level are female. Speakers with bilingual background or "extensive social contact" with native speakers were not included in the database.

The data analyzed in this study are the interview portion of a photo description task that was followed by a personal interview.[4] In the interview, a native Spanish speaker asked the participant questions about their current interests, their past activities and their plans for the future. According to the information on the SPLLOC website (http://www.splloc.soton.ac.uk/index.html), the tasks were conducted by native speakers of Spanish who had been trained in data elicitation. The interviews were conducted at the schools and were recorded using portable recording devices. Sound files and transcripts in the CHAT format are available on the SPLLOC website and through the CHILDES database (MacWhinney, 2000). A total of 1,225 clauses were analyzed.

[4] The photo description part of the task involved the learner describing six photographs, then the researcher asked the participant to find out information about the pictures by asking questions; however, the method in which the researcher transitioned to asking the participants to ask questions varied greatly in the transcripts. Sometimes the researcher said in English that they were going to play a "detective game" to find out what was going on in the pictures (e.g. P56, an intermediate learner), or in Spanish, e.g. *algo que quieras preguntar?* 'anything you want to ask?' (P08, a beginning learner). The result is that the data from the question portion were diverse and possibly due to misunderstandings of the task, not due to developmental differences. Therefore, only the data from the interview part (a task where there was a clear switch to discussing personal questions with the student) was analyzed.

### 3.1.2 Data Analysis

The transcripts were first organized and coded for the specific syntactic and morphological features predicted by PT. All utterances were categorized according to the order of syntactic elements (e.g. S for subject, V for verb, O for object, and X for any element) and for morphology (Jansen, 2008, p. 199). Exclusions were clauses mostly in English or unintelligible clauses. Also excluded were repetitions of the exact same phrase by a single learner; for instance, one beginning learner produced *practico la natación* 'I swim' five times during the course of the short conversation. This phrase was only counted once in the overall count of production. In addition, verbs like *gustar* 'to like' were excluded from the syntactic analysis but not the morphological analysis. These verbs have a non-prototypical mapping in that the experiencer (typically subject) and theme (typically object) are reversed: experiencer maps to the object position and the theme to subject position. For example; *me gustan las manzanas* 'apples are pleasing to me' (Pienemann et al., 2005, p. 223). Therefore, for the purposes of this dissertation, *gustar* and verbs like it were analyzed just for their interphrasal nature of morphology, e.g. Esther produces *porque los chicos les gusta* 'because the boys [Pl] they [Pl] like it'.

The emergence criteria, to be discussed below, were then applied in order to make a judgment as to the learners' stage, and the overall interlanguage by learner level was statistically analyzed using implicational scaling (Hatch & Lazaraton, 1991). Implicational scaling is a means of interpreting the cross-sectional data of learner's morphological or syntactic development as representative of an individual learner over time. In PT research, it allows for verification of the hypothesized order and cumulative nature of the stages (e.g. Di Biase & Kawaguchi, 2002; Jansen, 2008).

#### 3.1.2.1 Emergence Criteria

Acquisition of each stage is defined by the emergence criteria (Meisel et al., 1981) rather than defined by an accuracy count of structures pertinent to PT. Pienemann (1998) offered the following definition of emergence: "From a speech processing point of view, emergence can be understood as the point in time at which certain skills have, in principle, been attained or at which certain operations can, in principle, be carried out (p. 138). Emergence, then, is a way to measure the first use of a structure in order to determine that a learner has acquired the necessary procedure in order to produce the structure (Pienemann, 1998, p. 138). However, the emergence criteria is not simply whether the learner has used the structure or not, rather a structure must be shown to be used systematically and productively in order to determine emergence (Pallotti, 2007). A structure being used systematically refers to that at first it could be used randomly; systematic use can be reflected in its being used in a sufficient number of tokens or contexts. Productivity relates to a structure being used with a variety of lexical items, in the case of morphology, or in a variety of contexts, in the case of syntax. The specific criteria to determine emergence largely follows Pienemann (1998) and Pallotti (2007) for both the syntax and morphology as discussed in the next sections.

##### *Syntax*

For syntax, the emergence criterion is the following: A non-rote-learned structure is considered to have emerged if a minimum of four[5] total contexts for the rule are also present (following

[5] The number of four contexts is arbitrary; it was used by Pienemann (1998) and also by Jansen (2008). Therefore four contexts were considered sufficient for the present study.

Pienemann, 1998, p. 145; Jansen, 2008). Given that the goal is to determine whether a structure has emerged, and not the percentage of suppliance in obligatory contexts, it is irrelevant in how many contexts a structure is found, i.e. if a structure is found once in four or twenty-four contexts. In either context, the structure would be considered to have emerged. One instance of a syntactic structure in question is considered to be a creative, unanalyzed, productive instance of the structure unless it is a rote-learned or chunked phrase. In Spanish, for example, rote-learned chunks were considered to be phrases such as *me gusta* 'I like' or *se llama* 'his/her/its name is'. Given that determining rote-learned chunks is potentially quite subjective, a list of utterances determined to be rote-learned chunks is available in Appendix A for review.

If a phrase is not considered to be chunked or rote-learned, it is considered to be a productive use of the structure with the further caveat that at least four contexts for application or non-application of the rule also exist (Pallotti, 2007). The notion of "contexts" for the rules in question refers not just to obligatory contexts as defined by the target language grammar; it also refers to optional contexts that contain the linguistic elements in question in order to determine application or non-application of the syntactic phenomena under investigation, given that many of the syntactic rules tested for Spanish are optional, e.g. XP-adjunction. Again, the philosophy of the emergence criteria is to systematically analyze learner production as a unique system and to avoid quantitative analyses based on percentage of rule application in obligatory contexts as defined by the target grammar (Pienemann, 1998, p. 144). In terms of processing procedures, the analysis of the first productive use of a rule shows that the rule has become processable; PT makes no predictions regarding when rules become target-like or mostly accurate, a criticism of PT which was discussed in Section 2.1.6.

This concept of including an analysis of a minimum number of contexts allows for stronger evidence that a learner applies the rule or not in terms of systematicity and productivity as discussed above. For instance, if a learner applies the rule once, but not enough contexts exist for the learner to have applied the rule, it is indeterminate whether the learner does not have the linguistic resources to produce the structure, or whether the task does not elicit the desired structure effectively or does not require the structure in question. In the data in the present study, a full range of combinations were found, e.g., from learners that produced neither the target structures nor the contexts for the structures, to learners that produced one or more target structure but not enough contexts, and learners that produced at least one structure in at least four contexts. This progression from not producing the structure at all to producing the context and the structure itself is considered to be part of the learners' typical development (Pienemann, 1998, p. 146).

To illustrate an application of the emergence criteria, post-verbal subjects are predicted at stage 4. Paula produced one example of VOS: *es muy muy triste muy aburrido el año nuevo* 'it's very very sad very boring the New Year'. Since Paula produced 16 other utterances with an explicit subject, verb and object, a sufficient number of contexts exist for the rule and this structure will be considered to have emerged. On the other hand, if Paula had not used an explicit subject in at least three other utterances, there would be an insufficient number of contexts to determine application or non-application of the rule. This analysis is not based on a case-by-case analysis of whether post-verbal subjects are appropriate according to the target language norms; again, what is of interest is whether the learner is systematically manipulating word order or producing canonical word order. The following table shows the proposed stages for the syntax and examples from the data. Names are pseudonyms created by the author; the

original file number from the corpus and the level of the learner is also given in parentheses in the examples.

**Table 6. Proposed stages of word order development**

| Stage | Example | Learner |
|---|---|---|
| Subordinate clauses (Stage 5) | *pero pienso que harán mucho ruido* 'but I think that they will make a lot of noise.' | Paula (P72) |
| SV-inversion / Clitic placement (Stage 4) | *es muy [/] muy triste muy aburrido el año nuevo* 'is very sad very boring the New Year.' | Paula (P72) |
| XP-adjunction (Stage 3) | *um en # dos semanas um tengo un concierto* 'um in two weeks um I have a concert.' | Dorothy (P68) |
| SVO (Stage 2) | *ehm ella [*] ju(ga) [/] juga [: juega] [*] al badminton.* 'she plays badminton.' | Denise (P01) |

### *Morphology*

For morphology, the item in question must be shown to be used systematically and productively with lexically varied words in a minimum of four contexts (Pallotti, 2007; Pienemann, 1998, p. 13). Pienemann (1998, p. 13) discusses that an instance of *he goes*, for example, does not alone show acquisition of subject/verb agreement; examples of the same verb with various morphology and varied lexical subjects must be found in order to see that the rule governing inflection on *go* is productive and not a lexically learned item. As per Di Biase and Kawaguchi (2002), echoic utterances were excluded; for example, one learner produces the phrase *mis amigas* 'my friends'

twice, but does not produce any other plural nouns. In this case, only the first instance of *mis amigas* 'my friends' will be counted for plural *–s* marking. It should also be noted that words that have no singular form (e.g. *deberes* 'homework') were not considered examples of plural *–s* given that they could not be considered a productive application of plural *–s*.

The emergence criteria used for the emergence of morphology in this paper are as follows: A rule is considered to have emerged if it is used systematically and productively out of a total of at least four contexts. Evidence that a rule is being used systematically and productively is at least two of any of the following situations (Pallotti, 2007, p. 271, 375):

- Morphological minimal pairs
- Lexical variety
- Creative constructions

As with the emergence criteria for the syntax, the rationale for the emergence criteria is that a rule is productive and not a learned lexical item. Pienemann (1998, p. 13) discusses that an instance of *he goes*, for example, does not alone show acquisition of subject/verb agreement; we must see examples of the same verb with various morphology and varied lexical subjects in order to see that the rule governing inflection on *go* is productive and not a lexically learned item. Productions of the morphological rules in this paper, such as plural marking on attributive adjectives, were analyzed to see whether minimal pairs existed, whether the structure was used with a variety of lexical items, or whether the structure was creatively applied. Specifically, morphological minimal pairs are found to occur when the same lexical item, e.g. *dog*, is marked with the target structure, e.g. *dog –s*, as well as left unmarked, e.g. *dog*. Evidence that a rule is used with a variety of lexical items was to find three examples of the structure with three different lexical items: e.g., *amigos* 'friends', *exámenes* 'exams', *padres* 'parents', as well as

three different lexical items without the structure, e.g., *semana* 'week', *iglesia* 'church', and *fiesta* 'party'. Finally, a creative construction was considered an overgeneralization of a rule when it was not required, for example, in English adding the plural *–s* to *foot* instead of producing the irregular plural *feet.*

To illustrate the emergence criteria for morphology, Denise produces plural *–s* at least once out of at least four contexts, and she produces two morphological minimal pairs, e.g., *tíos* 'uncles' and *tío* 'uncle'. She has therefore acquired a Stage 2 structure, plural marking with *-s*. In the same manner as for the syntax, contexts were considered for the obligatory rules, namely, phrasal and interphrasal number agreement and subjunctive use, but contexts for object agreement were defined by the presence of elements, e.g. lexical items, to which the rules in question could be applied. For example, a context for object agreement was the presence of an object marker, e.g. *le, la, lo, las,* or *les,* along with the corresponding noun phrase, rather than the presence of a linguistic context for which native speakers would produce an object marker. For illustrate, Paula says *prefiero pasar tiempo con mis amigas. Ver todas mis amigas.* 'I prefer to spend time with my friends. To see my friends.' Although a native speaker might not repeat *mis amigas*, instead they would replace it with the object pronoun *las* 'them', contexts such as these were not interpreted in that sense in comparison to a native-like grammar. Table 7 shows examples of each stage in the morphology.

**Table 7. Proposed stages in morphology**

| Stage | Example | Learner |
|---|---|---|
| Subjunctive marking / Relative clause agreement (Stage 5) | *mientras esté ahí me voy a hacer nuevos amigos y viajar con ellos* 'while I am (subjunctive) there, I'm going to make new friends and travel with them' | Michelle (P85) |
| Object marking (Stage 4) | *pero yo me gusta* 'but I like' | Paula (P72) |
| Predicative agreement (Stage 4) | *pero los billetes eran muy muy baratas baratos* 'but the tickets were very expensive' | Paula (P72) |
| NP-agreement (Stage 3) | *muchos exámenes* 'many exams' *mucho alcohol* 'a lot of alcohol' | Ann (P50) |
| plural *-s* (Stage 2) | *ciudades* 'cities' *ciudad* 'city' | Denise (P01) |

### 3.1.2.2 Implicational Scaling

An implicational table visually represents acquisition of grammar over time; it allows for one to easily see that the least advanced learners are at the lowest stages of development while the more advanced learners have acquired not only the beginning stages but also the more advanced ones. Table 8 shows a sample implicational table.

**Table 8. Sample implicational table**

| | Stage 1 | Stage 2 | Stage 3 |
|---|---|---|---|
| Participant A | - | - | - |
| Participant B | + | - | + |
| Participant C | + | + | + |

As seen in Table 8, the first column indicates the participants, who are in order based on how many stages they have acquired, from the least advanced learner (Participant A) to the most advanced (Participant C). The next three columns show the stages in order from the first (Stage 1) to the last (Stage 3). If a learner has acquired a particular stage, it is marked in this table with a (+); if not, it is marked with a (-). In a perfect implicational table, the dotted line indicates

everything to the left of the dotted line has been acquired, and everything to the right has not. However, as seen in Table 8, this implicational table has an "error" in that Participant B has acquired Stages 1 and 3, but not Stage 2. The number of errors is considered when calculating the statistics for the table. Several statistics are calculated in order to verify the hypothesized order and cumulative nature of the stages as described in Hatch and Lazarton (1991). First, the coefficient of reproducibility (C of R) shows how well the table predicts how a student would perform based on his/her rank in the implicational table. The equation to compute the C of R is shown in (22), with an example from Table 8 in (23) and (24).

(22) C of R = 1 – (# of errors / total number of responses)

(23) C of R = 1 – (1/9)

(24) C of R = .89

Next, the minimum marginal reproducibility (MMR) is calculated, which excludes the errors by looking only at the emerged responses. The formula is the following along with the calculation for Table 8.

(25) MMR = number of emerged responses / total number of responses

(26) MMR = 5/9

(27) MMR = .56

The third statistic is the percent improvement in reproducibility (PIR). This number shows the percent improvement between the coefficient of reproducibility and the minimal marginal reproducibility. The formula and example from Table 8 are shown in the following examples.

(28) PIR = C of R – MMR

(29) PIR = .89 - .56

(30) PIR = .33

Finally, in order to determine how reliable the development order is in the table, the coefficient of scalability (C of S) is calculated. This number takes into account all of the previous calculations (i.e. the C of R, the MMR and the PIR). The equation to determine this is as follows:

(31) C of S = PIR / (1 – MMR)

(32) C of S = .33 / (1 - .56)

(33) C of S = .75

A coefficient of scalability above .6 is considered to indicate a scalable table (Hatch & Lazarton, 1991); this is the statistic that is reported for implicational scaling, along with the C of R, in order to demonstrate that an implicational table is representative of a developmental pattern.

## 3.2 RESULTS

The results of the corpus analysis are presented in this section. The analysis of the syntax is presented first, followed by the morphology, then the syntax and morphology together.

### 3.2.1 Syntax

The number and type of clauses produced by each learner were organized in a matrix used in implicational scaling, as shown in Table 9.

**Table 9. Acquisition of syntax implicationally scaled for all learners**

| Participant | SVO | XP-Adj | SV-inv / Clitic | Sub | Total |
|---|---|---|---|---|---|
| Nicole | *1* | 0 | 0 | 0 | 1 |
| Benjamin | 7 | 0 | 0 | 0 | 7 |
| Lily | 7 | 0 | 0 | 0 | 7 |
| Grace | 9 | 0 | 0 | 0 | 9 |
| Carly | 16 | 0 | 0 | 0 | 16 |
| Joseph | 7 | *1* | 0 | 0 | 8 |
| Ann | 7 | 9 | 0 | 0 | 16 |
| Denise | 10 | 7 | 0 | 0 | 17 |
| Dorothy | 16 | 5 | 0 | 0 | 21 |
| Christopher | 17 | 7 | 0 | 0 | 24 |
| Mandy | 22 | 6 | 0 | *2* | 30 |
| Ava | 15 | 7 | 0 | *2* | 24 |
| Cristina | 17 | 8 | *1* | *1* | 27 |
| Hadleigh | 23 | 11 | 4 | *2* | 40 |
| Emily | 48 | 10 | 1 | 4 | 63 |
| Paula | 73 | 36 | 1 | 9 | 119 |
| Esther | 86 | 20 | 5 | 10 | 121 |
| Shayla | 65 | 43 | 4 | 20 | 132 |
| Mary | 116 | 41 | 7 | 25 | 189 |
| Kyle | 63 | 28 | 9 | 26 | 126 |
| Michelle | 115 | 56 | 18 | 39 | 228 |

*Note.* The italics indicate that the learner has produced the structure, but less than four contexts were found for the rule.

Overall, as illustrated in Table 9, the learners show a clear progression from emergence and high production of Stage 2, SVO, to emergence of Stage 5, Subordinate clauses. One learner, Nicole, produces only words. Five learners are at Stage 2, canonical word order. For example, Grace produces *juego en ordenador* '(I) play on the computer'. These learners produced mainly VO or VX clauses (40/45 clauses, or 88.9%). Overall, subjects are rarely produced, as almost all Stage 2 clauses produced are VO or VX (661/723 or 91.4%). This is contrary to the predictions of the Unmarked Alignment Hypothesis (Pienemann et al., 2005); the data here show that the learners at Stage 2 produce mostly VO or VX clauses and rarely produced explicit subjects. The learners

at Stage 3 (e.g. Dorothy and Christopher) produced mostly VO or VX clauses as well as XP-adjunction. For example, Dorothy produces a VX clause, *fui para cuatro semanas* '(I) went for four weeks', as well as an XP-adjunct clause *en septiembre iré al escuela de música* 'in September (I) will go to the music school'. The most advanced learners produced VO or VX clauses, XP-adjunction, SV-inversion and clitic placement, and subordinate clauses (e.g. Shayla and Kyle), as predicted by PT. For example, Shayla produces a pre-verbal dative clitic: *fui a una academia de inglés y les pregunté* 'I went to an English academy and to them I asked'. She also produces subordinate clauses, e.g., *me gusta mezclar con la gente que no conozco bien* 'I like to mix with people that I do not know well'. As seen in Table 9, even as learners develop other means of arranging syntactic elements, the majority of clauses (723/1237, or 58%) remain VO or VX. The stages emerge in the order predicted; as to the left and above the dotted line, there is no evidence of acquisition of the structures; likewise, to the right, there is evidence of acquisition of the structures. The C of R is 1.0, as is the C of S, which shows that this table is 100% scalable, i.e. the stages are acquired in the order predicted. As for evidence that each of the four stages are indeed stages and acquired one-by-one, the following observations hold:

- Stage 1, Lexical items: Nicole is at Stage 1; she is the only learner that does not show evidence for acquisition of Stage 2, as she only produces one clause with a subject and verb, which is not enough evidence to show emergence of this stage.
- Stage 2, SVO: Benjamin, Lily, Grace, and Joseph produce VO or VX clauses, but produce no clauses with initial adjuncts, a Stage 3 procedure.
- Stage 3, XP-adjunction: Ann, Denise, Dorothy, and Christopher produce VO, VX, or adjunct-initial clauses. Ava, Mandy and Cristina produce Stage 3 topicalized clauses, and are also are beginning to produce Stage 4 and Stage 5 clauses.

- Stage 4, SV-inversion / Clitic placement: Hadleigh has acquired Stage 4, but not Stage 5.
- Stage 5, Subordinate clauses: Emily, Paula, Esther, Shayla, Kyle, Mary and Michelle all produce subordinate clauses.

Overall, several learners are found to be at either Stage 2, 3, 4, or 5 with no evidence of having acquired subsequent stages.

A more detailed analysis of word order in subordinate clauses and which kinds of subordinate clauses these learners produced follows in order to shed more light on the differences between main clauses and subordinate clauses. Of the 144 complex sentences produced by these learners, 28 have explicit subjects in the main clause or the dependent clause. Of these 28 subjects, only 8 appear in the main clause, while 20 appear in the dependent clause, e.g. *ehm # eh Jessy pienso que [/] que Jessy es mi favorita porque ehm* 'um Jessy I think that that Jessy is my favorite because um…' (Mandy). Of these 28 subjects, all but 2 are pre-verbal. This tendency for SV word order mimics the results from non-complex sentences found in the rest of the data, which shows that these learners are not marking subordinate clauses differently in terms of the syntax, which is expected in target-like Spanish. The two post-verbal subjects are found in dependent clauses. Both are examples of target subject / verb inversion: *iba a preguntarla cuánto [/] cuánto costaba la chaqueta*... 'I was going to ask her how much cost (V) the jacket (S) [the jacket cost]' (Michelle). The other example is: *espero que vengan mis padres para recogerme sí # en coche* 'I hope that come (V) my parents (S) to pick me up in car'. (Mary). Of the pre-verbal subjects, all but one are target-like: *no sé qué la gente hace* 'I don`t know what the people (S) do (V)' (Paula). In sum, these advanced learners that produce subordinate clauses show variations in word order in subordinate clauses that are mostly target-

like, which indicates that they have knowledge of target phrase structure rules in main clauses as well as subordinate clauses.

In sum, all evidence points towards learners acquiring each stage in a step-like fashion, in the following implicational order: word/lemma > category procedure (SVX/VX) > phrasal procedure (XP-adjunction) > S-procedure (SV-inversion / clitic placement) > subordinate clause procedure (subordinate clause).

### 3.2.2 Morphology

All tokens of the target morphology were analyzed according to the emergence criteria, then the overall morphological production for the five stages of development predicted for the morphology was plotted using implicational scaling in Table 10. For example, as seen in Table 10, Christopher produced the plural *–s* in 6 out of 6 total contexts (6/6); this is a sufficient number of contexts, and he produced the plural *–s* with at least three lexically varied words and he produced at least three nouns with no plural marking. Therefore, he has acquired plural *–s*. Likewise, he is considered to have acquired NP agreement in the noun phrase, as 3 out of 5 contexts are marked correctly for plurality, as well as a morphological minimal pair: e.g., *mis* 'my (plural)' and *mi* 'my (singular)'. He also oversupplied NP agreement in three cases (as indicated as >3), e.g. *mis* (plural) *relación* (singular) 'my (plural) relation (singular)': while the issue of oversuppliance is not relevant in this case, it is important to consider if a learner is producing random cases of the structures in question or systematically marking structures such as plural *–s*.

**Table 10. Acquisition of morphology implicationally scaled for all learners**

| Participant | Plural -*s* | NP-agreement | Pred / Obj | Subj / RC |
|---|---|---|---|---|
| Nicole | 0 | 0 | 0 | 0 |
| Benjamin | 0 | 0 | 0 | 0 |
| Grace | *1/1* | *2/2* | 0 | 0 |
| Carly | *2/2* | *3/3* | 0 | 0 |
| Lily | *3/3* | *3/3* | 0 | 0 |
| Joseph | 4/4 | *0/3* | 0 | 0 |
| Ava | 5/5 | *3/3* | 0 | 0 |
| Christopher | 6/6 | 3/5, >3 | 0 | 0 |
| Dorothy | 7/7 | 7/7 | 0 | 0 |
| Ann | 7/7 | 7/7 | 0 | 0 |
| Denise | 9/9 | 11/14 | 0 | 0 |
| Mandy | 19/19 | 13/12 | *0/1* | 0 |
| Cristina | 9/9 | 7/8 | *1/1* | 0 |
| Hadleigh | 11/11 | 14/14 | *1/1* | 0 |
| Emily | 17/17 | 21/21 | *0* | 0 |
| Paula | 28/28 | 37/37 | *1/1* | 0 |
| Esther | 16/16 | 22/22 | 4/4 | *2/2* |
| Shayla | 30/30 | 19/19 | 7/7 | *1* |
| Mary | 41/41 | 35/35 | 5/6 | *0/1* |
| Kyle | 26/26 | 31/31 | 6/6 | *3/3* |
| Michelle | 51/51 | 64/66, >1 | 12/12 | *4/4* |

*Note.* The italics indicate that there were not a sufficient number of contexts in order to determine application or non-application of the rule. When a learner did produce a structure, three values may be noted: how many times the rule is produced correctly out of the total contexts for the rule (e.g. 3/5) and how many times the rule was oversupplied (e.g., >3).

Overall, as seen in Table 10, the least advanced learners, Nicole and Benjamin, produce no plural –*s* morphology or contexts for plural -*s*, but only isolated lexical items, a Stage 1 procedure. Beginning learners Grace, Carly, and Lily are starting to produce Stage 2 plural –*s* as well as some NP agreement, but they do not meet the emergence criteria in order to be considered Stage 2 or 3. For example, Grace only produces one case of plural morphology, *amigas*, and two cases of phrasal morphology, *mis amigas* 'my friends' and *mis deberes* 'my homework'. Carly is closer to meeting the emergence criteria than Grace for phrasal morphology: she produces *amigos* 'friends', *muchas cosas diferentes* 'many different things', and **las muchas cosas diferentes* 'the many different things'. The inclusion of ungrammatical *las* suggests that Carly

has learned the phrase *muchas cosas diferentes* as an unanalyzed chunk. Joseph, on the other hand, meets the criteria for plural *–s*, but does not yet mark number on determiners or adjectives, a stage 3 operation. He fails to produce plural *–s* marking on three lexical items*: *mi hermanos* 'my brothers'*, *mi hermanas* 'my sisters'*,* and *mi vacaciones* 'my vacations'. More advanced learners show the progression expected from the intermediate learners: here, Stage 2 and 3 plural and NP agreement have both emerged (e.g. learners Christopher, Dorothy and Ann), and for the next stage, several learners produce Stage 4 interphrasal agreement (e.g. Esther, Shayla, and Mary), illustrated in Spanish by predicative adjectives and object agreement. For example, Esther produces the following four cases of interphrasal agreement, in (34):

(34) *pues en la mañana ah yo estaba encargada de # como # ah hacer actividades con* ***los niños*** *ayudala@n [//]ayud(ándoles) [/]* ***ayudándoles*** *a [/] a hacer los deberes del colegio y.*

'so in the morning ah I was in charge of how doing activities with the **kids (Pl)** helping helping helping **them (Pl)** to do their schoolwork.

(35) *somos todos rubios hablamos ingles somos muy fríos*

'we (Pl) are all blonde (Pl) we speak English (we) are very cold (Pl)

(36) *los chicos les gusta*

'the boys (Pl) we like them (Pl)

Esther shows just four cases of interphrasal agreement, which makes her case borderline for emergence or not. However, a review of the examples shows that this learner clearly uses interphrasal agreement with four different adjectives and verbs. Strictly speaking, given that two

cases in (34) share the same subject, *todos,* it could be argued that the context is not varied enough; however, given the variety of the other examples, e.g. marking plurality on the indirect object pronoun cliticized to the infinitive in (34) and with *gustar* in (36), interphrasal agreement was determined to have emerged for Esther.

Several learners are starting to produce subjunctive marking (e.g. Kyle and Esther), a Stage 5 procedure. One learner, Michelle, has almost acquired Stage 5 morphology; this learner marked the subjunctive in 2/2 contexts as well as inter-clausal agreement in 2 cases, e.g., y **habían depen(dientes) [///] pues dependistas@n que eran españolas y…* 'and there were salespeople (pl) well salespeople (fem, pl) that were Spanish (fem, pl). In this case, Michelle has marked *salespeople* with plural agreement between the main clause and the relative clause. While this learner used four different Stage 5 rules in four varied lexical contexts, while multiple, i.e. more than four different Stage 5 contexts were left unmarked for subjunctive or inter-clausal agreement, this only satisfies one of the two situations. Another situation, such as morphological minimal pairs, a creative construction, or more lexical variety would have to be present to determine emergence of this structure for Michelle.

Overall, the data are 100% scalable, i.e. C of S is 1.0 and C of R is 1.0, which, along with the observations for the development of word order, indicates an implicational relationship between the stages in morphological development. As for the progression from stage to stage, the following observations are found:

- Stage 1, Lexical Items: Nicole, Benjamin, Grace, Carly, and Lily are at Stage 1 but not Stage 2, although for Grace, Carly, and Lily, Stages 2 and 3 are beginning to emerge.
- Stage 2, Plural *–s*: Joseph and Ava both show acquisition of Stage 2 plural *–s*, but not Stage 3, NP-agreement.

- Stage 3, NP-agreement: Christopher, Dorothy, Ann, Denise, Mandy, Cristina, Hadleigh, Emily and Paula mark both plurality (Stage 2) and NP-agreement (Stage 3), but have not yet acquired Stage 4.
- Stage 4, Predicative agreement / Object agreement: Esther, Shayla, Mary, and Kyle mark predicative adjectives or objects at Stage 4, but do not yet have enough instances of Stage 5, subjunctive marking.
- Stage 5, Subjunctive / Relative clauses: Michelle has almost acquired Stage 5 morphology, as she marks both the subjunctive and relative clauses.

Overall, there is evidence by multiple learners for Stages 1, 2, 3, and 4. There is evidence that Stage 5 is beginning to emerge for several learners (Esther, Mary, Kyle, and Michelle).

### 3.2.3 Syntax and Morphology

Next, the emergence of the syntax and morphology across all learners combined will be looked at in order to see if the stages continue to emerge in the order predicted. Counter-evidence to PT would be to find evidence that a learner has skipped a stage; to illustrate, that a learner has acquired Stage 4 morphology, Stage 2 syntax, and neither Stage 3 syntax or morphology, i.e. Stage 3 has been skipped. Table 11 shows the stages of development of syntax along with the morphology. To the right of the dotted line indicates acquisition of both the syntax and the morphology for each stage, while to the left of the dotted line indicates non-acquisition of the stage. The shaded areas indicate that the syntax has emerged for the stage, but the morphology production did not meet the emergence criterion. There were no cases where the morphology had emerged but not the syntax.

**Table 11. Acquisition of syntax and morphology implicationally scaled for all learners**

| Participant | Stage 2 | | Stage 3 | | Stage 4 | | Stage 5 | |
|---|---|---|---|---|---|---|---|---|
| | S | M | S | M | S | M | S | M |
| Nicole | *1* | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Benjamin | 7 | *0* | 0 | 0 | 0 | 0 | 0 | 0 |
| Lily | 7 | *3/3* | 0 | *3/3* | 0 | 0 | 0 | 0 |
| Grace | 9 | *1/1* | 0 | *2/2* | 0 | 0 | 0 | 0 |
| Carly | 16 | *2/2* | 0 | *3/3* | 0 | 0 | 0 | 0 |
| Joseph | 7 | 4/4 | *1* | *0/3* | 0 | 0 | 0 | 0 |
| Ava | 15 | 5/5 | 7 | *3/3* | 0 | 0 | *2* | 0 |
| Ann | 7 | 7/7 | 9 | 7/7 | 0 | 0 | 0 | 0 |
| Denise | 10 | 9/9 | 7 | 11/14 | 0 | 0 | 0 | 0 |
| Dorothy | 16 | 7/7 | 5 | 7/7 | 0 | 0 | 0 | 0 |
| Christopher | 17 | 6/6 | 7 | 3/5, >3 | 0 | 0 | 0 | 0 |
| Mandy | 22 | 19/19 | 6 | 13/12 | 0 | *0/1* | *2* | 0 |
| Cristina | 17 | 9/9 | 8 | 7/8 | *1* | *1/1* | *1* | 0 |
| Hadleigh | 23 | 11/11 | 11 | 14/14 | 4 | *1/1* | *2* | 0 |
| Emily | 48 | 17/17 | 10 | 21/21 | 1 | *0* | 4 | 0 |
| Paula | 73 | 28/28 | 36 | 37/37 | 1 | *1/1* | 9 | 0 |
| Esther | 86 | 16/16 | 20 | 22/22 | 5 | 4/4 | 10 | *2/2* |
| Shayla | 65 | 30/30 | 43 | 19/19 | 4 | 7/7 | 20 | *1* |
| Kyle | 63 | 26/26 | 28 | 31/31 | 9 | 6/6 | 26 | *3/3* |
| Mary | 116 | 41/41 | 41 | 35/35 | 7 | 5/6 | 25 | *0/1* |
| Michelle | 115 | 51/51 | 56 | 64/66, >1 | 18 | 12/12 | 39 | 4/4 |

As illustrated in Table 11, the acquisition order predicted is upheld with 100% scalability, in other words, C of S is 1.0 and C of R is 1.0. There is no evidence of acquisition to the left of the dotted line, nor non-acquisition to the right of the dotted line. Secondly, the shaded areas indicate that the syntax and morphology do not emerge simultaneously. Rather, without exception, syntax emerges first when only one of the two has emerged, in other words, in no case has the morphology emerged before the syntax. To illustrate, for learners Benjamin, Lily and Grace, we can see evidence of emergence of Stage 2, SVO, but there is not enough evidence of emergence of the morphological procedures. For three of the more advanced learners (namely, Hadleigh, Emily and Paula) there is not enough evidence to determine emergence of the last two

stages for the morphology, while the syntactic phenomena for the last two stages have clearly emerged. This is not counter-evidence to the order of acquisition of stages predicted by PT: although Stage 5 syntax has emerged before Stage 4 morphology for Hadleigh, Emily, and Paula, which potentially shows a 'skipped' stage, since Stage 4 syntax has emerged, then it can not be concluded that any stages have been skipped. Rather, the conclusion is that the learner can process both Stages 4 and 5, but simply has not yet made use of all the structures available at Stages 4 and 5. Indeed, a look at the next three learners (Esther, Shayla and Kyle), the morphology production appears to 'catch-up' as there is evidence of Stage 4 morphology as well as Stage 4 and 5 syntax. At Stage 5, the last five learners (Esther, Shayla, Kyle, and Mary) clearly produce a high number of subordinate clauses, but few cases of and contexts for the subjunctive.

On the whole, this dataset represents each developmental stage of the PT hierarchy, as there are learners at who are clearly at a certain developmental stage. Evidence for the stage-like nature of development exists at Stages 2, 3, 4 and 5 by multiple learners, with the exception that only one learner was at Stage 1. However, the syntax and morphology are not found to emerge simultaneously across the board for all learners, rather syntax overall is found to emerge before the morphology.

## 3.3 DISCUSSION

The first two questions this study aimed to address were whether the stages predicted by PT are present for L2 learners of Spanish and whether they are indeed independent stages. The stages of the syntax will first be discussed, followed by a discussion of the morphology, then both the syntax and morphology together.

### 3.3.1 Syntax

The five stages predicted for the syntax were found to emerge in a hierarchical manner: canonical word (VO or VX) > XP-adjunction > SV-inversion / clitic placement> subordinate clause. Implicational scaling clearly verified the order of the stages with 100% scalability. Most studies on PT have found such a strong fit (e.g. for L2 German and English, Pienemann, 1998; for L2 German, Jansen, 2008). The first stage, canonical word order was predicted to be SVO; however, the results showed that learners rarely explicitly express the subject. For all learners, the majority of the utterances were VO or VX (661/740 or 89.3%). The early appearance of null subjects has been found in previous studies of acquisition of null subject languages by non pro-drop first language speakers (e.g. Liceras & Díaz, 1999). Given that all learners in this study are native speakers of English, an SVO language, this result shows that learners did not transfer the SVO structure of their native language to their second language. Kawaguchi (2005) also found that L1 English speakers learning Japanese did not produce SVO for canonical word order; instead, all of their utterances began with the topic marker to mark the subject (Kawaguchi, 2005, p. 286-289). The Unmarked Alignment Hypothesis, as proposed by Pienemann et al. (2005), predicts that learners will map the subject to the initial position at c-structure.

Kawaguchi's (2005) result supports the UAH given that learners initially used the topic marker –*wa* on initial NPs as shown in (37).

*kazouk..-wa er suupaa-e ikimasita*

family-TOP supermarket-to go-POL.PAST

'The family went to a supermarket'

However, the production of almost exclusive null-subject phrases by the learners in this paper appears to contradict this hypothesis, as learners do not produce a subject at c-structure. Instead, the initial position is filled by the verb. Since the Unmarked Alignment Hypothesis and PT assume a prominent role of the subject in Stage 2 canonical word order, it is not clear which processing procedure relates to the early null-subject production by the learners in this study.

At the third stage, XP-adjunction, learners consistently began to front prepositional phrases and other adjuncts before the verb or before the subject (e.g. Ann or Denise). At the fourth stage, SV-inversion / clitic placement, one learner, Hadleigh, had acquired Stage 4, SV-inversion and clitic placement, but not Stage 5, Subordinate clauses. Overall, the production of Stage 4 structures was relatively low compared to the other stages. This could be due to the fact that Spanish is pro-drop; since learners rarely produced subjects, it was less likely to find examples of SV-inversion. In fact, the majority of the evidence that learners had acquired Stage 4 (S-procedure) were the dative or accusative clitic pronouns that had been placed before the verb. Another limitation for Stage 4 is that no questions were in the dataset, which would have been an important source of evidence for knowledge of the target word order. In Studies 2 and 3, questions are elicited to provide more data on Stage 4 subject/verb inversion. For Stage 5, many learners were found to produce subordinate clauses with mostly target-like word order, including a few examples of target subject verb inversion. Overall, abundant evidence was found for Stage

5, subordinate clauses, which are fairly common and also highly necessary in speech, while post-verbal subjects are highly variable and dependent on semantics and pragmatics. This perhaps constitutes even stronger evidence for PT, because even with the limited evidence for Stage 4 compared to the abundant evidence for Stage 5, the stages are still upheld.

One area of interest for a future study involves relative clause formation given their syntactic and morphological consequences. Of the 144 subordinate clauses produced by these learners, 46 are relative clauses, the majority of which are subject or direct object relative clauses. One learner, Michelle, produces an example of relativization of a prepositional phrase in which she fails to move the preposition: *sí pero creo que los [/] los niños que yo trabajaban CON ehm dormían en una casa…* 'Yes but I think that the children that I worked with ehm slept in a house' (Michelle). In this case, the preposition *con* should remain with *que.* More precisely elicited data targeting the formation of relative clauses would be informative for this aspect of subordinate clause syntax.

### 3.3.2 Morphology

For the morphology, implicational scaling showed the hypothesized order to be upheld with 100% scalability: plural *–s* > NP-agreement > object agreement / predicative agreement. While the Stage 5 subjunctive had not yet emerged, it was close to meeting the emergence criteria for several learners. As for the results for the syntax, other studies on morphology acquisition have also shown strong scalability (for Arabic, Mansouri, 2005; for Chinese, Zhang, 2005).

The first two stages, plural *–s* as a lexical marker and NP- agreement as phrasal agreement, are found in the order predicted for all learners. The next stage, interphrasal agreement, has emerged for the most advanced learners (Esther, Shayla, Mary, Kyle and

Michelle) while a handful of learners do not produce enough examples of this structure in order to consider its emergence (Mandy, Cristina, Hadleigh, and Paula). The final stage predicted was that of the use of the subjunctive marker in subordinate clauses and agreement across clausal boundaries. Only one learner, Michelle, produced enough examples of both structures in order for this stage to be considered close to emerged; however, as discussed previously, the subjunctive mood is only required in certain contexts in subordinate clauses. The fact that few learners produce could be reflective of the fact that they avoid or are unaware of the contexts for the subjunctive mood. Importantly, however, the advanced learners were found to be capable of producing subordinate clauses before they begin to produce isolated instances of the subjunctive mood. Overall, the results show evidence for independent stages 1,2,3, 4 and 5 in the acquisition of morphology.

One obvious omission for this discussion of Spanish morphology is subject/verb agreement, given the rich morphology of the language. With the exception of the least advanced learner, Nicole, who only produces lexical items (Stage 1, 'lemma access), all learners produce verbal morphology as well as null subjects. As discussed previously, the point of departure in this paper is that subject-verb agreement in pro-drop languages does not involve feature unification; rather, the subject, i.e. the subject marker, is marked as morphology on the verb in V, which links directly in c-structure to the feature SUBJ in f-structure. As Mansouri (2005) discussed for Arabic, these subject markers have an attribute PRED with the value PRO; in other words, each affix, e.g. first person –o in Spanish *hablo* 'I speak', is assumed to be lexically listed with an attribute (PRED) that specifies null subjects (PRO). In addition, each affix must be annotated for other grammatical features, such as number agreement (AGR NUM), and person agreement (AGR PERS) (c.f. Mansouri, 2005, p. 133). In terms of PT, this procedure is

potentially categorical, like Stage 2 plural *–s*, as learners could begin annotating features as soon as they begin to develop categories for individual lexical entries. If subject-verb agreement is a category procedure (Stage 2), then it can explain the early production of inflected verbs for Spanish by beginning learners. A detailed distributional analysis[13] (Pienemann, 1998, p. 157) would be necessary to accurately classify whether learners productively mark verbal morphology or are producing memorized lexical items, which is likely a high percentage of early verbal production for beginning learners. While not addressed in this dissertation, this is a logical next step for future research on the typological plausibility of PT in L2 Spanish.

### 3.3.3 Syntax and Morphology

The last two research questions of this study were to analyze the morphology and syntax separately, then together to see if the proposed acquisition order still held true. Although syntax and morphology emerge separately, implicational scaling showed with a scalability of 100% that the acquisition order is upheld, i.e. Stage 1 before Stage 2, etc. Clearly, however, there were learners who had acquired the syntactic phenomenon of a particular stage, while evidence for emergence of the morphology was inconclusive. This is exactly what Dyson (2009) found for the acquisition of L2 English; the syntactic procedures preceded the morphological ones for the two longitudinal learners in her study. The fact that syntax clearly emerges before morphology for learners of L2 Spanish supports Dyson's (2009) result and conflicts with the idea that acquisition of morphology is a precursor to the acquisition of the syntax at Stages 2-3, as discussed in Chapter 2 (Section 2.1.6). Instead, the results of this study indicate that learners first produced Stage 2 canonical word order before showing production of Stage 2 lexical morphemes. At Stage 3, learners begin to produce topicalized clauses first, and then begin to show evidence of

phrasal agreement within the noun phrase. One potential explanation for this discrepancy is the nature of the task; there may not have been enough evidence for Stage 2 or 3 procedures simply because learners did not produce them. On the other hand, clauses of some sort were bound to be produced given that the discourse required it. In sum, these results shows that learners initially rely on a canonical one-to-one mapping of a-structure and f-structure before developing category procedure and the production of lexical morphemes. Next, as learners develop phrasal procedure, it shows up first in the syntax in that learners front XP-phrases to a canonical word order structure and later in the production of phrasal morphemes. At Stages 4 and 5, the pattern continues in that the syntax precedes the production of morphology; this is evident in the data presented in this study as well as predicted by PT. In general, however, the evidence that syntax emerges before morphology is not directly contradictory to the principles of PT given that PT proposes that learners acquire the ability to process each stage in a hierarchical fashion; however, a learner does not necessarily produce all processable structures at a given stage once that stage is reached. As implicational scaling showed a perfect fit (100%) for the syntax and morphology, the predictions of PT are supported. The issue of development of syntax and morphology will be discussed further in the discussion.

## 3.4 CHAPTER SUMMARY

In this chapter, the methodology for establishing the PT stages was presented, including the emergence criteria for syntax and morphology used in Study 1, 2 and 3 and implicational scaling was described. Details of the corpus used for the analysis of the PT stages in Spanish were discussed. The results of the analysis of conversational interviews from the SPLLOC corpus

were presented in implicational scaling tables. Overall, the five stages predicted for L2 Spanish for syntax and morphology were found to be present for beginning, intermediate and advanced learners of Spanish with L1 English with 100% scalability. Five discrete stages in syntax (Stage 2 canonical word order> Stage 3 XP-adjunction > Stage 4 SV-inversion / clitic placement > Stage 5 subordinate clause) were found. For morphology, the five stages found were Stages 2 through 4: plural *–s* > NP-agreement > object agreement / predicative agreement. Stage 5 morphology, subjunctive or relative clauses, had not quite emerged for any of the advanced learners in Study 1. In the next several sections, the procedure and results for two teaching experiment (Study 2 and Study 3) to teach the syntactic and morphological structures of Stages 3 to 5 to four groups of learners of L2 Spanish will be presented and discussed.

# 4.0 STUDY 2

In this chapter, the first teaching experiment conducted to test the effect of instruction on learners' development through the last two stages of PT, Stages 4 and 5, will be discussed. Section 4.1 details the overall methodology of the study. Section 4.1.1 describes the participants in the study and the groups in which the participants were divided. In Section 4.1.2, background is given on the nature of the instruction preceding the instructional period, as well as an overall schema of the experimental period. Section 4.1.3 describes the testing materials used, and Section 4.1.4 explains the procedure for the instructional sessions. The procedure for transcribing and coding the data is explained in Section 4.1.5, and Section 4.1.6 describes the statistical analyses used to analyze the data. The results of the data analysis are presented in Section 4.2. In Section 4.2.1, the PT stages for all learners on the pre-test, post-test and delayed post-test are presented. The overall stage changes for the three groups are then presented in Section 4.2.2. Section 4.2.3 shows the results of how production of higher-level structures changed over time. A discussion of the results in relation to the research questions of this study follows in Section 4.3.

## 4.1 METHODOLOGY

In this section, the nature and background of the participants in the study are discussed. The overall design of the study is described in Sections 4.1.1 through 4.1.4, including a description of the procedure, the testing materials and nature of the instructional sessions. Sections 4.1.5 through 4.1.6 detail how the data were transcribed, coded and analyzed.

### 4.1.1 Participants

The participants (*N*=36) for Study 2 were students of Elementary Spanish II at the University of Pittsburgh. Students are placed into this class based on their performance on a written and oral placement test, or because they have taken a pre-requisite course, Elementary Spanish I. The written part of the placement test is the Brigham Young University Computer Adaptive Placement Exam (Larson, 1996), an online test for Spanish proficiency, and the oral test is an informal interview with the coordinator of the Spanish language program. Students meet for five 50-minute class meetings a week.

Three intact classes of Elementary Spanish II were selected to participate in the study based on the fact that they were the sections with the highest enrollment numbers. With the permission of the coordinator of the language program, the five sessions for data collection were included in the course syllabus for these three classes. The week before the study was scheduled to begin, the researcher met with the instructors of the three intact classes in order to explain the goals and format of the study. The day before the pre-test, the researcher introduced the study to each class. Students were informed of the design of the study as well as the indirect benefits of participation, such as to contribute to our knowledge of language learning and instruction.

Students were encouraged by the researcher to participate in all five sessions of the study, and the instructors of each class offered students extra points for participating as an additional incentive.

A total of fifty-seven students (19 per class on average) were enrolled in the three sections. The classes were randomly assigned to one of three groups based on the target of instruction during the experimental period: the Stage 4-instructed group, the Stage 5-instructed group, and a control group. Of the fifty-seven students in the three classes, thirty completed the pre-test, the two instructional sessions, and the post-test. A total of twenty-two students completed all five sessions, i.e. the pre-test, the instructional sessions, the post-test and the delayed post-test. All testing and instructional sessions were conducted during the students' normal class time, with the exception of six students from the control group who met with the researcher out of class time to take the post-test several days after it was given to the rest of the participants.[6] In addition to the three intact groups, participants were recruited from three other Spanish classes of the same level to act as an additional control group. Nine students volunteered to participate in the study; however, the interval between the post-test and the delayed post-test for this group of students was only 10 days compared to three weeks for the intact classes[7]. A summary of the number of participants in each group follows in Table 12.

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[6] These six students did not attend the post-test session at the scheduled time during a Friday class. The researcher contacted the students and arranged for them to complete the post-test between Monday and Wednesday of the following week.

[7] These students took the pre-test a week after the students in the three intact groups; therefore, in order to conduct all parts of the study before instruction commenced on the subjunctive, a target structure for this study, the interval between the post-test and delayed post-test was shortened for the additional control participants.

**Table 12. Number of Participants per Group**

| Groups | Pre and Post test | Delayed Post |
|---|---|---|
| Stage 4 | *n*=11 | *n*=11 |
| Stage 5 | *n*=11 | *n*=7 |
| Control | *n*=8 | *n*=4 |
| Additional control | *n*=6 | *n*=2 |
| **Total** | *N*= 36 | *N*=24 |

The total rate of participation for all five sessions of the experiment was similar across all three classes. An average of ten students in each class participated in most sessions of the study (11/19 in the Stage 4-instructed group, 11/20 in the Stage 5-instructed group, and 8/19 in the control group). The remainder of the students (*n*=22) did not take either the pre-test or the post-test, and their data have been excluded from the results.

A further note on the groups is that the pre-test showed that participants varied in their initial stage of syntax and morphology. Given that the major goal of this study was to investigate the effect of instruction on the *next* or *next + 1* stage, the results will be discussed by Stage, i.e. the Stage 2 learners from all three groups will be compared together, then the Stage 3 learners, etc. In this way, the actual target of instruction—whether *next*, *next + 1*, or even *next +2*—can be clearly delimited.

A related point is that while instruction was focused at Stages 4 and 5 syntax and morphology, there were several participants who had already acquired Stage 4 syntax (*n*= 9) or Stage 5 syntax (*n*=12). In order to determine whether the three groups differed in terms of how many students in each group had already acquired Stages 4 or 5, a Chi-square analysis was performed. The test showed no relationship between the three groups and number of participants who had already acquired Stage 4 (Target), $\chi^2$ (2, 13) = 1.82, *p*=.40), or Stage 5 (Subordinate clauses), $\chi^2$ (2, 13) = 0.93, *p*=.63. In other words, the groups were comparable regarding how

many participants had already acquired Stage 4 or Stage 5 syntax. The participants were not as advanced in morphology: only one participant had already acquired Stage 4 morphology, and no participant had acquired Stage 5 morphology.

Overall, the participants in the study were divided fairly equally by males (*n*=19) or females (*n*=17). The age of the participants ranged from 18 to 29, with an average of 20.8 years. Thirty-two participants were native speakers of English. Four participants reported being native speakers of other languages (Chinese, Urdu, and Tamil for two participants). Many participants (*n*=15) reported intermediate or advanced proficiency in a second language (German, Latin, French, or English). Most of the participants (*n*=26) had all taken Elementary Spanish I, the preceding course to Elementary Spanish II, at the University of Pittsburgh. Many students (*n*=15) had also studied Spanish prior to the University of Pittsburgh, from one year in elementary school (approximately ages 6-11) to up to several years in high school (approximately ages 14-18).

### 4.1.2 Procedure

The details of the experimental period and the progression of data collection for Study 2 are illustrated in Figure 8.

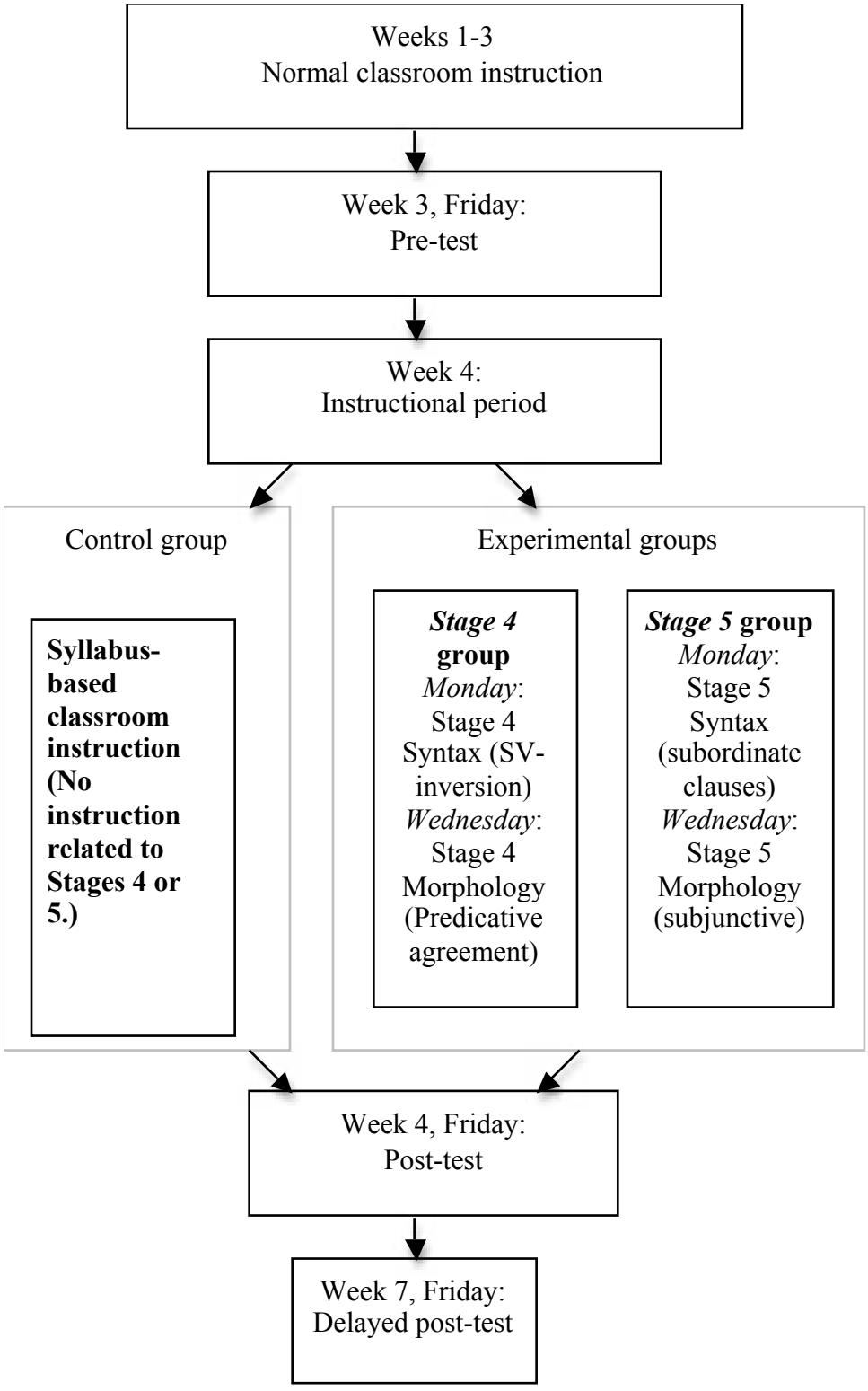


**Figure 8. Schema of Groups and Timing for Elementary Spanish II Groups**

Figure 8 summarizes the groups in the study as well as the progression of data collection. The three intact classes were randomly assigned as a control group or one of two experimental groups. As seen in Figure 8, all three groups were given the same pre-test. Over the next week, the control group did not receive any explicit instruction on the grammatical topics that were covered in the experimental group. Rather, they received instruction on other vocabulary and grammatical items that arise in the course syllabus. The two experimental groups received two days of instruction on Monday and Wednesday. By Week 3, the Elementary Spanish II learners were expected to be at least at Stage 3[8]. Therefore, instruction targeted Stage 4, the Stage 4-instructed group and Stage 5, the Stage 5-instructed group. Finally, on Friday, all three groups took the post-test[9], then three weeks later, the delayed post-test. During the time between the post-test and the delayed post-test, no further specific instruction was given related to the instructed topics.

As seen in Figure 8, the syntax and morphology for each stage were taught separately on separate days in order to teach a relatively coherent topic each day, given that the syntax and morphology topics at a given stage are not easily integrated. In addition, as I found in Study 1 and Dyson (2009) found for the acquisition of L2 English, the development of the syntax tends to precede the morphology when only one of the two has emerged at a particular stage. Therefore, for practical purposes of coherence and in keeping with previous research, the

[8] While many of the learners were at Stage 3, some learners were found to be at a higher stage, such as Stage 4 or 5, or at a lower stage, such as Stage 1 or 2. The results from these learners will be discussed separately in the Results section.

[9] As mentioned previously, the exception is the control group, in which the majority ($n$=6) took the post-test several days after the experimental groups.

instruction of the syntax and morphology were separate. Likewise, for the analysis of the learners' stages, the syntax and morphology will be analyzed separately then together. Details follow on the materials used for the testing period as well as the instructional period.

For the Stage 4-instructed group that received instruction on Stage 4 syntax and morphology, the lesson on Stage 4 predicative adjectives was likely not a new topic for most of the students; however, as seen in Table 12, the topic is not explicitly addressed in the syllabus for this Spanish class. The lesson on Stage 4 subject-verb inversion was likely a new topic, as it is not addressed in the second semester nor is it typically addressed in detail in beginning Spanish classes. The lesson on subject-verb inversion addressed cases when the subject must or can follow the verb in Spanish, i.e. in questions and in certain pragmatic contexts.

The Stage 5-instructed group received instruction on Stage 5 subjunctive syntax and morphology. This instruction took place around the same time as students were instructed on formal commands for giving instructions. This is important because the morphology for the subjunctive follows the same paradigm as that of formal commands; this fact was pointed out to the students during the lesson on morphology. The lesson on Stage 5 syntax, the formation of subordinate clauses, should have been an entirely new grammatical item for these learners. This lesson focused on the formation of noun subordinate clauses with the connecting word *que*, e.g. *necesito que* 'I need that'*, espero que* 'I want that'*, recomiendo que* 'I recommend that', which is the kind of subordinate clause typically taught in the first two semesters of Spanish classroom learning. These kinds of structure were taught on the first day of instruction for syntax, and the specific morphology of subjunctive clauses were taught on the second day of instruction. The focus on instruction of noun clause syntax and subjunctive morphology will address the issue raised in research on acquisition of the subjunctive in Spanish as to whether learners can produce

the complex structures required in order to mark subjunctive morphology (Collentine, 1995). The other Stage 5 morphological structure, inter-clausal agreement, was not explicitly taught to the Stage 5-instructed group; however, these structures if present will also be counted in the data analysis section.

Given that students were attending regular classes during the experimental period, the timing of the data collection was designed to be integrated with the course syllabus. The curriculum for this class follows the second half of *Mosaicos* (Castells, Guzmán, Lapuerta & Liskin-Gasparro, 2010), a widely popular textbook based on communicative language teaching methodology. The data collection started on Friday of Week 4 of the semester. Table 13 shows a summary of the grammatical items taught in second semester Spanish during the time of the data collection.

**Table 13. Sequence of classroom instruction and data collection**

| Week | Classroom instruction | Data collection |
|---|---|---|
| 1 | Vocabulary; verbal morphology (preterit) | - |
| 2 | Past reference (preterit and imperfect); Comparisons of inequality and equality | - |
| 3 | Vocabulary | **Pre-test** |
| 4 | Direct and indirect object pronouns (Stage 4 syntax and morphology)<br>Past reference (preterit and imperfect); morphology of formal commands | **Instructional period and post-test** |
| 5 | Vocabulary; impersonal constructions | - |
| 6 | Past reference (present perfect); morphology of informal commands; morphology of future tense | - |
| 7 | Vocabulary | **Delayed post-test** |
| 8 | Subjunctive; relative clauses (Stage 5) | |

*Note.* If the grammatical topic is part of the PT hierarchy, the stage is indicated in parentheses.

As seen in Table 13, the first seven to eight weeks of Elementary Spanish II are mostly dedicated to vocabulary as well as to referencing the past by using preterit, imperfect or present perfect morphology. Starting with Week 8 of the semester, Elementary Spanish II students are taught uses of the subjunctive as well as relative clauses, which are both Stage 5 procedures in PT. Therefore, testing began on Friday of Week 3 of the semester, and the instructional period took place during Week 4 of the semester in order to complete all parts of the study before relative clauses and the subjunctive are taught to all Elementary Spanish II students in Week 8 of the semester. Note that during Week 4, all students, both the experimental and control groups, were taught direct and indirect object pronouns, which are hypothesized to be Stage 4 procedures in PT. For that reason, examples of Stage 4 clitic agreement and placement in the data are not included in the data analysis, although production of clitics will still be analyzed separately.

### 4.1.3 Testing materials

The purpose of the three tests was to determine the learner's developmental stage before instruction with the pre-test, directly after instruction with the first post-test, and three weeks after instruction with the delayed post-test. The delayed post-test was conducted three weeks later for practical constraints, as well as based on Mackey (1999), who had the delayed post-test three weeks after the post-test. As PT is a theory of oral language production, spontaneous speech was the object of investigation (cf. Pienemann, 1998, p. 280; Ellis, 2008, p. 73). The pre, post-test and delayed post-test took place in a language lab on Macintosh or Dell computers. Students accessed the materials for both tasks from the researcher's website (www.pitt.edu/~clw50/Project.html). The participants recorded themselves speaking using headphones and Audio Recorder 3.2 on Macintosh computers or using Qualcomm's PureVoice

2.4.0 on Dell computers. For both tasks, students were instructed to record themselves speaking spontaneously; that is, they were instructed not to plan what they wanted to say or pause at any point during the recording or re-do any recordings. The first task was to describe pictures and retell a story using a series of eight pictures in a *pdf* file. The pictures depicted the fairy tale Little Red Riding Hood. Students first described the scene in each of the pictures, and then looked back at each picture in order to re-tell the entire story. This method of first describing the pictures then retelling the story ensured that students did not have to know the fairy tale in order to accomplish the task as well as provided a context for more structures predicted by PT (e.g. predicative and attributive adjectives). For the second task, the participants answered ten recorded questions over various topics. The first eight questions asked a variety of personal questions typical of the first semester of language study: e.g., what their families are like, what their plans are for the summer vacation, what kinds of gifts they give on holidays, and what they did on their last vacation. The last two questions elicited questions from the students, e.g. question #9 asked the students to imagine that they were going to study in Madrid for a semester and to ask questions of their host family. A sample slide from the story and the full list of questions in English are available in Appendix B and C. Both tasks were designed to elicit the target PT structures. For example, in order to elicit predicative and attributive adjectives, participants were asked about physical and personality characteristics of their family members. There were two versions of the questions for the second task; Version 1 was given as the pre-test, then Version 2 for the post-test, and the original version was used for the delayed post-test. The modifications in the two versions were slight; for example, in the pre-test, the participant were asked to describe their family, while in the post-test they were asked to describe their best

friends. The average time participants took to complete the task was around 25 minutes. After the pre-test, all participants also completed a brief questionnaire of their language background.

### 4.1.4 Instructional period

Two days after the pre-test, two instructional periods took place targeting different stages of PT for each group of learners. The instructional period was designed to take place for 30 minutes of a typical 50-minute class. The researcher trained an instructor from the Spanish department to lead the instructional sessions. The instructor was a native speaker of Spanish, a highly proficient speaker of English, and an experienced instructor of Spanish as a second language. Training sessions with the teaching assistant took place a few days before the first instructional period. The teaching assistant was given explicit instructions on how to teach each segment of the 30-minute instructional period. While the topics of instruction differed for each class, the sequence of activities was identical for each instructional period: explicit instruction of the grammatical topic, teacher-led oral practice, paired practice completed orally and in writing, and teacher-led revision of the paired practice. Each student was given a handout with the text from the explicit instruction and the exercises to be completed during the instructional session. Details follow on each section of the instructional period; also, see Appendix D for a sample student handout.

**Explicit instruction (5 minutes).** First, the topic of instruction, e.g. predicative adjectives, was introduced and explained explicitly in English, using a Powerpoint and the chalkboard as visual aids.

**Teacher-led practice (5 minutes).** Next, the instructor led the students in completing the first exercise on the handout, which was an explicit activity to practice the information taught in the Powerpoint.

**Paired practice (15 minutes).** The instructor divided the class in pairs and instructed them to complete the second exercise orally and in writing on the handout. Exercise #2 was designed to be a communicative task, such as an information gap task, where learners had to ask each other questions and share information in order to complete the task. The third exercise consisted of personal questions the students were to ask each other in pairs, e.g. discuss with a partner what your best friend is like. As the students worked in pairs, the instructor circulated through the classroom and provided corrective feedback and answered questions. The instructor most commonly corrected errors related to the topic of instruction, or answered questions related to vocabulary or the grammatical topic of the lesson.

**Teacher-led practice (5 minutes)**. After exercises #2 and #3, the instructor led a summary of what the students discussed in the paired practice and provided corrective feedback.

Overall, the focus of the instructional period was to provide explicit instruction as well as corrective feedback. In addition, a combination of teacher-led and student-led activities was included in order to provide a variety of input as well as a variety of opportunities for spontaneous output. Although the exercises were conducted in Spanish, the instructor was directed to use English if necessary in order to provide additional explanations. Although there are many approaches to grammar instruction that address how learners most effectively learn in the classroom, this study will not address whether a particular method is more effective than another. Explicit grammar instruction was chosen for the method of instruction in this study as a wide range of studies have shown it to be effective at furthering learners' development in the target language (Norris & Ortega, 2000). Explicit instruction has also been found to be more effective than implicit methods in research on the Teachability Hypothesis (Spada &

Lightbown, 1999) as well as on the Projection Model, e.g. Yabuki-Soh (2007) found explicit methods to be more effective than implicit for relative clause acquisition in L2 Japanese.

### 4.1.5 Data Transcription

The pre-test, post-test and delayed post-test recordings were first transcribed, and then coded for specific syntactic and morphological features predicted by PT for each stage of the syntax and morphology. The conventions for transcribing were based on those for the SPLLOC project (Mitchell et al., 2008). Words were transcribed using normal Spanish orthography, with the exception that preceding question marks or exclamation points were not transcribed. Utterances were recorded on separate lines. An utterance with a conjugated verb, i.e. a verb not in the infinitive form, was considered a sentence. Sentences followed by coordinating conjunctions such as *y* 'and', *pero* 'but', *entonces* 'then', *luego* 'therefore, *o* 'or', *puesto que* 'since', *ya que* 'since', *sin embargo* 'however' or *no obstante* 'nevertheless' were separated into two utterances. Sentences followed by a subordinating conjunction, e.g. *cuando* 'when', *porque* 'because', *que* 'that', *si* 'if', were not separated. Utterances were marked with a question mark if the learner used rising intonation to indicate a question. Otherwise, utterances ended with periods. Other coding that was used is detailed in Table 14.

**Table 14. Transcription codes and explanations**

| Code | Explanation |
|---|---|
| xx | Unintelligible speech |
| (*?bosque) | Good guess of what the word is |
| # | Pause |
| (*coughs) | Noises such as coughs, laughs |
| eh, oh | Fillers such as these are transcribed phonetically |
| " " | To indicate direct quotes (e.g. the wolf says "…") |
| … | Trailing off |
| (*eng) | To indicate speaking English |
| (*viene) | If a student makes a mistake, but the word is intelligible, the correction is in brackets. |
| (*?for) | Word in another language besides English or Spanish |
| (*?for pron) | Word similar to Spanish, but pronounced with pronunciation not English or Spanish. |
| (*?) | Word is indecipherable. |
| < xx > | Aside spoken to oneself or the researcher |

### 4.1.6 Data Coding

The coding of the data for the specific morphosyntactic elements of the PT hierarchy consisted of counting the PT structures produced by the learner as well as noting the contexts produced by the learner for PT structures. For example, participant 13 on the pre-test produced *unos flores* 'some flowers' once: *# # um un chica e (*?) recoge un fleur (*for) unos flores* 'um a girl e (*?) picks a flower some flowers'. This counts as a production of plural *–s* marking (*flores)* as well as number marking (*unos flores)*. Both obligatory contexts and production of number marking were counted. For example, P13 also produces several contexts where number marking is necessary, but left unmarked: *su abuelos es simpática no su abuelos son simpática # y contente…* 'her (sing) grandparents (plural) is (sing) nice(sing) no her (sing) grandparents (plural) are (plural) nice(sing) and happy (sing)'. In this case, P13 fails to mark *su* for plurality; these cases were counted as obligatory contexts for number marking. Another important consideration when coding the data involved interpreting words produced erroneously or in a foreign language.

If a word was pronounced incorrectly, but it was comprehensible, then it was included in the count. Words produced in a foreign language were excluded, even if the word could be comprehensible to a Spanish speaker. For example, several students who had studied French as a second language produced *fleur* 'flower' in French instead of '*flor'* 'flower' in Spanish; for example, Participant 13 in the example above varies between producing *fleur* and *flores*. Lastly, if a student reformulated a form or structures, the last form was always counted and the preceding ones disregarded. For example, on the post-test, Learner 10 produced the following utterance: *y # su madre es rubio rubia también.* 'and her mother is blonde (masculine) blonde (feminine) also.' In this case, the learner has corrected the gender of 'blonde' to agree with the subject 'mother'; the second use of blonde with the corrected gender was counted in the overall count.

#### 4.1.6.1 Coding for emergence

The data were also coded for learner stage on the pre-test, post-test and delayed post-test. The same criteria for stage emergence used in Study 1 was used in this study (see Chapter 3, Section 3.1.2). To reiterate briefly, for syntax, the emergence criteria is the following: a non-rote-learned structure is considered to have emerged if a minimum of four total contexts for the rule are also present (cf. Pienemann, 1998, p. 145; Jansen, 2008). To illustrate the emergence criteria for the syntax, P18 is considered to be at Stage 2, canonical word order. This participant produces seven clauses of the type SVX. For the next stage, XP-adjunction, the learner produces two utterances (*primero miro la televisión* 'first I watch television' and *normalmente eh voy con mi las amigos a la cine en sábados* 'normally I go with my friends to the movies on Saturdays'.) However, the learner produces no other contexts for XP-adjunction in his speech; that is, he produces no other

adverbs, wh-words, or prepositional phrases. Therefore, for this learner, Stage 2, canonical word order, is the furthest stage that is considered to have emerged. Some learners produced a sequence of two or three tokens of chunked questions such as these three questions produced by P15: *cómo es tu supermercado. cómo es la comida de España. cómo es la esc las escuelas* 'what is the supermarket like, what is the food of Spain like, what are the schools like'. In these cases, only the first utterance with the question word was counted as target word order in questions. For morphology, the criterion follows: a rule is considered to have emerged if it is used systematically and productively out of a total of at least four contexts. Evidence that a rule is being used systematically and productively is at least two of any of the following situations (Pallotti, 2007, p. 271, 375):

- Morphological minimal pairs
- Lexical variety
- Creative constructions

As in Study 1, production of types, not tokens, were counted. For example, many learners focused on describing *las flores* 'the flowers' repeatedly through the Little Red Riding Hood task. Only the first instance of *flores* was counted as an example of Stage 2 plural *–s* marking; likewise, only the first instance of *las flores* was counted as Stage 3 number marking.

To illustrate the emergence criteria for morphology, participant 21 produces 15 lexically varied instances of plural *–s,* which is sufficient to show emergence of Stage 2. She also marks plural *–s* on determiners or adjectives in 15 out of 18 contexts, which shows that she has acquired Stage 3. For Stage 4, marking of plural *–s* in predicative adjectives, participant 21 marks 4 out of 7 predicative adjectives with plural *–s*. Of the four predicative adjectives, participant produces a minimal pair: *amarillo 'yellow'* as a predicative adjective with no plural

marking and *amarillos* as a predicative adjective with plural marking. The other three predicative adjectives with plural *–s* marking are lexically varied (*pequeñas* 'small'*, rojas* 'red' and *grandes* 'big'*)* and are complemented by three singular predicative adjectives (*blanco* 'white', *alegre* 'happy', and *enfermo* 'sick'). Given that a sufficient number of contexts also exist, this participant is considered to be at Stage 4, plural *–s* marking. For the final stage, Stage 5, participant 21 produces two subordinate clauses that require the subjunctive, but no subjunctive marking: *es necesario que tú come comes la comida* 'it's necessary that you eat the food' and *también es necesario que tú haces lo las deportes* 'it's necessary that you play sports'. Therefore, Stage 5 is considered not acquired for this learner. If this learner had produced subjunctive marking according to the criteria stated above, as well as produced two more contexts for subjunctive marking, then this learner would have been considered to be at Stage 5.

### 4.1.7 Statistical procedures

Once the data were coded, the comparison of development of the various groups over the three tests was performed using various statistical procedures. As in Study 1, separate analyses were performed for the development of the syntax, morphology, or a combination of both.

The first three research questions address whether instruction aimed at the *next* or *next + 1* stage is effective at advancing learners past their current stage. This will be shown by comparing the development, as defined by increasing one or more stages in the PT hierarchy, of learners at the same stages in the groups, the Stage 4-instructed, Stage 5-instructed and the Control group. This comparison of stage gain will be done by performing the Chi-square test, which will show if the instructed groups are more likely to show stage increase than the control group. The benefit of instruction may also be illustrated by comparing the amount of PT

structures at each stage produced by the groups, which is the procedure used by Mackey (1999). The potential differences in amount of output of these structures will be statistically analyzed by comparing the mean ranks of higher-level structures produced for each of the three groups in the pre-test, post-test and delayed post-test using the Kruskal-Wallis test, which ranks the data then uses the Chi-square distribution to find any significant differences. Wilcoxon signed rank tests were also ran to compare the means within each group between the three tests.

In addition, in order to address research question #4, whether learners can 'skip' a stage, the stages of all learners will be plotted in a table for implicational scaling, a statistical procedure which was described in Study 1, in order to determine whether the hierarchical nature of the PT stages is maintained after instruction.

## 4.2 RESULTS

In this section, the results of the data analysis are presented. In Section 4.2.1, the overall stages in syntax and morphology for all participants are presented. In Section 4.2.2, the stage changes for learners at the same stages in each group are discussed for syntax and morphology separately. In Section 4.2.3, a comparison of the production frequency of structures at each PT stage (Stages 2,3,4, and 5) is made between learners at the same stages in the three groups in syntax and morphology separately.

When analyzing the results, several important considerations were made regarding the participants. While a total of 36 participated across all three groups, several separate analyses were performed using a sub-set of these participants. First, as described in Section 4.1.1, data were collected from two Control groups. These two groups were compared using the Mann-

Whitney tests, and no significant differences were found between the two groups on any measure. Therefore, these two groups were combined into one Control group ($n$=14) for the data analysis.

Next, 4 participants missed one day of instruction from the Stage 4 or Stage 5-instructed groups. One participant (Participant 10) from the Stage 4-instructed group missed the instruction on syntax and one (Participant 11) missed the instruction of morphology. Likewise, one participant from the Stage 5-instructed group (Participant 21) missed the session of instruction on syntax and another participant (Participant 22) missed instruction on morphology. Since separate analyses of the syntax and morphology were conducted, those participants who missed the instruction on the syntax were excluded when analyzing at the results from the syntax, but included when looking at the results from the morphology.

As mentioned in Section 4.1.1, the analysis of stage gains and production of syntax and morphology were performed by comparing learners at the same initial stages on the pre-test in order to pinpoint the precise target of instruction, whether the *next* stage, *next* + *x* stage, or an already acquired stage. To summarize, Table 15 shows the breakdown of participants' stages on the pre-test. In the sections that follow, the analyses of stage gains and production frequency will be based on comparing learners from the same stages: for example, stage gains and production frequency for all Stage 3 learners in syntax ($N$=17) will be compared by group, Stage-4 instructed ($n$=4), Stage-5 instructed ($n$=*6*) and Control ($n$=*7*).

**Table 15. Initial PT stages in syntax and morphology for each group**

| Initial stages on pre-test | Stage 4-instructed | Stage 5-instructed | Control group | Total |
|---|---|---|---|---|
| Syntax | | | | |
| Stage 1 | 0 | 0 | 0 | 0 |
| Stage 2 | 0 | 2 | 4 | 6 |
| Stage 3 | 4 | 6 | 7 | 17 |
| Stage 4 | 0 | 0 | 0 | 0 |
| Stage 5 | 3 | 2 | 2 | 7 |
| Stage 5 no 4 | 3 | 0 | 1 | 4 |
| **Total** | **10** | **10** | **14** | **34** |
| Morphology | | | | |
| Stage 1 | 0 | 2 | 3 | 5 |
| Stage 2 | 1 | 4 | 1 | 6 |
| Stage 3 | 9 | 3 | 10 | 22 |
| Stage 4 | 0 | 1 | 0 | 1 |
| Stage 5 | 0 | 0 | 0 | 0 |
| **Total** | **10** | **10** | **14** | **34** |

As reflected in Table 15, given that two participants from each experimental group, the Stage-4 instructed and the Stage-5 instructed, missed instruction on syntax as well as morphology, the total participants in each group for syntax is 10, as well as for morphology, which is one less than the total number of participants in each group. Although the groups varied in their initial stages, the majority of learners were at Stage 3 syntax ($n$=17) or morphology ($n$=22) on the pre-test, which is the stage at which learners were anticipated to be. In the following sections, the results will be presented as discussed above. First, a qualitative look at how several learners' production varied on the pre-test, post-test and delayed post-test is presented in order to exemplify how learners' production and stages changed over the three tests. Next, the overall stages for all participants on the pre-test, post-test, and delayed post-test are compared, followed

by an analysis of stages gains in syntax and/or morphology, production frequency, and finally, combined analysis of stage gains and production frequency.

### 4.2.1 Examples from the Production Tasks

Before presenting the quantitative analysis in the following sections, the results of several learners in the experimental groups will be discussed. To begin, Participant 3 from the Stage 4-instructed group, was a native English speaker and reported that she had studied Spanish for three years in high school. Like the majority of learners in Study 2, Participant 3 began the study at Stage 3 syntax and morphology. Examples from the story re-tell task for Participant 3 on the pre-test and delayed post-test follow in (38) and (39) respectively.

(38) Los plantas son verde. el lobo es muy mal.
The(pl) plants(pl) are green(sg). The(sg) wolf(sg) is very bad (sg).
'The plants are green. The wolf is very bad.'

(39) # # capercita roja es muy guapa. Vive en la ciudad muy pequeño. Los las casas son rojos y blancas.
Little Red Riding Hood is very pretty. Lives in the city very small. The(pl:masc) the (pl:fem) houses are red (pl:masc) and white (pl:fem).
'Little Red Riding Hood is very pretty. She lives in a very small city. The houses are red and white.'

In (38), Participant 3 shows a very basic word order as evident at Stages 2 and 3 syntax. She can mark plural *–s* on the pre-test as well as the determiner, but does not mark the predicative

adjective *verde* for plurality. On the delayed post-test, her syntax is similar to that on the pre-test, but she accurately marks plurality across the sentence, e.g. *rojos* and *blancos* match *casas* for plurality. The correct gender marking, however, clearly has not yet been acquired for *casas* as she marks *casas* with a masculine determiner, a masculine predicative adjective, and a feminine predicative adjective. The progress of Participant 3 in the Stage 4-instructed group reflects the general changes found for the instruction on syntax, that is, that instruction on syntax resulted in no significant differences between the instructed groups and the control group, neither in stage gains nor in production frequency. For example, on the pre-test, Participant 3 was at Stage 3 syntax (37 Stage 2 SVO structures, and 2 Stage 3 XP-adjunction structures). On the post-tests, she remained at Stage 3 with similar production of Stage 2 structures (32 and 39 respectively) and a slight increase at Stage 3 structures (4 on both post-tests). However, for morphology, this same participant reflects the general progress found for the Stage 4-instructed group; that is, instruction on Stage 4 morphology, interphrasal morphemes, for the Stage 3 learners led to them producing more Stage 4, 3 and 2 morphology. To illustrate, on the pre-test Participant 3 produced 5 plural *–s* structures, marked phrasal morphology in 5/5 contexts, and left interphrasal morphology unmarked in 6 contexts. On the post-test and delayed post-test, she marked plural *–s* 8 and 11 times respectively, and phrasal morphology in 9/9 contexts and 20/20 contexts. Interphrasal morphology, the topic of instruction, was marked twice in 7 and 6 contexts on the post-test and delayed post-test respectively. In sum, instruction for this Stage 3 learner resulted in a small increase in production of the instructed stage, Stage 4, as well as an important increase at contexts for and production of Stage 3. However, for stage gains, Participant 3 remained at Stage 3 syntax and morphology; that is, instruction on Stage 4 did not lead to this learner gaining Stage 4, although production of Stage 4 structures did increase slightly.

As for the Stage 5-instructed group, no differences were found for instruction on subordinate clauses, but instruction on the subjunctive did lead to two learners producing it on the post-test. For example, Participant 19 produced infinitive forms where the subjunctive is required on the pre-test, e.g. in (40), but produced the subjunctive in 4 out of 5 contexts on the post-test, for example in (41). This participant is a native speaker of English and had studied Spanish for four years in high school; she was also at Stage 5 syntax and Stage 3 morphology on the pre-test.

(40) es necesario que dormir para siete o ochas horas um cada noche.

Is necessary that sleep(inf) for seven or eight hours um each night.

'It is necessary to sleep seven or eight hours each night.'

(41) y es necesario que coma frutas y verduras.

And is necessary that (you) eat (subj) fruit and verduras.

'And it is necessary that you eat fruit and vegetables.'

Clearly, this participant was capable on the pre-test of producing an appropriate context for the subjunctive, but she tended to mark the subordinated verb in the infinitive or in the present tense instead of using subjunctive morphology. After instruction on how to form the subjunctive and the contexts in which it is used, this learner was able to mark it spontaneously on the oral tasks. As for other aspects of her morphology, production was largely similar between the three testing measures: plural *–s* was marked 28 and 26 times, phrasal morphemes 26/30 and 27/28, and interphrasal morphology 1/4 and 2/7 on the pre- and post-test respectively. In other words, this

participant was ready to acquire Stage 4, interphrasal morphology, but she did not acquire this stage on the post-test. Instead, instruction on the next + 1 stage, the subjunctive, led her to showing emergence of the subjunctive and skipping Stage 4 morphology. However, since she had already acquired all 5 stages of syntax, this is not considered counter-evidence to the implicational hierarchy. Still, since she had not acquired Stage 4 morphology and combined with the fact that another Stage 3 learner from the Stage 5-instructed group, i.e. the *next + 1* stage, also showed emergence of the subjunctive on the post-test, is not consistent with the claim of the Teachability Hypothesis that instruction must be targeted at the *next* stage in order to be effective. As the results are presented in the next sections, it will be shown that effects of instruction were found on production of the target structures, whether the *next*, as for Participant 3, or *next +1*, as for Participant 19. First, the stages for all participants on the pre-test, post-test and delayed post-test will be presented in the following sections.

### 4.2.2 Overall Stage Changes for All Participants

In this section, the stages of the learners from all groups have been collated into three implicational tables, i.e. one for each test, the pre, post, and delayed, with the purpose of establishing whether the PT stages are acquired in the order predicted and whether participants skipped any stages after instruction. The results for the pre-test are shown in Table 16. The stages of the syntax (S) and morphology (M) are separately listed in the table. As shown by the dotted line, if a learner had acquired either the syntax or the morphology, that stage is considered to have emerged.

**Table 16. Stages for all learners on the pre-test**

| Participant | Stage 2 | Stage 3 | Stage 4 | Stage 5 |
|---|---|---|---|---|
| 25 | S | - | - | - |
| 28 | S | - | - | - |
| 15 | S | - | - | - |
| 18 | S,M | - | - | - |
| 32 | S,M | - | - | - |
| 31 | S,M | - | - | - |
| 13 | S | S | - | - |
| 20 | S,M | S | - | - |
| 14 | S,M | S | - | - |
| 16 | S,M | S | - | - |
| 29 | S,M | S | - | - |
| 8 | S,M | S,M | - | - |
| 2 | S,M | S,M | - | - |
| 3 | S,M | S,M | - | - |
| 1 | S,M | S,M | - | - |
| 22 | S,M | S,M | - | - |
| 17 | S,M | S,M | - | - |
| 27 | S,M | S,M | - | - |
| 24 | S,M | S,M | - | - |
| 23 | S,M | S,M | - | - |
| 26 | S,M | S,M | - | - |
| 34 | S,M | S,M | - | - |
| 36 | S,M | S,M | - | - |
| 4 | S,M | S,M | - | **S** |
| 6 | S,M | S,M | - | **S** |
| 7 | S,M | S | - | **S** |
| 30 | S,M | S,M | - | **S** |
| 10 | S,M | S,M | S | - |
| 5 | S,M | S,M | S | S |
| 11 | S,M | S,M | S | S |
| 9 | S,M | S,M | S | S |
| 33 | S,M | S,M | S | S |
| 35 | S,M | S,M | S | S |
| 12 | S,M | S,M | S | S |
| 19 | S,M | S,M | S | S |
| 21 | S,M | S,M | S,M | S |

Overall, as seen in Table 16, syntax emerges before morphology when only one of the two has emerged; there are multiple learners at each stage who had only acquired the syntax of a given stage and not the morphology. In general, Stage 3 Syntax, Morphology, or both had emerged for

most of the participants (*n*=21). Some participants (*n*=6) were at Stage 2 Syntax or Syntax and Morphology. A number of participants (*n*=8) had already acquired Stages 4 and 5 Syntax, although only one participant (Participant 21) had acquired morphological marking above Stage 3. Four errors are present in the table; all of these errors come from four learners (Participants 4, 6, 7 and 30) who had acquired Stage 5 Syntax, but had not shown emergence of any Stage 4 morphological or syntactic structures. These learners all produced diverse structures at Stage 5 but did not produce Stage 4 structures. The C of R is .97, which shows that the table is reproducible. The C of S for this table is .86, from which it can be concluded that the implicational stages are indeed acquired in the order predicted by PT for these learners given that tables with a C of S higher than .6 is considered scalable. Table 17 shows the implicational table for the post-test.

As seen in Table 17, after the instructional session, only 13 participants are at Stage 3 Syntax or Syntax and Morphology. Seven participants remain at Stage 2 Syntax. Thirteen participants have now shown emergence of Stage 4 Syntax or Morphology. Two participants have shown emergence of Stage 5 morphology. Unlike in the pre-test, there are two cases where morphology has emerged before the syntax at Stage 4 (P24 and P7). Three errors remain in the table (Participants 30, 26, 22); as in the pre-test, these errors are emergence of Stage 5 syntax before any Stage 4 structures have emerged. The table is predictable (C of R, 0.98). As the C of S is .95, this table strongly validates the implicational sequence predicted by PT. These results show that instruction on higher-level stages 4 and 5 did not alter significantly the implicational sequence on the post-test. One learner (P22) from the Stage 5-instructed group did skip a stage after instruction; this participant was shown to be at Stage 3 Syntax and Morphology on the pre-test. At the post-test, Stage 5 syntax had emerged but not Stage 4. However, since one learner

(P26) from the Control group followed this same pattern, i.e. skipped Stage 4 between the pre-test and the post-test, it cannot be concluded that this pattern was due to the instructional sessions. Indeed, the pattern of Stage 5 emerging before Stage 4 seems to be an overall developmental pattern, given that this is the only error in the implicational table.

**Table 17. Stage for all learners on the post-test**

| Participant | Stage 2 | Stage 3 | Stage 4 | Stage 5 |
|---|---|---|---|---|
| 20 | S | - | - | - |
| 18 | S,M | - | - | - |
| 25 | S,M | - | - | - |
| 27 | S,M | - | - | - |
| 28 | S,M | - | - | - |
| 32 | S,M | - | - | - |
| 31 | S,M | - | - | - |
| 8 | S,M | S | - | - |
| 15 | S,M | S | - | - |
| 13 | S,M | S | - | - |
| 16 | S,M | S | - | - |
| 1 | S,M | S,M | - | - |
| 2 | S,M | S,M | - | - |
| 3 | S,M | S,M | - | - |
| 4 | S,M | S,M | - | - |
| 14 | S,M | S,M | - | - |
| 29 | S,M | S,M | - | - |
| 23 | S,M | S,M | - | - |
| 34 | S,M | S,M | - | - |
| 36 | S,M | S,M | - | - |
| 30 | S,M | S,M | - | **S** |
| 26 | S,M | S,M | - | **S** |
| 22 | S,M | S,M | - | **S** |
| 17 | S,M | S,M | S | - |
| 24 | S,M | S,M | M | - |
| 10 | S,M | S,M | S,M | - |
| 9 | S,M | S,M | S | S |
| 11 | S,M | S,M | S | S |
| 33 | S,M | S,M | S | S |
| 35 | S,M | S,M | S | S |
| 21 | S,M | S,M | S,M | S |
| 7 | S,M | S,M | M | S |
| 5 | S,M | S,M | S,M | S |
| 6 | S,M | S,M | S,M | S |
| 19 | S,M | S,M | S | S,M |
| 12 | S,M | S,M | S | S,M |

The results from the delayed post-test are shown in Table 18.

**Table 18. Stage for all learners on the delayed post-test**

| Participant | Stage 2 | Stage 3 | Stage 4 | Stage 5 |
|---|---|---|---|---|
| 25 | S | - | - | - |
| 31 | S,M | - | - | - |
| 13 | S,M | S | - | - |
| 15 | S,M | S | - | - |
| 2 | S,M | S,M | - | - |
| 3 | S,M | S,M | - | - |
| 8 | S,M | S,M | - | - |
| 1 | S,M | S,M | - | - |
| 17 | S,M | S,M | - | - |
| 24 | S,M | S,M | - | - |
| 32 | S,M | S,M | - | - |
| 16 | S,M | S | - | **S** |
| 26 | S,M | S,M | - | **S** |
| 7 | S,M | S,M | S | - |
| 14 | S,M | S,M | S | - |
| 23 | S,M | S,M | S,M | - |
| 5 | S,M | S,M | S | S |
| 22 | S,M | S,M | S | S |
| 12 | S,M | S,M | S | S |
| 4 | S,M | S,M | S | S |
| 11 | S,M | S,M | S | S |
| 9 | S,M | S,M | S | S |
| 10 | S,M | S,M | S,M | S |
| 6 | S,M | S,M | S,M | S |

First, as noted in Section 4.1.1 and illustrated in Table 18, only 24 students took the delayed post-test. Half of these students had acquired Stage 3 Syntax or Morphology on the delayed post-test; two participants were at Stage 2. Ten students showed emergence of either Stage 4 Syntax or Morphology. Seven students were found to be at Stage 5 Syntax, but no student had acquired Stage 5 morphology. There is evidence of syntax emerging before morphology at all stages. Two errors were found in the table of the same nature as the errors in the pre-test and the post-test; Stage 5 Syntax was found to emerge for these participants before Stage 4 Syntax or Morphology. The C of R is .98, and the C of S is .93.

In summary, in this section, the implicational hierarchy predicted by PT for syntax and morphology is shown to be upheld and valid before instruction, a week after instruction with the

post-test, and three weeks later with the delayed post-test. In response to Research Question 4, there is no evidence of learners skipping stages as a result of instruction. In addition, syntax was found to emerge before morphology across the board on the pre-test, post-test and the delayed post-test. The only two exceptions are two learners on the post-test who show evidence of Stage 4 morphology but not syntax. In the next section, detailed stage changes are presented for each group with separate analyses for syntax and morphology.

### 4.2.3 Stage Changes by Group

The question of whether the learners that received instruction on Stages 4 and 5 syntax and morphology showed stage gains on the post-test or the delayed post-test are presented in this section. The first section looks at the syntax and morphology combined, and then the subsequent two sections discuss the stages gains in syntax and morphology separately.

#### 4.2.3.1 Syntax and Morphology

To begin, Table 19 details whether participants gained a stage or two from the pre-test to the post-test, from the pre-test to the delayed post-test, or from the post-test to the delayed post-test when combining the results from the syntax and the morphology. This table includes all participants at all stages in order to first present a general picture of stage gains for all learners, including the four participants who missed instruction on syntax or morphology, in order to show that these participants may have gained a stage in syntax even if they missed instruction on morphology. If a participant gained one stage or more than one stage in either syntax or morphology, they were given a score of one. If they did not gain a stage or regressed one or more

stages, they were given a zero. Table 19 shows the total number of participants who gained one or more stages in each group followed by the breakdown of where the gains were made between the tests.

**Table 19. Stage gains in syntax and morphology**

| Test Range | Treatment groups | | |
|---|---|---|---|
| | **Stage 4-instructed** | **Stage 5-instructed** | **Control group** |
| *Pre-Post* | 2/11 (18%) | 3/11 (27%) | 3/14 (21%) |
| *Pre-Delayed* | 4/11 (36%) | 4/7 (57%) | 3/6 (50%) |
| *Post-Delayed* | 2/11 (18%) | 3/7 (43%) | 1/6 (17%) |

As shown in Table 19, between 1 and 4 participants gained stages for each group among the three combinations of tests. Chi-square analyses showed no significant differences between group and stage gain on the pre- to post-test, $\chi^2$ (2, $N$ = 36) = 0.27, $p$ = .50, pre-to delayed post-test, $\chi^2$ (2, $N$ = 36) = 0.8, $p$ = .45 or the post- to delayed post-tests $\chi^2$ (2, $N$ = 36) = 1.69, $p$ = .36. In summary, while several learners in each group did gain stages over time, there was no relationship between the instruction and stage gains. In the next two sections, stage gains made in syntax or morphology for learners at the same stages are discussed.

#### 4.2.3.2 Syntax

This section shows whether participants gained stages in syntax. Table 20 shows the total number of participants who began the study at Stage 2 ($N$=6) and whether they gained one or more stages during the experimental period between any of the three tests. Only results from the Stage 5-instructed group and Control group are shown as no learner from the Stage 4-instructed group began the study at Stage 2.

**Table 20. Stage gains in syntax by learners at Stage 2**

| Test Range | Treatment groups | |
|---|---|---|
| | **Stage 5-instructed** | **Control** |
| Pre-Post | 1/2 (50%) | 0/4 (0%) |
| Pre-Delayed | 1/1 (100%) | 1/3 (33%) |
| Post-Delayed | 0/1 (0%) | 1/3 (33%) |

For the two learners at stage 2 who received instruction on Stage 5, i.e. the next + 2 stage, one made gains from the pre-test to the post-test, and one from the pre-test to the delayed post-test. Likewise, one learner in the Control group gained one stage. Chi-square tests showed no significant differences between the groups on any of the three comparisons: pre to post ($\chi^2$ (1, $N$ = 6) = 2.4, $p$ = .33), pre to delayed ($\chi^2$ (1, $N$ = 4) = 1.3, $p$ = 1.00), or post to delayed $\chi^2$ (1, $N$ = 4) = 0.4, $p$ =1.00). Table 21 shows learners ($N$=17) who began the study at Stage 3.

**Table 21. Stage gains in syntax by learners at Stage 3**

| Test Range | Treatment groups | | |
|---|---|---|---|
| | **Stage 4-instructed** | **Stage 5-instructed** | **Control** |
| Pre-Post | 0/4 (0%) | 2/6 (33%) | 1/7 (14%) |
| Pre-Delayed | 0/4 (0%) | 3/5 (60%) | 2/3 (67%) |
| Post-Delayed | 0/4 (0%) | 3/5 (60%) | 1/3 (33%) |

Of the learners at Stage 3 on the pre-test that were taught the next stage, Stage 4, none made stage gains. However, of the six learners at Stage 3 on the pre-test in the Stage 5-instructed group, i.e. the *next + 1* stage, some learners (*n=3*) gained the next stage. However, no significant differences were found between the three groups between any of the testing measures through Chi-square tests: pre to post ($\chi^2$ (2, $N$ = 17) = 1.9, $p$ = .28), pre to delayed test ($\chi^2$ (2, $N$ = 12) = 4.3, $p$ = .08), or post to delayed post-test ($\chi^2$ (2, $N$ = 12) = 3.6, $p$ = .08).

The next analysis would concern the learners who began the study at Stage 4 syntax. However, there was only one learner who began at Stage 4 syntax, and she missed the instruction for syntax, therefore we will not discuss this case and move on to learners who were at Stage 5 on the pre-test. Nine participants began the study at Stage 5 syntax; these participants are excluded from the analysis in this section given that they could not gain any more stages. However, four learners who began the study at Stage 5 syntax had not acquired Stage 4 syntax, the results of which are discussed next. Table 22 shows how many of these learners gained stages, i.e. Stage 4, by group.

**Table 22. Stage gains in syntax by learners who were at Stage 5 but had not reached Stage 4**

| Test Range | Treatment groups | |
|---|---|---|
| | **Stage 4-instructed** | **Control** |
| Pre-Post | 1/3 (33%) | 0/1 (0%) |
| Pre-Delayed | 2/3 (66.7%) | N/A |
| Post-Delayed | 3/3 (100%) | N/A |

Of the four learners who had Stage 5 but not Stage 4, one was in the control group, while the other three were in the group that received instruction on Stage 4. That these four participants apparently skipped Stage 4 is counter-evidence to the implicational stages of PT. However, all three of these learners acquired Stage 4 after instruction by the delayed post-test. The issue of why Stage 4 was not acquired before Stage 5 for several participants will be discussed further in the Discussion (Section 4.3.3).

To sum up this section, there were no significant differences between the experimental and control groups in stage gains after instruction on stages 4 or 5 syntax. However, of the learners that began the study at Stage 3, as illustrated in Table 21, it is true that most that were taught Stage 5, i.e. the next + 1 stage, did gain the next stage, while those that were taught the

next stage, Stage 4, did not gain any stages. However, those in the Control group did also gain stages, therefore it cannot be determined that the gains were due to instruction only.

#### 4.2.3.3 Morphology

As for morphology, the students were more uniform in beginning stage: students began the study at either Stage 2 or Stage 3. Table 23 shows the stage changes over the three tests for those students that began the study at Stage 2.

**Table 23. Stage gains in morphology by learners at Stage 2**

| Test Range | Treatment groups | | |
|---|---|---|---|
| | **Stage 4-instructed** | **Stage 5-instructed** | **Control** |
| Pre-Post | 1/1 (100%) | 1/4 (25%) | 1/1 (100%) |
| Pre-Delayed | 1/1 (100%) | 1/2 (50%) | N/A |
| Post-Delayed | 1/1 (100%) | 2/2 (100%) | N/A |

Across all three groups, these learners that began the study at Stage 2 gained a stage or two regardless of instruction, e.g. 1 in the Stage 4-instructed group from the pre-test to the post-test and 2 in the Stage 5-instructed group from the post-test to the delayed post-test. Chi-square analyses showed no significant differences between the groups in terms of stage gain and test range: pre to post ($\chi^2$ (2, $N$ = 6) = 3.0, $p$ = .20), or pre to delayed test ($\chi^2$ (2, $N$ = 3) = 0.8, $p$ = 1.00).

Most of the participants began the study at Stage 3 morphology. Table 24 shows the stage gains in morphology for these learners.

**Table 24. Stage gains in morphology by learners at Stage 3**

| Test Range | Treatment groups | | |
|---|---|---|---|
| | **Stage 4-instructed** | **Stage 5-instructed** | **Control** |
| Pre-Post | 3/9 (33%) | 2/3 (67%) | 1/10 (10%) |
| Pre-Delayed | 2/9 (22%) | 0/2 (0%) | 1/4 (25%) |
| Post-Delayed | 0/9 (0%) | 0/2 (0%) | 1/4 (25%) |

Several learners at Stage 3 gained stages whether instructed on Stage 4 (*n=3*) or Stage 5 (*n=2*). One participant in the Control group also made stage gains. No significant differences were found between the groups on the pre to delayed test ($\chi^2$ (2, $N$ = 15) = 0.59, $p$ = .67), or post to delayed ($\chi^2$ (2, $N$ = 15) = 2.9, $p$ = .40). The groups were significantly different between the pre to post ($\chi^2$ (2, $N$ = 22) = 4.0, $p$ = .05), but post-hoc Mann-Whitney tests showed no differences between the groups.

#### 4.2.3.4 Summary of Stage Changes

To sum up the analysis of stage changes, while many of the participants in this study did show gains in PT stages during the experimental period, no significant differences were found between the experimental groups and the control group. In general, the results in this section point to no relationship between instruction and stage gain on the post-test or the delayed post-test. In other words, in regards to research questions 1 and 2, whether instruction on the *next* or *next + 1* stage can facilitate development, the answer is yes, given that learners in the Stage 4 and Stage 5-instructed group did advance in terms of stage gains. However, given that learners in the Control group also advanced, it cannot be determined that instruction itself facilitated the stage gains. Overall, although the groups that were instructed on subsequent stages did show stage gains, no apparent advantage was found for instruction focused at either the *next* or *next + 1* stage given

that no statistical differences were found between the groups on either of the two post-tests in terms of stage gains.

In the next section, the overall production of PT structures will be compared by group. This analysis will allow for a comparison of the means of the higher-level structures in order to determine whether instruction targeted at certain structures was effective at aiding learners to produce these structures. While PT is based on the idea of analyzing emergence of structures in order to determine that a given stage is processable, a token count of production of the structures can also provide insight into whether the participants produced a greater amount of higher-level structures after instruction which can speak to how learners continue to evolve after emergence of a stage (Mackey, 1995; Kawaguchi & Di Biase, in press).

### 4.2.4 Overall Production of PT Structures

In this section, the analysis of the overall production of PT structures are presented in order to address the question of whether learners produced a greater number of higher-level structures after instruction on either Stage 4 or Stage 5. Since all datasets were found to be non-normal (Kolmogorov–Smirnov test for normality), non-parametric statistical procedures were used to find significant differences among the data. To compare means between the groups, the Kruskal-Wallis test was used, a test comparable to the parametric one-way analysis of variance (ANOVA). Post-hoc tests were performed using the Mann-Whitney test, a non-parametric version of the t-test. To compare the means within each group between the three tests (pre, post and delayed), Wilcoxon signed-rank tests were performed, which is comparable to the parametric paired t-test.

The results for the production of the syntax are presented first, followed by the morphology. Results are presented for learners who began the study at each stage (2, 3, 4, or 5) separately.

#### 4.2.4.1 Syntax

The overall production of the PT structures on the pre-test, post-test and delayed post-test for the syntax is presented in this section for learners at the same initial stage in each of the three treatment groups. If the total number of participants across all three groups to be compared is less than 10, the results for all participants are given. If more than 10 participants are being compared, means and standard deviations are presented, and statistical tests were performed.

##### *Stage 2 (SVO) learners*

Six participants began the study at Stage 2 (SVO) on the pre-test, 2 from the Stage 5-instructed group and 4 from the Control group. The production at the four stages over the three tests is presented in Table 25.

**Table 25. Production of syntax for Stage 2 learners**

| PT structures | Treatment groups | | | | | |
|---|---|---|---|---|---|---|
| | Stage 5-instructed | | Control | | | |
| **SVO** | **P15** | **P18** | **P25** | **P28** | **P31** | **P32** |
| Pre | 30 | 6 | 27 | 6 | 22 | 8 |
| Post | 20 | 7 | 23 | 6 | 34 | 11 |
| Delayed | 44 | - | 17 | - | 24 | 22 |
| **TOP** | | | | | | |
| Pre | 1 | 0 | 0 | 0 | 0 | 0 |
| Post | 4 | 2 | 0 | 1 | 1 | 0 |
| Delayed | 5 | - | 0 | - | 1 | 4 |
| **SV-INV** | | | | | | |
| Pre | 0 | 0 | 0 | 0 | 0 | 0 |
| Post | 0 | 0 | 0 | 0 | 0 | 2 |
| Delayed | 0 | - | 0 | - | 0 | 0 |
| **SUB-CL** | | | | | | |
| Pre | 0 | 0 | 0 | 0 | 0 | 0 |
| Post | 0 | 0 | 0 | 0 | 0 | 1 |
| Delayed | 1 | - | 0 | - | 0 | 3 |

*Note.* The shaded areas indicate the stage that was the topic of instruction for the experimental groups.

Overall, after instruction, participants 15 and 18 from the Stage 5-instructed group did show an increase in Stage 3 structures, from 1 to 5 for Participant 15 and 0 to 2 for Participant 18. All three participants in the Control group also showed some increases at Stage 3 structures, especially by Participant 32 from 0 on the pre-test to 4 on the delayed post-test. In fact, both Participants 15 and 32 increased production of Stage 3 structures on the delayed post-test, while production by the other participants remained similar. In general, the effect of instruction on Stage 5 structures, in other words, the next + 2 stage, did not lead to students producing that structure; instead, they continued to produce more Stage 2 structures as well as began to produce Stage 3 structures, a progression which was similar to that of the Control group.

### *Stage 3 (Topicalization) learners*

Most learners ($n$=17) began the study at Stage 3 as demonstrated on the pre-test. The means and standard deviations for participants at Stage 3 in the three groups for all four stages are presented in Table 26.

**Table 26. Production of syntax for Stage 3 learners**

| **Treatment group** | **PT structures** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Stage 4-instructed Group** | **SVO (Stage 2)** | | **TOP (Stage 3)** | | **SV-INV (Stage 4)** | | **SUB-CL (Stage 5)** | |
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| Pre *n*=4 | 39.3 | 10.8 | 5.8 | 3.3 | 0.3 | 0.5 | 0.8 | 1.0 |
| Post *n* =4 | 29.3 | 17.4 | 5.5 | 1.9 | 0 | 0 | 0 | 0 |
| Delayed *n* =4 | 38.8 | 13.9 | 9.8 | 7.3 | 0.5 | 0.8 | 0.5 | 1 |
| **Stage 5-instructed Group** | **SVO (Stage 2)** | | **TOP (Stage 3)** | | **SV-INV (Stage 4)** | | **SUB-CL (Stage 5)** | |
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| Pre *n* =6 | 23.8 | 12.6 | 5.5 | 4.3 | 0.3 | 0.8 | 0.5 | 1.2 |
| Post *n* =6 | 21 | 6.7 | 6 | 3.9 | 0.2 | 0.4 | 1.7 | 2.1 |
| Delayed *n* =5 | 23.8 | 13.2 | 9.4 | 6.7 | 1.4 | 1.3 | 2.6 | 3.7 |
| **Control** | **SVO (Stage 2)** | | **TOP (Stage 3)** | | **SV-INV (Stage 4)** | | **SUB-CL (Stage 5)** | |
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| Pre *n* =7 | 37 | 10.6 | 8.4 | 6.1 | 0.1 | 0.4 | 0.9 | 0.7 |
| Post *n* =7 | 22.4 | 12.7 | 5.7 | 4.8 | 0.3 | 0.5 | 1.3 | 2.6 |
| Delayed *n* =3 | 31 | 6.9 | 9.3 | 3.2 | 0.7 | 1.2 | 2.7 | 3.8 |

*Note.* The shaded areas indicate the stage that was the topic of instruction for the experimental groups.

Table 26 shows that the Stage 4-instructed group received instruction on the next stage, SV-inversion, but showed minimal change in this structure on the post-tests: from 0.3 to 0 to 0.5 on the delayed post-test. Likewise, the Stage 5-instructed group showed some changes in mean

production of the instructed structure, the next + 1 stage, subordinate clauses: from 0.5 to 1.7 to 2.6. Kruskal-Wallis tests showed the only significant difference between the three groups to be SVO structures on the pre-test for the Stage 5-instructed group, $\chi^2$ (2, $N$ = 17) = 4.9, $p$ = .02. Post-hoc Mann-Whitney tests showed that Stage 5-instructed group produced significantly less Stage 2 structures on the pre-test than the Control group ($z$ = -1.79, $p$ = .04) and the Stage 4-instructed group ($z$ = -1.92, $p$ = .03). The Stage 5-instructed group continued to produce around the same amount of Stage 5 structures on the post-test and delayed post-test, as did the Stage 4 and Control groups, which shows that there were no major changes in production of Stage 5 structures as a result of the instruction. Overall, the group of learners at Stage 3 who were theoretically ready to acquire Stage 4 structures, showed no difference in production of Stage 4 structures after instruction on Stage 4, nor did the learners instructed on Stage 5 show differences in production at Stage 4 or 5.

To sum up, after the instructional sessions, the Stage 3 learners in the Stage 4 and Stage 5-instructed groups did not show significant changes in production. Given that the one learner who was at Stage 4 on the pre-test missed the instruction on syntax, the results of the learners who began the study at Stage 5, subordinate clauses, are presented next.

### *Stage 5 (subordinate clauses) learners*

A total of 7 participants from all three groups at the beginning of the study had already acquired all of the PT stages. Table 27 shows the production for these participants at each stage.

**Table 27. Production of syntax for Stage 5 learners**

| PT structures | Treatment groups | | | | | | |
|---|---|---|---|---|---|---|---|
| | Stage 4-instructed | | | Stage 5-instructed | | Control | |
| **SVO** | **P5** | **P9** | **P11** | **P12** | **P19** | **P33** | **P35** |
| Pre | 66 | 45 | 66 | 36 | 29 | 42 | 63 |
| Post | 56 | 41 | 62 | 22 | 27 | 37 | 46 |
| Delayed | 72 | 53 | 43 | 26 | - | - | - |
| **TOP** | | | | | | | |
| Pre | 11 | 17 | 19 | 8 | 23 | 3 | 12 |
| Post | 7 | 18 | 12 | 7 | 23 | 10 | 11 |
| Delayed | 15 | 17 | 25 | 9 | - | - | - |
| **SV-INV** | | | | | | | |
| Pre | 2 | 4 | 6 | 4 | 2 | 8 | 8 |
| Post | 1 | 3 | 4 | 1 | 2 | 4 | 2 |
| Delayed | 3 | 10 | 6 | 3 | - | - | - |
| **SUB-CL** | | | | | | | |
| Pre | 6 | 9 | 6 | 10 | 10 | 3 | 5 |
| Post | 12 | 9 | 7 | 5 | 13 | 3 | 3 |
| Delayed | 14 | 5 | 7 | 6 | - | - | - |

*Note.* The shaded areas indicate the stage that was the topic of instruction for the experimental groups.

A look at the production between the three tests shows little change within the groups overall. On an individual level, Participant 9 did show a jump in production of Stage 4 structures from 4 to 3 to 10 on the delayed post-test, which suggests that the instruction on Stage 4 was beneficial for this learner. As for the Stage 5-instructed group, Participant 19 produced a similar amount of Stage 5 structures (10 and 13 on the pre-test and post-test), and Participant 12 declined in production of Stage 5 structures from 10 to 5 to 6. Overall, instruction on stages that these learners had already acquired had little effect on production amounts of the structures instructed.

### *Stage 5 no 4: Subordinate Clause but no SV-Inversion*

Three learners in the Stage 4-instructed group and one learner in the Control group showed emergence of Stage 5, but not Stage 4, on the pre-test, as well as one learner in the Control group. Results for these learners are shown in Table 28.

**Table 28. Production of syntax for Stage 5 no 4 learners**

| **PT structures** | **Treatment groups** | | | |
|---|---|---|---|---|
| | **Stage 4-instructed** | | | **Control** |
| **SVO** | **P4** | **P6** | **P7** | **P30** |
| Pre | 27 | 47 | 43 | 30 |
| Post | 23 | 50 | 39 | 36 |
| Delayed | 21 | 58 | 51 | - |
| **TOP** | | | | |
| Pre | 15 | 17 | 2 | 8 |
| Post | 9 | 21 | 15 | 8 |
| Delayed | 19 | 21 | 17 | - |
| **SV-INV** | | | | |
| Pre | 0 | 0 | 0 | 0 |
| Post | 0 | 1 | 0 | 0 |
| Delayed | 3 | 5 | 2 | - |
| **SUB-CL** | | | | |
| Pre | 5 | 10 | 3 | 12 |
| Post | 2 | 10 | 5 | 7 |
| Delayed | 3 | 11 | 2 | - |

*Note.* The shaded areas indicate the stage that was the topic of instruction for the experimental groups.

As seen in Table 28, the Stage 4-instructed group did not produce any Stage 4 clauses on the pre-test; however, after instruction on Stage 4, Participant 6 produced one of these structures on the post-test, but by the delayed post-test, all three participants produced a total of 10 Stage 4 structures. In comparison, one participant in the Control group did not produce any Stage 4, SV-inversion, structures on the post-test. In this case, instruction on Stage 4 to these learners in the Stage 4-instructed group did result in production of these structures on the post-test and delayed post-test.

### *Summary of Production of Syntax*

The analysis of the production at each stage for each of the three groups in this section aimed to address whether instruction on the *next* stage, presumed to be Stage 4, or the *next + 1* stage, presumed to be Stage 5, was effective at aiding learners to produce higher-level structures. In actuality, several different teaching conditions resulted given that participants were either at lower or higher stages than the targets of instruction. Table 29 summarizes at which stage the instruction was actually directed and the resulting effect of instruction.

**Table 29. Target and effect of instruction for syntax**

| **Target of instruction** | **Initial stage of learners** | | | |
|---|---|---|---|---|
| | **Stage 2 learners (*n*=6)** | **Stage 3 learners (*n*=17)** | **Stage 5 learners (*n*=7)** | **Stage 5 no 4 learners (*n=4)*** |
| Next stage | - | No sig. changes | - | - |
| Next + 1 stage | - | No sig. changes | - | - |
| Next + 2 stage | No sig. change | - | - | - |
| 'Skipped' stage | - | - | - | Instructed learners acquired the skipped stage, Stage 4 on delayed post-test. |
| Already acquired stage | - | - | No sig. change | - |

Overall, instruction on the *next, next* +1, or *next + 2* stage of syntax had no effect on production of these items. For the learners who had already acquired the instructed stages 4 or 5, instruction had no effect. The only area where instruction showed an effect on production for learners who had not acquired the stage instructed was for those learners who had 'skipped' stage 4. These learners showed gains at Stage 4 on the delayed post-test.

In sum, regarding the research questions of this study, the analysis of production of the five stages of syntax demonstrated little effect of instruction. The first two research questions are whether instruction on the *next* or *next + 1* stage can facilitate development. As shown in Table 29, the learners who were taught the *next* or *next + 1* stage did not change in terms of production of these items. This shows that readiness was not a predictor of learners' advancement. Instruction on Stage 4 syntax was beneficial for the learners who had already acquired Stage 5 structures but not Stage 4, but not beneficial to the *ready* learners who were at Stage 3. Given that the Stage 4 syntax and target word order involve marked structures that are governed by variable pragmatic and semantic rules often dependent on the context, it is not altogether surprising that only the more advanced learners, i.e. the Stage 5 learners, were capable of acquiring this rule in this context. At the same time, it is likely that the lack of development at Stage 4 syntax may be due to the overall low occurrence of these structures in learner output compared to the other PT syntactic structures. As for the third research question, whether instruction at the *next* or *next + 1* stage is more effective, the answer so far is that neither appeared to have an effect on either syntax production or stage gain for this group of learners. The theoretical implications of these results will be considered in Section 4.3.

#### 4.2.4.2 Morphology

The overall production of the PT structures for the morphology is presented in this section for each of the three groups on the pre-test, post-test and delayed post-test. The analysis for the target structures was based on the actual production, the obligatory contexts for the structure, and the percentage of production out of total contexts. For each stage, the total overall production is presented followed by total contexts and / or percentages for that stage only if significant differences were found between the groups. As for the analysis of the syntax production, results

are presented by separating learners by their initial stage in morphology, starting with those that began the study at Stage 1.

### *Stage 1 (lexical items) learners*

Five learners began the study at Stage 1, two from the Stage 5-instructed group and 3 from the Control group as shown in Table 30.

**Table 30. Production of morphology for Stage 1 learners**

| PT structures | Treatment groups | | | | |
|---|---|---|---|---|---|
| | Stage 5-instructed | | Control | | |
| | **P13** | **P15** | **P25** | **P28** | **P32** |
| **Plural -*s*** | | | | | |
| Pre | 3 | 3 | 1 | 2 | 2 |
| Post | 6 | 6 | 5 | 8 | 4 |
| Delayed | 7 | 5 | 2 | - | 5 |
| **NP-Agr** | | | | | |
| Pre | 1 | 1 | 0 | 0 | 1 |
| Post | 3 | 1 | 0 | 2 | 3 |
| Delayed | 3 | 3 | 1 | - | 6 |
| **PO-Agr** | | | | | |
| Pre | 0 | 0 | 0 | 0 | 0 |
| Post | 0 | 0 | 0 | 0 | 0 |
| Delayed | 0 | 0 | 0 | - | 0 |
| **SUBJ** | | | | | |
| Pre | 0 | 0 | 0 | 0 | 0 |
| Post | 0 | 0 | 0 | 0 | 0 |
| Delayed | 0 | 0 | 0 | - | 0 |

*Note.* The shaded areas indicate the stage that was the topic of instruction for the experimental groups.

These learners showed small increases in production, e.g. from 3 to 6 for Participant 7, across the board on Stage 2 plural *–s* on the post-test, a change which was for the most part maintained in the delayed post-test. Slight increases in production of Stage 3, number marking, structures were also found on the post-test and delayed post-test for both groups, e.g. from 1 to 3 to 6 Stage 3 NP-agreement structures for Participant 32 in the Control group. Overall, instruction on Stage 5, the next + 3 stage, had no important effects on production of higher level structures for the Stage

5-instructed group, given that both the Stage 5-instructed group and the Control group showed similar increases in production at the next stages, Stage 2 and 3 on the post-test and the delayed post-test.

### *Stage 2 (Plural –s) learners*

Table 31 shows the production of all five stages by learners from the three groups that began the study at Stage 2.

**Table 31. Production of morphology for Stage 2 learners**

| PT structures | Treatment groups | | | | | |
|---|---|---|---|---|---|---|
| | Stage 4-instructed | | Stage 5-instructed | | Control | |
| | P7 | P14 | P16 | P18 | P20 | P29 |
| **Plural -*s*** | | | | | | |
| Pre | 14 | 8 | 9 | 2 | 6 | 7 |
| Post | 12 | 11 | 9 | 6 | 2 | 7 |
| Delayed | 14 | 10 | 12 | - | - | - |
| **NP-Agr** | | | | | | |
| Pre | 3 | 2 | 2 | 1 | 1 | 3 |
| Post | 10 | 7 | 3 | 4 | 1 | 5 |
| Delayed | 10 | 6 | 4 | - | - | - |
| **PO-Agr** | | | | | | |
| Pre | 1 | 2 | 0 | 0 | 0 | 0 |
| Post | 4 | 3 | 0 | 0 | 0 | 0 |
| Delayed | 2 | 4 | 0 | - | - | - |
| **SUBJ** | | | | | | |
| Pre | 0 | 0 | 0 | 0 | 0 | 0 |
| Post | 0 | 0 | 0 | 0 | 0 | 0 |
| Delayed | 0 | 0 | 0 | - | - | - |

*Note.* The shaded areas indicate the stage that was the topic of instruction for the experimental groups.

Table 31 shows that the learners at Stage 2 did not make great gains in Stage 4 or Stage 5 structures, predicative agreement or subjunctive marking: e.g. Participant 14 in the Stage 4-instructed group produced 2 Stage 4 PO-agreement structures on the pre-test, and 3 and 4 on the

post-test and delayed post-test respectively. Participant 18 in the Stage 5-instructed group showed little change at Stage 3 NP-agreement (2 to 3 to 4) and produced no Stage 5 morphology. However, Participant 7 in the Stage 4-instructed group tripled production of Stage 3 structures, noun phrase agreement, on the post-test and maintained it on the delayed post-test. Slight increases were found at Stage 2 and Stage 3 structures for the learners in the Stage 5-instructed group, but no learner produced the Stage 5 structures that were taught during the instructional period. Participant 29 from the Control showed little change from the pre-test to the post-test. Overall, descriptively, P7 did produce more of the *next* and *next + 1* structures after instruction on the *next* + 2 level.

### *Stage 3 (NP-agreement) learners*

Most participants (*n*=22) began the study at Stage 3. Table 32 shows the means and standard deviations for production at all stages by the three groups.

**Table 32. Production of morphology for Stage 3 learners**

| **Treatment groups** | **PT structures** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Stage 4-instructed** | **PL –S (Stage 2)** | | **NP-AGR (Stage 3)** | | **PO-AGR (Stage 4)** | | **SUBJ (Stage 5)** | |
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| Pre *n=9* | 14.7 | 7.6 | 13.3 | 9.6 | 0.8 | 1.1 | 0 | 0 |
| Post *n=9* | 14.3 | 8.3 | 15.1 | 12.4 | 3.7 | 4.2 | 0 | 0 |
| Delayed *n=9* | 18.3 | 9.0 | 20.7 | 11.2 | 2.4 | 3.1 | 0 | 0 |
| **Stage 5-instructed** | **PL –S (Stage 2)** | | **NP-AGR (Stage 3)** | | **PO-AGR (Stage 4)** | | **SUBJ (Stage 5)** | |
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| Pre *n=3* | 16.3 | 10.7 | 14 | 10.6 | 0.7 | 0.6 | 0 | 0 |
| Post *n=3* | 16 | 8.7 | 14.7 | 10.8 | 2 | 0 | 2.3 | 2.1 |
| Delayed *n=2* | 15 | 4.2 | 10.5 | 0.7 | 2.5 | 0.7 | 0 | 0 |
| **Control** | **PL –S (Stage 2)** | | **NP-AGR (Stage 3)** | | **PO-AGR (Stage 4)** | | **SUBJ (Stage 5)** | |
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| Pre *n=10* | 10.8 | 5.5 | 9.9 | 8.0 | 1.1 | 1.7 | 0 | 0 |
| Post *n=10* | 10.5 | 4.1 | 10.4 | 6.9 | 1.4 | 1.8 | 0 | 0 |
| Delayed *n=4* | 10.8 | 4.0 | 9.5 | 6.2 | 2 | 2.2 | 0 | 0 |

*Note.* The shaded areas indicate the stage that was the topic of instruction for the experimental groups.

Kruskal-Wallis tests showed significant differences between the groups on several measures. First, the means for subjunctive production were significantly different on the post-test ($\chi^2$ (2, $N$ = 22) = 13.27, $p$ = .01). Post-hoc Mann-Whitney tests showed the differences to be between the Stage 4-instructed group and the Stage 5-instructed group ($z$ = -2.56, $p$ = .05) and the Stage 5 and the *Control* group ($z$ = -2.69, $p$ = .04). This shows that instruction on the subjunctive, the *next* +

*1* stage, was effective in the short-term at correctly marking the subjunctive, although these gains disappear by the time of the delayed post-test.

Kruskal-Wallis tests also showed significant differences between the groups on the delayed post-test for NP-agreement production ($\chi^2$ (2, $N$ = 15) = 4.06, $p$ = .03) as well as NP-agreement contexts ($\chi^2$ (2, $N$ = 15) = 3.66, $p$ = .03). Post-hoc Mann-Whitney tests showed the differences to be between the Stage 4-instructed group and the Control group ($z$ = -1.78, $p$ = .04) for NP-agreement production and the Stage 4-instructed group and the Control group ($z$ = -1.78, $p$ = .04) for the contexts. This shows that instruction on Stage 4, the next stage, was not immediately evident, but changes were found one month later on the delayed post-test.

The only group that showed significant change over time is the Stage 4-instructed group on several of the stages. Wilcoxon signed rank tests showed that the Stage 4-instructed group changed significantly between the three testing measures on production and contexts for plural –*s*, NP-agreement and predicative object agreement, as shown in Table 33.

**Table 33. Significant differences in production for the Stage 4-instructed group**

| **PT structures** | **Test range** | | |
|---|---|---|---|
| | **Pre-Post** | **Pre-Delayed** | **Post-Delayed** |
| *Plural –s* | | | $z$ = -2.26, $p$ = .01 |
| *NP-Agreement production* | | $z$ =-2.11, $p$= .02 | $z$ =-2.32, $p$= .01 |
| *NP-Agreement contexts* | | $z$ =-2.02, $p$= .02 | $z$ =-2.32, $p$= .01 |
| *PO-Agreement production* | $z$ =-2.12, $p$= .02 | $z$ =-1.75, $p$= .06 | |

Overall, as demonstrated in Table 33, participants in the Stage 4-instructed group did produce more plural *–s* items, NP-agreement and PO-agreement after instruction on Stage 4 structures. This change was most prominent on the delayed post-test for plural *–s* and NP-agreement. The increase in production of Stage 4, PO-agreement structures, was evident immediately after instruction on the post-test and marginally significant between the pre-test and the delayed post-test. In sum, the instruction on the *next* or *next + 1* stage in morphology did result in changes in production of these items over time for the Stage 3 learners.

### *Stage 4* (PO-agreement) learners

Next, the production of one learner from the Stage 5-instructed group, Participant 21, is presented in Table 34. This learner is the only learner across all three groups who began the study at Stage 4 morphology; given that she did not take the delayed post-test, results are shown from the pre-test and post-test.

**Table 34. Production of morphology for one Stage 4 learner**

| Stage 2 | | | Stage 3 | | | Stage 4 | | | Stage 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pre | Post | Del. | Pre | Post | Del. | Pre | Post | Del. | Pre | Post | Del. |
| 19 | 15 | - | 19 | 15 | - | 5 | 4 | - | 0 | 0 | - |

*Note.* The shaded areas indicate the stage that was the topic of instruction for this learner.

Participant 21 showed a decline in production of Stage 3 and 4 structures, from 19 to 15 for Stage 3 and 5 to 4 for Stage 4. Production of the instructed structure resulted in no production on the post-test. This participant is the only one for whom subjunctive, Stage 5 morphology, was the next stage, but no effect of instruction is evident in Table 34.

### *Summary of Production of Morphology*

As the results in this section have shown, the actual stage that learners were taught varied depending on their initial stage on the pre-test. Table 35 summarizes which teaching condition resulted for the experimental groups, e.g. *next* or *next + 1,* and significant differences in production for those conditions.

**Table 35. Target and effect of instruction for morphology**

| **Target of instruction** | **Initial stage of learners** | | |
|---|---|---|---|
| | **Stage 1 learners (*n*=2)** | **Stage 2 learners (*n*=5)** | **Stage 3 learners (*n*=22)** |
| Next stage | - | | Sig. differences at Stages 2, 3 and 4 on the post-test and delayed post-test |
| Next + 1 stage | - | No sig. changes | Sig. differences at Stage 5 on the post-test |
| Next + 2 stage | - | No sig. changes | - |
| Next + 3 stage | No sig. changes | - | - |

Overall, the main two experimental conditions, that of instruction on the *next* or *next +1* stages of morphology, resulted in important differences between the instructed groups and the control group. Clearly, as demonstrated in Table 35, teaching the *next* and *next + 1* developmental stages resulted in the greatest changes in production over time. Given that the n-sizes were low for the conditions of teaching the *next + 2* and *next + 3* stages, little differences were found in

production for participants in these groups. The most important changes were found for the Stage 3 learners in the Stage 4-instructed group; they increased production of both the target stage structures, Stage 4, as well as stages they had already acquired, Stages 2 and 3. Given the implicational nature of Stages 2 to 4 of morphology (interphrasal < phrasal < lexical), it is seen that instruction of the most marked member of the trio, Stage 4, led to greater production of the less marked members, Stages 2 and 3.

Instruction on the *next + 1* stage, subjunctive morphology, resulted in the Stage 3 learners in the Stage 5-instructed group producing more subjunctive structures than the other groups, but this change was only seen on the post-test. Importantly, no other participants produced any subjunctive morphology on any of the tests, which suggests that instruction is essential at this level to producing subjunctive morphology. The other Stage 5 morphological structure predicted for L2 Spanish, inter-clausal marking, was not instructed, and only one learner produced any obligatory contexts for it: *es neceserio (*necesario) que ejerzizo (*ejercicio) y comer la comida bueno con los vegeta los vegetables (*eng) y las frutas y los otras um comida que no es um # que um bueno por um # uh health (*eng)* 'It's necessary that you exercise and eat good food with vegetables and fruits and other (plural) food (sing) that is (sing) um that um good (sing) for health.' (Participant 5). In this case, Participant 5 produces a relative clause that requires agreement: *los otras comida* and *bueno* should agree in gender and number. The noun is left unmarked for number, as is the adjective embedded in the relative clause, *bueno.*

Obligatory contexts for subjunctive morphology were also counted and compared between and within groups along with the production numbers. Obligatory contexts for the subjunctive were considered any contexts where the learner produced a phrase in the main clause that requires subjunctive in the subordinate clause, e.g. *es necesario que* 'it's necessary that',

with or without the obligatory complementizer *que.* No significant differences were found within or between the groups. This shows that learners in all three groups were producing these structures on the pre-test, post-test, and delayed post-test in similar amounts. In other words, in terms of structural requirements to produce the subjunctive, these learners were capable of spontaneously producing the *noun clause* + *que* + *verb* structure that is required for subjunctive morphology. Subjunctive morphology itself was rarely produced; learners varied in choice of morphology for the subordinated verb. Most participants used finite indicative forms with or without *que*: *yo recomiendo tú vas a partido de futból americano de Pittsburgh* 'I recommend you go to an American football game' (P24). Some learners also used a finite form in the subordinate clause: *y es necesario que beber mucho agua durante el día* 'it's necessary that to drink a lot of water during the day' (P33). As illustrated in Table 32, the only learners who produced subjunctive morphology appropriately in the subordinated clause were Stage 3 learners from the Stage 5-instructed group who were instructed on subjunctive morphology.

Overall, with regards to the research questions of this study, instruction on the *next* stage was effective at increasing learners' production of Stages 2,3 and 4 structures over time, while instruction on the *next + 1* stage showed only a small effect on the post-test. This result suggests that instruction was more effective when aimed at the *next* stage given that results were sustained through the delayed post-test. This result contrasts the results of the production of the syntax given that no effect of instruction on either the *next* or *next + 1* stages resulted in changes in production for the participants in this study. The theoretical implications of these results will be discussed in Section 4.3. In the next section, an analysis is presented of those participants who gained stages, as described in Section 4.2.2, and changes in their raw production, as reported in Section 4.2.3.

### 4.2.5 Stage Change and Production

Two analyses of learner production have been presented up to this point: that of stage gains and that of raw production of elements of the PT hierarchy. In this section, both analyses will be combined in order to present a descriptive analysis of the production of those who gained stages. Study 2 was designed around testing whether learners must be *ready* in order to acquire subsequent development stages, i.e. whether learners must be at the preceding developmental stage in order to continue to the next stage. But another important question is whether amount of production of the structures at the preceding or current stages is related to when a learner gains the next stage and not just whether stage attainment relates to when a learner can gain subsequent stages. An analysis of the raw production of those learners who gained stages may shed light on how much learners were producing at the preceding stage before gaining a stage, as well as how many higher-level structures they were producing on the post-test or delayed post-test, i.e. whether the target structures merely emerged or whether learners showed increased production of the structures in question. Such questions are important to several unanswered questions in PT theory, such as how learners proceed from the initial ability to produce a structure, i.e. emergence, to high production or automatization of a structure, to acquiring subsequent stages, to native-like usage of a structure (Kawaguchi & Di Biase, in press). A related question is whether advancement to the next stage depends on merely readiness as defined by the previous stage having emerged, or whether production can account for when learners advance to the next stage.

The analysis in this section consists of two parts. First, the production of all learners who gained any stages, regardless of their initial stage in syntax, will be presented in order to present

a descriptive analysis of how production at stages changed when a stage was gained. Second, a comparison using independent samples t-tests is presented with the intention of comparing production means of those who gained stages with those who did not. This statistical comparison will be limited to a comparison of learners who were at the same initial stage in order to allow for greater comparability of learners. As in line with the preceding analyses, first the results for syntax are presented, followed by morphology.

#### 4.2.5.1 Syntax

Table 36 shows the participants who gained one or more stages in syntax by group along with their production on the pre-test, post-test and delayed post-test for Stages 3, 4 and 5. The stages that were acquired are indicated by the shaded areas and the bolded text; to illustrate, it can be seen that Participant 15 gained Stage 3 on the post-test as indicated by the lack of shading and bold text for the pre-test and the presence of such enhancement for the post-test and delayed post-test.

**Table 36. Production of Stages 3, 4 and 5 syntax for learners who gained stages**

| Test range | PT structures | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Stage 3 structures | | | Stage 4 structures | | | Stage 5 structures | | |
| | Pre | Post | Delayed | Pre | Post | Delayed | Pre | Post | Delayed |
| **Stage 4-instructed** | | | | | | | | | |
| P4 | **15** | **9** | **19** | 0 | 0 | **3** | **5** | 2 | **3** |
| P6 | **17** | **21** | **21** | 0 | **1** | **5** | **10** | **10** | **11** |
| P7 | **2** | **15** | **17** | 0 | 0 | **3** | **3** | **5** | 2 |
| **Stage 5-instructed** | | | | | | | | | |
| P14 | **4** | **3** | **4** | 0 | 0 | **2** | 0 | 0 | 2 |
| P15 | 1 | **4** | **5** | 0 | 0 | 0 | 0 | 0 | 1 |
| P16 | **4** | **5** | **3** | 2 | 0 | 2 | 0 | 2 | **2** |
| P17 | **14** | **8** | **18** | 0 | **1** | 0 | 0 | 0 | 0 |
| P22 | **5** | **13** | **15** | 0 | 0 | **3** | 0 | **5** | **9** |
| **Control** | | | | | | | | | |
| P23 | **1** | **7** | **8** | 0 | 1 | **2** | 1 | 0 | 1 |
| P26 | **5** | **8** | **7** | 0 | 1 | 0 | 2 | **7** | **7** |
| P32 | 0 | 0 | **4** | 0 | 2 | 0 | 0 | 1 | 3 |

*Note.* The shaded areas and bolded text indicate that the stage was considered to be acquired.

As shown in Table 36, participants from all three groups gained Stage 4: 3 in the Stage 4-instructed group, 3 in the Stage 5-instructed group and 1 in the Control group. Overall, the stage gains made in syntax at Stage 4 correspond with emergence of Stage 4 structures, given that the numbers are low: from 1 Stage 4 structure to at most 5 by any one participant. Regarding Stage 5, two learners from the Stage 5-instructed group showed the stage to have emerged, although for Participant 16 the stage barely emerges (2 structures), while Participant 22 shows an increased productivity of subordinate clauses, the Stage 5 structure, on both the post-test and the delayed post-test. Likewise, Participant 26 from the Control group also showed a substantial increase in production of subordinate clauses on the post-test as well as the delayed post-test. The learners in the Stage 4-instructed group had already acquired Stage 5. In sum, the learners who gained the target stages, Stage 4 or 5, in general showed emergence of these structures; great gains in production were not made overall by these participants at either Stage 4 or Stage 5.

As to whether the amount of production at the preceding stages related to when learners gained or advanced to the next stage, Table 37 compares the production means of those learners that gained stages vs. those learners that did not. This analysis does not take into consideration the treatment group; instead, the goal is to learners who gained stages vs. those who did not. Independent sample t-tests were performed for the group of learners that began the study at Stage 3, as they are the only group of learners that included more than 10 participants.

**Table 37. Comparison of production means for Stage 3 learners that gained stages or not**

| **Test range** | **PT structures** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **SVO (Stage 2)** | | **TOP (Stage 3)** | | **SV-INV (Stage 4)** | | **SUB (Stage 5)** | |
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| **Pre** | | | | | | | | |
| Gain *(n=6)* | 25.2 | 13.0 | 5.5 | 4.4 | 0.3 | 0.8 | 0.5 | 0.8 |
| No Gain *(n=11)* | 37.1 | 10.9 | 7.5 | 5.2 | 0.2 | 0.4 | 0.8 | 1.0 |
| **Post** | | | | | | | | |
| Gain *(n=6)* | 22.5 | 9.5 | 7.3 | 3.4 | 0.5 | 0.5 | 2.3 | 3.0 |
| No Gain *(n=11)* | 24.1 | 13.5 | 4.9 | 3.8 | 0 | 0 | 0.5 | 0.9 |
| **Delayed** | | | | | | | | |
| Gain *(n=6)* | 26.8 | 11.9 | 9.2 | 6.0 | 1.5 | 1.2 | 3.5 | 3.6 |
| No Gain *(n=11)* | 34.3 | 14.1 | 9.8 | 6.0 | 0.3 | 0.5 | 0.3 | 0.8 |

Overall, no differences were found at any of the stages on any testing measure as determined through independent samples t-tests. In other words, the production levels were not different between these two groups, although one group did gain subsequent stages. Descriptively, however, the group that gained stages did have higher production means of Stage 3 structures on the post-test, e.g. 7.3 for those that gained stages compared to 4.9 for those that did not, and especially for Stage 5 structures on the post-test (2.3 compared to 0.5) and delayed post-test (3.5

and 0.3). In that case, there may be a tendency for production of syntax to increase once learners gain stages, although the statistical analysis did not confirm this. In the next section, the results of the same analyses performed for morphology are presented.

#### 4.2.5.2 Morphology

Table 38 shows the total production out of total contexts for Stage 2, 3 and 4 morphology by treatment group for those learners who gained a stage.

**Table 38. Production of Stage 2, 3 and 4 morphology for participants who gained a stage**

| Test range | PT structures | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Stage 2 structures | | | Stage 3 structures | | | Stage 4 structures | | |
| | Pre | Post | Delayed | Pre | Post | Delayed | Pre | Post | Delayed |
| **Stage 4-instructed** | | | | | | | | | |
| P5 | **10** | **22** | **32** | **11/16** | **33/36** | **33/36** | 0/2 | **6/8** | 3/19 |
| P6 | **26** | **28** | **29** | **27/28** | **33/41** | **37/45** | 1/22 | **6/7** | **8/8** |
| P7 | **14** | **12** | **14** | 3/9 | **10/15** | **10/17** | 1/1 | **4/11** | 2/7 |
| P10 | **13** | **9** | **7** | **17/18** | **12/12** | **10/10** | 3/7 | **13/15** | **7/7** |
| **Stage 5-instructed** | | | | | | | | | |
| P12 | **14** | **10** | **18** | **10/12** | **7/7** | **10/10** | 0/1 | 2/2 | 3/4 |
| P13 | 3 | **6** | **7** | 1/3 | 3/6 | 3/4 | 0/4 | 0/4 | 0/6 |
| P14 | **8** | **11** | **10** | 2/7 | **7/12** | **6/8** | 2/3 | 3/4 | 4/5 |
| P15 | 3 | **6** | **5** | 1/4 | 1/7 | 3/5 | 0/0 | 0/1 | 0/1 |
| P19 | **28** | **26** | - | **26/30** | **27/28** | - | 1/4 | 2/7 | - |
| **Control** | | | | | | | | | |
| P23 | **9** | **11** | **14** | **8/8** | **12/13** | **16/16** | 3/4 | 5/7 | **5/5** |
| P24 | **11** | **12** | **13** | **10/11** | **16/17** | **10/10** | 1/3 | **4/6** | 1/5 |
| P25 | 1 | **5** | 2 | 0/1 | 0/1 | 1/1 | 0/0 | 0/3 | 0/1 |
| P28 | 2 | **8** | - | 0/2 | 2/8 | - | 0/0 | 0/2 | - |
| P29 | **7** | **7** | - | 3/6 | **5/8** | - | 0/13 | 0/17 | - |
| P32 | **2** | 4 | 5 | 1/1 | 2/3 | 1/2 | 0/1 | 0/1 | 0/1 |

*Note.* The shaded areas and bolded text indicate that the stage was considered to be acquired.

For production of Stage 2, notable changes are learners who showed emergence on the post-test (Participants 13, 15, 25, and 28) by at least doubling production of Stage 2 structures, e.g. Participant 13 produced 3 Stage 2 structures on the pre-test and 6 on the post-test. Participant 5, who acquired Stage 4 on the post-test, also showed an important increase in production of Stage 2 from the pre-test (10) to the post-test (22) and the delayed post-test (32).

Overall, the structures targeted for the Stage 4-instructed group showed increases in production across the board. Those learners in the Stage 4-instructed group who began the study at Stage 3 (Participant 5, Participant 6, Participant 10) increased their production as well as contexts for Stage 3 on the post-test and delayed post-test, whereas those learners in the other two groups who had already acquired Stage 3 largely did not (Participant 12, Participant 19, Participant 23, Participant 24). For the learners who had not shown emergence of Stage 3 on the pre-test ($n$=6), three (one from each group) did acquire it on the post-test. These three learners may have been close to acquiring Stage 3 anyways as demonstrated by the fact that their production was close to meeting the emergence criteria on the pre-test: Participant 7, (3/9); Participant 14, (2/7); Participant 29, (3/6).

As for Stage 4, no learner had acquired it on the pre-test, but several learners were close to meeting the emergence criteria: Participant 23 (3/4) and Participant 10 (3/7). Participant 23 participant acquired Stage 4 on the delayed post-test, and Participant 10 was part of the four learners from the Stage 4-instructed group that gained Stage 4 on the post-test. Of these four learners, Participant 10 showed the highest production of Stage 4 structures (13/15), while the other three, who barely produced the rule on the pre-test, showed usage of the rule barely above the level required for emergence on the post-test. Participant 24 from the Control group also acquired Stage 4 on the post-test; while this learner did not have a high use of Stage 4 on the pre-test (1/3), he or she did show a strong command of Stage 3 on the pre-test, which could have contributed to the emergence of the *next* stage on the post-test. However, Participant 19 from the Stage 5-instructed group showed an extremely productive rule for Stage 3 with 26/30 contexts marked on the pre-test, but this participant did not show emergence of Stage 4 on the post-test. In sum, the uniform advancement of the Stage 4-instructed group regardless of initial production

levels shows the effect of instruction compared to the variable stage gains made by the other two groups.

The next section shows an analysis of means according to those learners who gained stages vs. those learners who did not, regardless of the experimental grouping. The analysis begins with the learners who were at Stage 3 on the pre-test, given that the other groups are too small, i.e. less than 10 participants, in order to make statistical comparisons. Table 39 shows production means and standard deviations of the learners who were at Stage 3 on the pre-test. Of these 22 learners, 7 gained Stage 4 on the post-test or the delayed post-test and 15 did not.

**Table 39. Production and stage gains for Stage 3 participants**

| **Test range** | **PT structures** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **PL –S (Stage 2)** | | **NP-AGR (Stage 3)** | | **PO-AGR (Stage 4)** | | **SUBJ (Stage 5)** | |
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| **Pre** | | | | | | | | |
| Gain *(n=7)* | 15.9 | 7.8 | 15.6 | 8 | 1.3 | 1.3 | 0 | 0 |
| No Gain *(n=15)* | 11.9 | 6.7 | 10.1 | 8.8 | 0.7 | 1.3 | 0 | 0 |
| **Post** | | | | | | | | |
| Gain *(n=7)* | 16.9 | 8.2 | **20**[1] | 10.8 | **5.4**[2] | 3.7 | 1 | 1.7 |
| No Gain *(n=15)* | 10.9 | 5.3 | **9.6**[1] | 7.5 | **1**[2] | 1.2 | 0 | 0 |
| **Delayed** | | | | | | | | |
| Gain *(n=6)* | 18.8 | 9.7 | 19.3 | 12.4 | **4.5**[2] | 2.7 | 0 | 0 |
| No Gain *(n=9)* | 13.9 | 6.3 | 14.3 | 9.2 | **0.9**[2] | 1.1 | 0 | 0 |

[1]Production of NP-AGR, a Stage 3 procedure, was significantly different between the two groups on the post-test ($p$=.02).
[2]Production of PO-AGR on the post-test was significantly different ($p$=.00) on the post-test as well as the delayed post-test ($p$=.02).

Table 39 illustrates that there were no significant differences as indicated by independent samples t-tests in production of Stage 2 or Stage 3 structures on the pre-test between the groups that gained Stage 4 and those that did not. In other words, both groups were producing similar

amounts of Stage 2 and 3 structures on the pre-test. On the post-test, 7 students gained Stage 4 in terms of emergence as well as showed a significantly higher amount of production of Stage 3 and 4 structures compared to those that did not gain those stages. In other words, gaining Stage 4 for these 7 learners also involved a significant increase in production.

#### 4.2.5.3 Summary of Stage Change and Production

In this section, comparisons were made of the production means of those who gained stages and those who did not gain stages. For syntax, there were no differences in production of Stages 3 and 4 between those that gained Stage 4 or 5 and those that did not. This result mirrors the result from the analysis of the production of syntax that showed little changes in production of syntax across the three groups. For morphology, production of Stages 3 and 4 for those that gained Stage 4 was also significantly higher compared to those that did not gain stages, which shows that stage gain also correlates with higher production, at least for morphology.

### 4.2.6 Summary of Results

The previous two sections reported the results of the stage changes by group for the syntax and morphology as well as the raw production for syntax and morphology, then a combined analysis was given of the production of learners that gained stages. The following list highlights the results discussed in this chapter.

- **Stage Gains**
    - Participants in all three groups gained stages, but no advantage was found for the instructed groups vs. the control groups.

- **Production of syntax**
    - Instruction on the *next* and *next + 1* stages of syntax showed no important changes in production of the syntactic stages.
    - Learners who had already acquired Stage 5, subordinate clause procedure, but not Stage 4, SV-inversion, gained that stage on the delayed post-test after instruction on Stage 4.
- **Production of morphology**
    - Instruction on the *next* stage of morphology, Stage 4, resulted in gains on the post-test and delayed post-test not only on the instructed stage, predicative object agreement, but also gains in noun phrase agreement, Stage 3, and plural *–s* marking, a Stage 2 procedure.
    - Instruction on the *next + 1* stage of morphology, subjunctive marking in subordinate clauses, resulted in two learners producing it on the post-test.
- **Production and stage gains**
    - The learners that gained Stage 4 (PO-agreement) morphology showed higher production of Stage 3 (NP-agreement) and Stage 4 structures on the post- and delayed post-test compared to those who did not gain Stage 4, however no differences in production were found for the syntax.

In sum, the instruction on syntax yielded few important changes in production. Neither instruction on the *next, next + 1, next* + 2, or an already acquired stage showed an effect on the post-test or the delayed post-test. The only instruction that did result in production gains was to the three participants who had skipped Stage 4, which shows that instruction helped learners be aware of Stage 4 SV-inversion and produce it.

As for morphology, instruction on the *next* stage of morphology was effective at improving learners' production at the target stage, Stage 4, as well as the related preceding stages, Stages 2 and 3. Instruction on the last stage, Stage 5 subjunctive morphology, showed a short-term effect compared to the other two experimental groups for those learners for which the subjunctive was the *next +1* stage. For those learners for whom the subjunctive was the *next +2* or *next + 3* stage, there was no effect of instruction on this higher-level structure. In sum, instruction geared at either the *next* stage or the *next + 1* stage proved to be the most effective for short-term and long-term production gains.

In the following section, the results will be interpreted in terms of the research questions of this study and the larger theoretical context.

## 4.3 DISCUSSION

The research questions in Study 2 aimed to address how instruction on the hierarchical PT stages could aid learners in advancing to subsequent stages. Two theories regarding how instruction can influence development acted as the impetus for the design of the study: the Teachability Hypothesis (Pienemann, 1984, 1989, 1998) and the Projection Model (Zobl, 1983, 1985). The Teachability Hypothesis claims that learners can only advance to the next developmental stage if they are developmentally ready but they cannot skip stages; in other words, a learner at Stage 3 is ready to advance to Stage 4, but not Stage 5. The Projection Model offers an explanation of how instruction can influence development of items on a hierarchy of markedness; the hypothesis of the Projection Model is that instruction on a more marked, or difficult structure, can aid not only

the acquisition of that structure, but also lesser marked structures on the same hierarchy. In the next sections, each of the research questions will be addressed regarding the results presented in the preceding sections and the implications for the Teachability Hypothesis and the Projection Model.

### 4.3.1 Teachability Hypothesis: next or next +1?

The question of whether instruction on the *next* or *next + 1* stage would facilitate development aimed to address the claim of the Teachability Hypothesis that only ready learners advance to the next stage, i.e. instruction is only effective if directed at the next psycholinguistic stage. The first research question asked whether instruction on the *next* stage would facilitate development to the subsequent developmental stage. The analysis of development, as measured in terms of either stage gains or in raw production of structures at the target stages, varied accordingly whether looking at the syntax, morphology, stage gains or production of structures. First, in terms of stage gains for syntax, morphology, or both, no group showed a significant change between each other. While individuals in each group did make stage gains, the instruction on the *next* stage did not result in greater stage gains compared to the other two groups. However, the learners at Stage 3 in the Stage 4-instructed group did make significant gains in production of the morphological structures targeted by instruction compared to Stage 3 learners in the other two groups. In the area of syntax, the only effect of instruction on production overall for any of the groups was for a sub-set of participants in the Stage 4-instructed group who had already acquired the subsequent stage, Stage 5, subordinate clauses, to the target of instruction, Stage 4, target word order.

Research question 2 asked whether instruction on the *next + 1* stage would facilitate development. Indeed, instruction on the *next + 1* stage of morphology for the Stage 3 learners in

the Stage 5-instructed group showed short-term gains in production and contexts compared to the Stage 3 learners in the Stage 4-instructed group and the Control group. While no differences were found for instruction on syntax, the fact that learners were able to produce contexts and mark the subjunctive shows that instruction on the *next + 1* stage could facilitate development, contrary to the core prediction of the Teachability Hypothesis. As for research question #3—whether instruction is more effective focused on the *next* stage or the *next + 1* stage—it is true that instruction on the *next* stage of morphology was the most effective for the participants in this study in the sense that learners were able to maintain production levels on the delayed post-test, while production of *next + 1* morphology was only evident on the post-test. This difference is likely due to the differences in complexity of the morphological rules and not due to processing constraints. Stage 4 or Stage 5 morphology are strikingly different in complexity: the subjunctive, Stage 5, is pragmatically complex and requires a very specific syntactic context, while the rule for Stage 4 morphology is exceedingly simple, e.g. 'mark adjectives for plural to agree with nouns'. Also, Stages 2, 3 and 4 morphology form a clearly related hierarchy of rules, e.g. lexical > phrasal > interphrasal morphemes, while Stage 5 morphology, subjunctive, is not related to the preceding stages except for its status as Stage 5 of the processing hierarchy. In addition, students of Spanish are constantly exposed to input with Stage 4 morphology, while it is unlikely that the subjunctive occurs with much frequency in beginning Spanish courses. As for research question #4, learners did not skip stages as a result of instruction; instead, the implicational hierarchy predicted by PT was strongly upheld for syntax, morphology and both on the post-test and the delayed post-test. The only error in the table was consistently of one type: that of Stage 5 syntax emerging before Stage 4 syntax, an anomaly that will be discussed in detail below.

In sum, learners made gains in production on subsequent developmental stages after instruction on either the *next* or *next + 1* stage, not just on the *next* stage, contrary to the main prediction of the Teachability Hypothesis. In addition, many learners who were ready for the instruction, in the sense that they were at the preceding stage to the target of instruction, did not gain the next stage. Neither the Teachability Hypothesis nor PT offers an explanation as to when learners advance to the next stage beyond the basic criteria that they must have acquired preceding stages before being able to advance. In Section 4.2.4, an attempt was made to find a relationship between stage gains and higher production on preceding stages, but no relationship was found between production on lower stages and stage gains on subsequent stages. In fact, learners who gained stages or not varied from barely reaching the emergence criteria to showing a productive rule for a structure for already acquired stages. However, for the morphology at least, once learners gained the next stage, their production of the next stage as well as their previous stage did differ from those participants who did not gains stages. This shows that gaining stages did mean learners produced more tokens of the gained stages as well as the initial stage. A theoretical account of how learners progress from emergence of a stage to the next stage would be informative to PT theory as well as for pedagogical purposes.

Kawaguchi and Di Biase (in press) have been the first to address this issue of progression from stage emergence to native-like mastery; as mentioned in Chapter 2 (Section 2.1.5), Kawaguchi and Di Biase found that learners differed in production of Stage 4 structures in L2 Japanese on two tasks, one which required lesser processing demands (a story re-telling task) than the other (a time-constrained oral response task based on a video). In the task with lesser cognitive demands, learners showed emergence of Stage 4 structures, but the task with greater cognitive demands showed that learners variably were capable of employing these structures,

from a spectrum of not being able to produce them at all, to variably accurate and stable production, to stable and accurate production (Kawaguchi & Di Biase, in press, p. 14). In other words, this set of learners, while showing emergence of Stage 4 structures, varied greatly in automatized production of Stage 4, as demonstrated by the trouble producing them in more demanding tasks. The results of Kawaguchi and Di Biase's study, along with the lack of correlations between production scores and stage gains in this dissertation, highlight a core principle of PT while adding an important corollary: the emergence criteria is important to show that learners are capable of producing structures as evidence that they have acquired the processing skills in order to produce these structures, but production levels in different tasks may represent degrees of automatization of these same structures. As demonstrated in Kawaguchi and Di Biase (in press), the difference in procedural skills at all five processing stages could be highlighted by using a more cognitively demanding task.

### 4.3.2 Projection Model: interprhasal, phrasal, and lexical morphology

The conditions of teaching the *next* or *next +1* stage also aimed to address the issue of whether teaching learners a more marked structure could aid learners at acquiring that structures as well as less marked structures of a similar semantic hierarchy. The results showed that instruction on the most marked end of the hierarchy of morphological marking (lexical > phrasal > interphrasal) was beneficial at increasing learners' production and contexts of the target of instruction, predicative adjective (interphrasal morphology), as well as attributive adjectives (phrasal morphology), and plural *–s* marking (lexical morphology). This result provides new evidence in favor of the Projection Model (Zobl, 1983, 1985): that instruction on more marked

structures can project to less marked structures. Whether the opposite is true – that instruction on less marked structures can project to more marked structures – will be tested in Study 3, as participants of Study 3 were taught either attributive adjectives (Stage 3, phrasal morphemes) or predicative adjectives (Stage 4, interphrasal morphemes). A full discussion of the Projection Model will continue when discussing the results from Study 3.

### 4.3.3 Discrepancies in the PT hierarchy

This study departs from the assumption that the five PT stages exist and develop in a hierarchical manner for L2 learners, based on the results from Study 1. Results of Study 2 showed that the five stages emerged in a hierarchical manner for syntax, morphology, and syntax and morphology as determined with strong, reproducible implicational scaling. However, several discrepancies arose with this dataset that are pertinent to overall PT: the emergence of syntax before morphology and the emergence of Stage 5 syntax before Stage 4 for some learners.

First, as demonstrated in Section 4.2.1, the syntactic and morphological development of these learners was largely disjointed. Clearly, syntax emerged before morphology for these learners as demonstrated by the fact that learners were found at Stages 2,3,4 and 5 that had acquired the syntax but not the morphology. The reverse was not true: only two learners (P24 from the *Control* group and P7 from the Stage 4-instructed group) were found to show emergence of Stage 4 morphology before syntax on the post-test. Both learners barely showed emergence of Stage 4 morphology on the post-test in that both had 4 instances of predicative / object agreement, the minimum in order to meet the emergence criteria. On the delayed post-test, neither show emergence of Stage 4 morphology; in fact, P24 has gone back to Stage 3 and P7 has shown acquisition of Stage 4 syntax, which suggests that the morphology emerging

before the syntax for these two learners was not evident of a larger trend. This suggests that the tendency for syntax to emerge before morphology is solid over time in not only this experimental study, but also in the corpus-based study in Study 1.

The only exception present in the implicational tables that indicates counter-evidence to the implicational hierarchy was that of Stage 5, subordinate clause syntax, emerging before Stage 4, target word order. Four participants showed emergence of Stage 5 before Stage 4 on the pre-test, three on the post-test, and two on the delayed post-test. Of the three learners on the pre-test who had initially Stage 5 but not 4 (P4, P6, and P7), all three acquired Stage 4 on the post-test or the delayed post-test; all three also received instruction on Stage 4. Of the three learners who had Stage 5 but not 4 on the post-test (P22, P26, and P30), on the delayed post-test, one did not take it (P30), one stayed the same (P26), and one acquired Stage 4 (P22). Still, the developmental pattern of 5 before 4 continues in the delayed post-test in that one leaner (P16) acquired Stage 5 but not Stage 4 syntax, although Stage 4 was close to meeting the emergence criteria for this learner, given that he or she produced 2 target word order structures, but less than four contexts overall were produced. In sum, a developmental pattern of Stage 5 emerging before Stage 4 appears to persist to a small degree for a low percentage of learners on each testing measure (3/36 learners on each testing measure, or around 8%). It does not appear that this discrepancy between Stage 4 and 5 is due to a problem with the implicational hierarchy itself given that the statistics for reproducibility and scalability were strong and reliable across all three testing sessions. It is more likely that Stage 5 has emerged before Stage 4 for several learners in this study due to the nature and overall low number of the target word order structures produced by these learners.

The notion of target word order in Spanish is complex and may contain a number of varied rules based on syntax, semantics and pragmatics (Liceras, 1994). The concept of target word order elicited and produced by the L2 Spanish speakers in this study in contrast was fairly simplistic: students were asked to produce questions requiring post-verbal subjects, and contexts for post-verbal subjects in declaratives were implicit in the story-telling task or the questions task, e.g. by the presence of contexts for presenting new vs. old information. Learners who were taught Stage 4 word order were taught that subjects can follow the verb in certain pragmatic situations, i.e. when the information is new, and are required to follow the verb in questions beginning with wh-words. The majority of the target word order structures produced by the leaners were questions (91 tokens across all participants) or simple subject / verb inversion in declaratives (29 tokens across all participants). Notably, and not altogether surprisingly given previous research over acquisition of subject / verb inversion in L2 Spanish (Hertel, 2003; Lozano, 2006), overall, most learners failed to produce potential subject / verb inversion with unaccusatives such as *venir* 'to come' or *llegar,* 'to arrive', two verbs which were highly frequent in the story re-tell task. Given the open nature of the question task, learner varied in their responses to the two questions, #9 and #10, which elicited questions with post-verbal subjects. Both questions asked learners to ask questions with explicit subjects; for example, Question #10 asked learners to ask a son/daughter of a famous person questions about their parents. Many learners produced inverted subjects, e.g. *qué haces (V) tú (S) con tu familia* "what do you do with your family" (P10), or lack of inverted subjects, e.g. *por qué tú um tú (S) fue (V) a la escuela por un abogada* "why you um you went to the school for a lawyer" (P5) A handful produced embedded questions: *para los hijas de Mihel Obama y Barak Obama yo voy a pregunta si si # trabaje trabajes con sus padres "*for the daughters of Mihel Obama and Barack

Obama, I'm going to ask if if she works you work with her parents" (P6). It was also possible that learners produced appropriate questions but did not use the subject: *um trabaja en la mañana o la noche* "um you work in the morning or the night" (P19). Many learners understood the question, but could not produce questions: *entrevista um Oprah. Con tu padres interesante? Bueno padres y uh divertido?* "interview um Oprah. With your parents interesting? Good parents and uh fun? (P8). Given the varying options that are permissible in Spanish word order, an open-natured task likely did not elicit as many of the desired subject / verb alternations as a more structured task would.

In addition to the variability inherent in Spanish target word order, this study only addressed subject / verb alternations for Stage 4; another process that reflects target word order in L2 Spanish is clitic doubling, such as *El libro lo di a Juan* "the book it I gave to Juan". These kinds of structures produced by students, along with structures with accusative or dative clitics and their referents, were not considered at Stage 4 morphology or syntax because all participants were instructed on these items during the experimental period or immediately following the experimental period as part of the sequence of normal classroom instruction. Inclusion of production of this structure would have confounded the instruction variable, given that instruction was focused on either Stage 4 or Stage 5. Still, these kinds of Stage 4 structures were elicited in the question task and implicitly present in the story-tell task and were coded and counted separately. Production was extremely low across all three groups: 6 unaccusative or dative clitics were produced on the pre-test (4 of which were by the same participant), 3 on the post-test, and 3 on the delayed post-test. A future study focused on clitics and / or elicited production of required subject / verb alternations would shed light on the issue of the developmental pattern of Stage 5 emerging before Stage 4 syntax. To sum up, the error of Stage

5 syntax emerging apparently before Stage 4 is likely a relic of the small sub-set of data actually elicited related to the potential pool of target word structures in L2 Spanish. At the same time, both subject / verb inversion and clitic production, Stage 4 structures, were produced much less than Stage 5 structures, subordinate clauses, which highlights the need for future study probing the emergence of Stage 4 and 5 structures and sub-structures, such as order of emergence of variations of Stage 4 target word order and types of Stage 5 subordinate clauses.

## 4.4 CHAPTER SUMMARY

This chapter presented the methodology (description of participants, procedure, and data analysis) and results from Study 2, a teaching experiment to teach Stages 4 and 5 syntax and morphology to beginning (second semester) students of Spanish. The aim of this study was to investigate whether learners would gain stages or increase production of the instructed stages whether instructed on the *next* or *next + 1* stage. No differences were found in terms of stage gains for the experimental or the control groups. Likewise, the instruction on syntax showed no important changes in production of PT structures. However, the instruction on the *next* stage of morphology, Stage 4 predicative (interphrasal) agreement, did result in these learners making gains in not only production of predicative object agreement in morphology, as well as Stage 3 phrasal, NP-agreement, morphology, and Stage 2, plural *–s*. Instruction on the *next + 1* stage of morphology also resulted in two learners producing it on the post-test, while no other learners in the study produced subjunctive morphology. In sum, regarding the research questions of this dissertation, learners did make production gains when instructed on the *next* or *next + 1* stages of

morphology, which suggests that instruction does not have to be focused on the *next* stage in order for stage changes to occur, contrary to the Teachability Hypothesis.

Further discussion related to PT theory: while the stages were found to emerge in a hierarchical manner on the pre-test, post-test, and delayed post-test for all learners, the only counter-evidence was the emergence of Stage 5 before Stage 4 for several learners. This difference was attributed more to the task designed to elicit Stage 4 structures than to a structural problem related to Stage 4 emerging before Stage 5. An additional issue discussed was the relationship between stage emergence and production: learners that gained stages in morphology produced comparable amounts of preceding stages compared to those who did not gained stages. However, for syntax, differences were found in production on the pre-test between those that gained stages and those that did not, which is a possible explanation for why these learners gained stages. However, once a structure emerged, learners who gained stages produced more of the emerged stage as well as preceding stages compared to those that did not gain stages.

In sum, Study 2 addressed the emergence of Stages 4 and 5 by second semester beginner learners; in the next section, the results from Study 3 will be presented to address the emergence of Stages 3 and 4 by first semester beginner students.

# 5.0 STUDY 3

In this chapter, the second teaching experiment to test the effect of instruction on the development through the earlier stages of PT, Stages 3 and 4, is described. The overall design and analysis of Study 3 is identical to Study 2; only the teaching materials differed given that the participants in Study 3 have a lower proficiency level than the participants in Study 2. In Section 5.1, the methodology is described, including a description of the participants, a summary of the overall design of the study, examples of the testing materials, a description of the instructional period, and the procedure used to transcribe and code the data. Section 5.2 presents the results of the data analysis, starting with overall stage changes over time in Section 5.2.1 and 5.2.2, changes in production of the target grammatical structures over time in Section 5.2.3, and an analysis of stage gains and production in Section 5.2.4. Section 5.3 discusses the implications of the results.

## 5.1 METHODOLOGY

The overall design of the study is described in this section, including the participants involved, procedure, materials used for the testing period, the instructional design, and the means of transcribing and coding the data.

### 5.1.1 Participants

The participants (*N*=21) of Study 3 were students from Elementary Spanish I, the most basic Spanish class offered at the University of Pittsburgh, in order to address the emergence of earlier stages (Stages 2,3 and 4) of PT. Classes at this level meet during the day for five 50-minute class sessions a week, or two evenings a week for two and a half hours sessions. Students in this class are assumed to have little previous experience with Spanish as determined through the written and oral placement test described in Study 2. In addition, for the first two weeks of the semester, instructors are asked to be aware of 'false beginners,' i.e. students who already have sufficient knowledge of Spanish in order to be switched to a more advanced course. In sum, every effort is made to procure true beginning learners in the Elementary Spanish I classes.

Two intact classes of Elementary Spanish I, a day class and an evening class, were in session during the semester of data collection. The evening class participated in the study during class time, and students from the day class (*n*=12) volunteered to complete the study outside of class.[10] As with Study 2, the five sessions for data collection were included in the course syllabus for the intact class that participated in the study. The researcher presented the study to the classes the day before the pre-test in order to explain the procedure for the study, as well as how the study would be beneficial to gaining a greater understanding of second language acquisition. Students were offered extra points for participating by the instructors of both sections.

[10] Both intact classes originally were included to participate in the study. However, due to a complaint from a student after completing the pre-test that the study was to be conducted during class time, the administration in the Spanish department decided that the study should be conducted outside of class time for this particular section.

As in Study 2, participants were divided into three groups based on the object of instruction: Stage 3-instructed group, Stage 4-instructed group, and a control group that received no instruction. As in Study 2, participants varied in their initial stage of syntax and morphology. For that reason, the results will be analyzed in the same manner as in Study 2, that is, all Stage 2 participants will be compared by group, then all Stage 3 participants by group, etc. Again, the purpose is to delimit at which stage instruction was targeted: the *next* or *next + x*. The evening class was split into two groups for the instructional portion of the experiment. One group received instruction on Stage 3, assumed to be the *next* stage for most participants, while another group received instruction on what was assumed to be the *next + 1* stage, Stage 4. The participants from the day class ($n$=7) received instruction on the *next* stage, or they were given a control lesson in a separate classroom consisting of reading a passage in Spanish and answering comprehension questions orally.

Overall, of the nineteen students enrolled in the day class, twelve signed up to participate in the study outside of class time; seven of the twelve then completed all five sessions of the study. Nineteen students were enrolled in the evening class; of these students, 13 completed all five sessions of the study. Of the six who did not complete all five sessions, three students chose not to participate and did not complete any sessions, and three students completed only one or more of the testing sessions. Table 40 summarizes the number of participants in each group: Stage 3, Stage 4, and Control.

**Table 40. Grouping of participants**

| Groups | Participants |
|---|---|
| Stage 3 | *n*=10 |
| Stage 4 | *n*=8 |
| Control | *n*=3 |
| **Total** | ***n*= 21** |

As described previously, the students in the Stage 3-instructed group were from two different intact classes (the day class and the evening class), while the students in the Stage 4-instructed group were all from the same intact class. The control group consisted of students from the day class.

Overall, ten females and eleven males participated in the study. The age of the participants ranged from 17 to 25. Many participants (*n*=12) in the study had studied Spanish prior to their current class, from a brief period in middle school (approximately age 11-13) to up to several years in high school (approximately age 14-18). Nineteen participants were native speakers of English, and two were native speakers of Chinese (P16 in the Stage 3-instructed group and P10 in the Stage 4-instructed group). Six other participants reported intermediate to advanced knowledge of another foreign language. One participant (P11 in the Stage 4-instructed group) reported a native-like proficiency in French. Another participant (P15 in the Stage 4-instructred group) had studied several other languages at the high school and university level, including German (two years in high school and one semester in college) and Italian (two semesters in college). Similarly, another participant (P7 in the Control group) reported intermediate / advanced knowledge of Hebrew, advanced knowledge of French, and intermediate / advanced knowledge of Italian.

### 5.1.2 Procedure

Figure 9 summarizes the groups in the study as well as the progression of data collection. As seen in Figure 9, all three groups were given the same pre-test on Wednesday or Friday of Week 4. Over the next week, the control group did not receive any explicit instruction on the grammatical topics that were covered in the experimental group. Rather, they participated in two sessions of instruction based on a oral reading activity followed by oral comprehension activities. The two experimental groups received two days of instruction on Monday and Wednesday of Week 5. The target of instruction was either Stage 3, i.e. the Stage 3-instructed group, or Stage 4, i.e. the Stage 4-instructed group. Finally, on Friday or Monday, all three groups took the post-test, then three weeks later, the delayed post-test on Wednesday or Thursday. As in Study 2, during the time between the post-test and the delayed post-test, no further specific instruction was given related to the instructed topics.

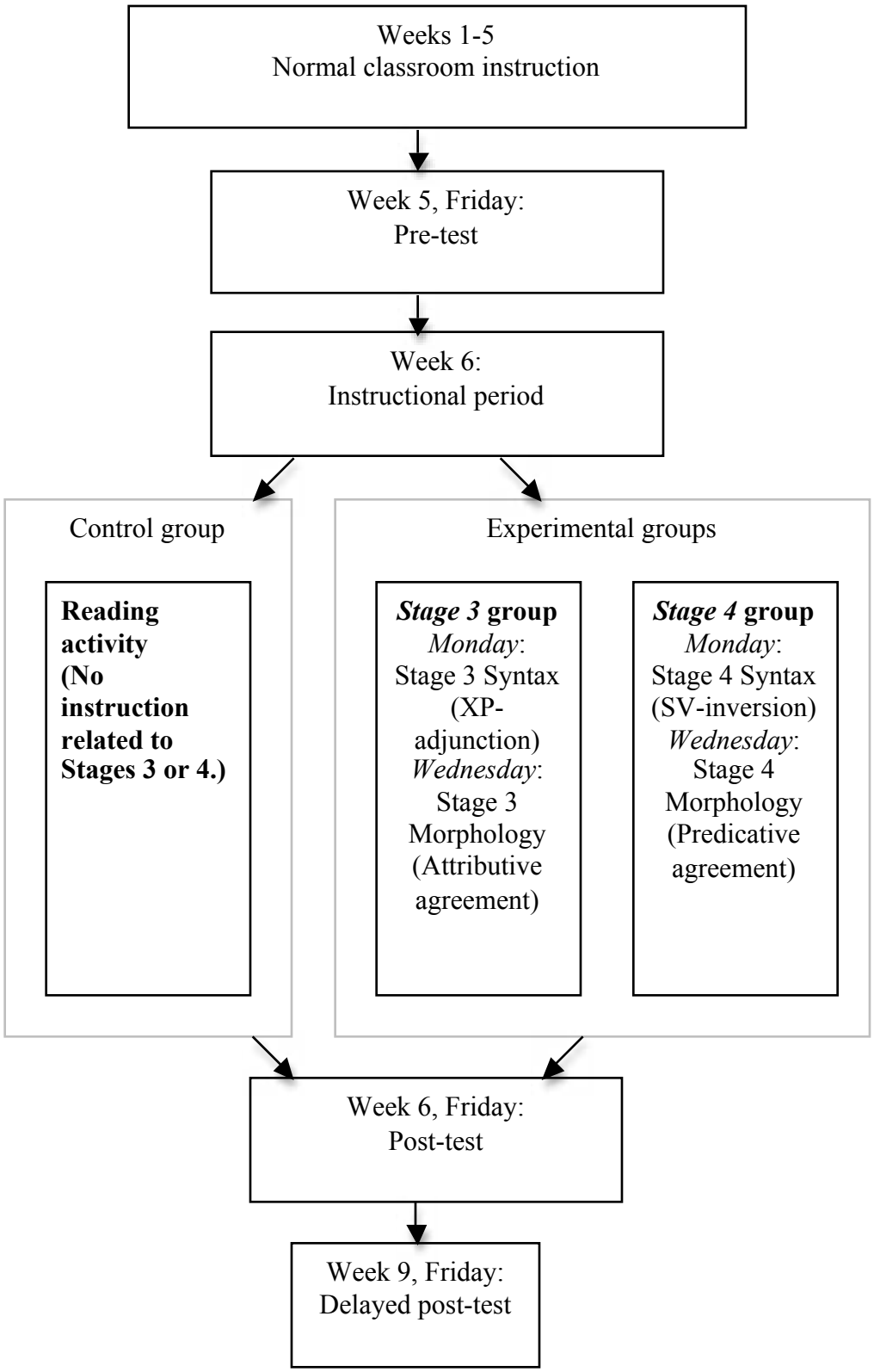


**Figure 9. Schema of groups and timing for Elementary Spanish I groups**

As in Study 2, the timing of the data collection was integrated with the course syllabus. The curriculum for this class follows the first seven chapters of *Mosaicos* (Castells, et al., 2010). In the first 11 weeks of the semester, the time up to and including the data collection, few elements of the PT hierarchy were explicitly taught in the class. Table 41 shows the sequence of classroom instruction as well as the timing of the data collection.

**Table 41. Timing of topics of classroom instruction and data collection**

| Week | Classroom instruction | Data collection |
|---|---|---|
| **1** | Vocabulary | - |
| **2** | Vocabulary; present verbal morphology | - |
| **3** | Present verbal morphology<br>Agreement of gender and number nouns and adjectives (Stage 3)<br>Interrogative words (Stage 3) | - |
| **4** | Verbal morphology (present); copula choice<br>Agreement of ser 'to be' and adjectives (Stage 4)<br>Possessive adjectives (Stage 3) | - |
| **5** | Vocabulary; present verbal morphology | - |
| **6** | Vocabulary; present verbal morphology | Pre-test |
| **7** | Vocabulary; present verbal morphology | Treatment period and post-test |
| **8** | Present verbal morphology and reflexive pronouns | |
| **9** | Vocabulary; present progressive | |
| **10** | | Delayed post-test |

*Note.* If the grammatical topic is part of the PT hierarchy, the stage is indicated in parentheses.

As seen in Table 41, the main topics of instruction in the first 10 weeks of instruction are vocabulary and present tense verbal morphology, such as verbs ending in *-ar*, *-er*, *-ir*, as well as verbs with irregular morphology, such as *hacer* 'do', or *poner* 'put'. Overall, the instructional sequence does not follow in any way the sequence predicted by PT. In fact, the participants are exposed to Stage 3 and 4 structures in Weeks 3 and 4, while Stages 1 and 2 are never explicitly taught. The data collection for this study took place beginning with the pre-test in Week 6 (after approximately 30 hours of instruction) of the semester. While the pre-test determined exactly at which stage each learner is according to PT, it was anticipated that most participants would

produce lexical items (Stage 1) as well as plural *–s* and canonical word order (Stage 2) by Week 6[11].

### 5.1.3 Testing Materials

The testing materials are identical to those of Study 2. All testing took place in a computer lab using recording equipment on Macintosh or Dell computers. Participants first recorded themselves describing the pictures and re-telling the story of Little Red Riding Hood, then they recorded their answers to the ten questions. The same two versions of the questions were used as described for Study 2. The average time participants took to complete the task was around 20 minutes. Participants also completed a language questionnaire during the first testing session.

### 5.1.4 Instructional Period

During the week after the pre-test, two twenty-five minute instructional periods took place to target subsequent PT stages 3 and 4, or to act as a control lesson. The instructional periods lasted 30 minutes. Two instructors from the Spanish department were trained to instruct the participants. Both instructors were native speakers of Spanish, highly proficient speakers of English, and experienced instructors of Spanish as a second language. For the instructional periods, one instructor led the instruction on PT, while the other instructor led the control lesson in an adjacent classroom. As in Study 2, the instructors were given explicit instructions on how

[11] Although all learners will have been taught Stage 3 and 4 morphological structures in Weeks 3 and 4, it is anticipated that spontaneous oral production of these structures will still be limited by the time of the pre-test, which means that they likely will still be at Stage 1.

to conduct each segment of the instructional period. The instructional periods targeting Stages 3 and 4 followed the same format as described in Study 2. That is, the instruction included explicit instruction of the grammatical topic in English presented visually in a Powerpoint, followed by teacher-led practice, then paired oral and written practice and teacher-led feedback. Students were given handouts with the grammatical explanations and exercises to be completed during the classroom session. The control lesson consisted of several warm-up pre-reading questions, a short reading on Hispanic culture, followed by comprehension questions. The students worked in pairs to complete the pre-reading and post-reading questions orally and in writing. They also read the article out loud to each other. See Appendix E for a sample of the control lesson and Appendix D for a sample of the experimental lesson.

### 5.1.5 Data Transcription and Coding

The data transcription and coding is identical to that of Study 2. That is, after the recordings were transcribed and coded, the production of all learners was analyzed using the emergence criteria, then implicational scaling determined the progression of the participants through the hierarchical stages. Finally, the production from the three groups was compared as described in Study 2 in order to determine whether there is a significant effect of instruction for the experimental groups compared to the control groups.

## 5.2 RESULTS

The results of the teaching experiment are described in this section in the same manner as in Study 2. As in Study 2, given the differing initial stages of all learners on the pre-test, the analyses in the following sections will be constrained by comparing learners who were at the same stage on the pre-test in order to determine the exact target of instruction, e.g. *next* or *next + 1*. Table 42 shows the initial stages of syntax and morphology for learners in the three treatment groups.

**Table 42. Initial PT stages in syntax and morphology in Study 3**

| Initial stages on pre-test | Stage 3-instructed | Stage 4-instructed | Control group | Total |
|---|---|---|---|---|
| Syntax | | | | |
| Stage 1 | 1 | 0 | 0 | 1 |
| Stage 2 | 8 | 6 | 2 | 16 |
| Stage 3 | 1 | 1 | 1 | 3 |
| Stage 4 | 0 | 0 | 0 | 0 |
| Stage 5 | 0 | 1 | 0 | 1 |
| **Total** | **10** | **8** | **3** | **21** |
| Morphology | | | | |
| Stage 1 | 6 | 5 | 1 | 12 |
| Stage 2 | 0 | 0 | 0 | 0 |
| Stage 3 | 2 | 1 | 2 | 5 |
| Stage 4 | 0 | 2 | 0 | 2 |
| Stage 4 no 3 | 2 | 0 | 0 | 2 |
| **Total** | **10** | **8** | **3** | **21** |

As in Study 2, learners varied within the groups regarding their initial stages, but the majority of learners were at Stage 2 syntax (*N=16*) and Stage 1 morphology (*N=12*). To begin the discussion

of the results, a qualitative look at some of the learners from the instructed groups is presented, followed by the quantitative results in subsequent sections.

### 5.2.1 Examples from the Production Tasks

First, a discussion of the production by several learners will illustrate some of the results before the presentation of the quantitative analysis in the following sections. Overall, participants in both of the instructed groups increased production of the Stage 3 and 4 PT structures on the post-test and delayed post-test in both syntax and morphology. To illustrate, Participant 12, a native speaker of English who studied Spanish for 2 years in high school, was at Stage 2 syntax and Stage 1 morphology on the pre-test, like the majority of the participants in Study 3. Examples from the story re-tell task for Participant 3 on the pre-test and delayed post-test follow in (42) and (43).

(42) mis padres es trabajador y uh no perezoso.

my(pl) parents(pl) is(sg) hard-working(sg) and uh not lazy (sg).

'My parents are hard-working and not lazy.'

(43) las casas son blanco.

The(fem:pl) houses(fem:pl) are(pl) white(masc:pl)

'The houses are white.'

On the pre-test, as illustrated in (42), Participant 12 plural *–s* at the lexical level, the phrasal level, and leaves the interphrasal level unmarked (5, 5/5 and 0/4 tokens respectively). Overall, on the post-test, he continues to mark plural –s and phrasal morphology in 6 and 6/7 contexts

respectively. On the post-test and delayed post-test, the contexts for interphrasal morphology has continued to increase from 4 on the pre-test to 11 on the post-test and delayed post-test each. As seen in (43), predicative adjectives are produced but continue to be left unmarked for plurality. In fact, the predicative adjectives produced are with a variety of lexical subjects and adjectives: namely, to describe flowers, houses, parents, grandparents, and professors. This learner was instructed on Stage 4, which was the *next + 2* stage; although he did not mark more Stage 4 morphology on the post-test, he did increase contexts for their marking and continued to increase marking of Stage 2 plural *–s* and Stage 3 phrasal morphology. As for his syntax production, it largely stayed the same over the three tests: he produced 18, 28 and 39 Stage 2 canonical word order structures on the three tests, while he only produced 1 Stage 3 topicalized clause on the post-test and 2 on the delayed post-test. Clearly, for this learner, instruction on Stage 4 morphology lead to gains in production of Stage 4 contexts as well as gaining Stage 3 and Stage 2 and increasing production of Stage 2 and 3 structures.

A comparison with a similar learner from the other instructed group, the Stage 3-instructed group, shows the differences in effect of instruction. Participant 18 also was a native speaker of English who studied Spanish for 2 years in high school. He also began the study at Stage 2 syntax and Stage 1 morphology, but was instructed on Stage 3 morphology not Stage 4 like Participant 12. Examples from his production on the pre-test and delayed post-test follow in (44) and (45).

(44) mi profesores es uh muy contento.

my(sg) professors(pl) is(sg) uh very happy (sg)

'My professors are very happy.'

(45) um mis abuelos y um muy simpático y agradable.

Um my(pl) grandparents(masc:pl) and um very happy(sg) and nice(sg)
'My grandparents are very happy and nice.'

Participant 18 improves at marking phrasal morphology on the delayed post-test, as evident in his lack of plural agreement between *mi* and *profesores* in (44) and the presence of agreement with *mi* and its plural modifier *abuelos* in (45). Overall, for Stage 2 plural *–s,* after instruction he increases production from 4 tokens on the pre-test to 5 on the post-test and 14 on the delayed post-test. For phrasal morphology, Stage 3, he produced almost the same between the pre and post-test (1/4 and 1/5 respectively), but he gained Stage 3 and showed an increase on the delayed post-test to 7/10 tokens. Likewise, contexts for interphrasal agreement went from 0 on the pre-test and post-test to 5 on the delayed post-test. In sum, although he did increase production of contexts for interphrasal agreement, it was restricted to description of two lexical items: three predicative adjectives describing his grandparents and two predicative adjectives describing his parents. The instruction on phrasal morphology for this learner was most effective showed at the instructed stage, Stage 3 as well as Stage 2, plural marking. As for changes in syntax for this learner, he gained Stage 3 syntax on the delayed post-test, the production of which increased from 3 structures on the pre-test, 1 on the post-test, to 6 on the delayed post-test. Stage 2 structures also increased over the three tests, from 20 to 25 to 45 tokens over the three tests. In sum, Participant 18 received instruction on Stage 3 syntax and morphology and gained both stages after instruction as well as increased production of those structures.

As will be seen in the following sections, the changes in production discussed for Participants 12 and 18 reflect the results for the instructed groups; that is, learners largely increased production or contexts of the instructed structures, whether it was the *next*, *next + 1*, or

*next + 2* stage, which suggests that if this pattern is generally observed with other learners, the claim of the Teachability Hypothesis that instruction must be targeted at the next stage in order to be effective would be untenable. In addition, it lends support to the Projection Model that instruction targeted at more marked stages can lead to learners improving at the marked as well as less marked stages. This pattern will become clear as the results are presented in the next sections for the stage gains and overall production of PT structures for syntax and morphology for the instructed groups and the control group.

### 5.2.2 Overall Stage Changes for All Participants

In this section, the results from all participants on the three testing measures will be presented for the four stages of syntax and morphology, syntax, and morphology alone with the purpose of establishing whether the stages are acquired in the order predicted and whether any stages are skipped. First, Table 43 shows at which stage the participants were on the pre-test. If a participant acquired either the syntax or the morphology for a stage, that stage was considered emerged, as indicated by the dotted line.

**Table 43. Stages for all learners on the pre-test in Study 3**

| | STAGE 2 | STAGE 3 | STAGE 4 | STAGE 5 |
|---|---|---|---|---|
| **16** | - | - | - | - |
| **3** | S | - | - | - |
| **20** | S | - | - | - |
| **19** | S | - | - | - |
| **21** | S | - | - | - |
| **18** | S | - | - | - |
| **10** | S | - | - | - |
| **13** | S | - | - | - |
| **15** | S | - | - | - |
| **12** | S | - | - | - |
| **8** | S | - | - | - |
| **5** | S | - | - | - |
| **17** | S | - | **M** | - |
| **1** | S, M | M | - | - |
| **4** | S, M | M | - | - |
| **6** | S,M | M | - | - |
| **14** | S,M | S,M | - | - |
| **7** | S,M | S,M | - | - |
| **9** | S,M | M | M | - |
| **2** | S, M | S,M | M | - |
| **11** | S,M | S,M | S,M | S |

As seen in Table 43, most students were at Stage 2 syntax (SVO) or morphology (plural *–s*) on the pre-test. At Stage 2, many students had acquired the syntax, but not the morphology. Importantly, no participant was at only Stage 2 morphology (plural *–s*); if a student showed emergence of Stage 2, he or she also showed emergence of a higher stage, either Stage 3 (NP-agreement) or 4 (predicative agreement) or both, e.g. P1, P9 or P2. This fact does not preclude that a learner could have produced Stage 2 morphology without producing Stage 3 or 4 morphology; it means that the production of Stage 3 or 4 did not meet the emergence criterion. Eight participants were at Stage 3 (NP-agreement) on the pre-test; at this stage, several (*n*=4) showed evidence of Stage 3 morphology but not Stage 3 syntax (XP-adjunction). Likewise, four

participants were at Stage 4 morphology (predicative agreement) but not Stage 4 syntax (SV-inversion), and one participant had acquired both. This participant was the most advanced of this group; he had acquired all five stages of syntax and four out of the five morphological stages. In sum, 9 of the 21 participants started the study at Stage 3, 4 or 5; all of these participants showed emergence of morphological stages 3 or 4, while only four showed emergence of any of the stages for syntax past Stage 2. The emergence of morphology before syntax for this group of learners will be discussed further in the Discussion (Section 5.3.3). There is one 'error' in the table (P17). Implicational scaling showed this table to be scalable (C of R = .99, C of S = .98). Next, Table 44 shows the stages of all learners on the post-test.

**Table 44. Stages for all learners on post-test in Study 3**

| | STAGE 2 | STAGE 3 | STAGE 4 | STAGE 5 |
|---|---|---|---|---|
| **16** | - | - | - | - |
| **20** | S | - | - | - |
| **17** | S | - | - | - |
| **15** | S | - | - | - |
| **10** | S | - | - | - |
| **8** | S | - | - | - |
| **5** | S | - | - | - |
| **4** | S,M | - | - | - |
| **18** | S,M | - | - | - |
| **3** | S,M | - | - | - |
| **13** | S,M | - | - | - |
| **1** | S,M | M | - | - |
| **21** | S,M | M | - | - |
| **12** | S,M | M | - | - |
| **6** | S,M | M | - | - |
| **14** | S,M | S,M | - | - |
| **19** | S,M | S,M | - | - |
| **9** | S,M | M | S,M | - |
| **7** | S,M | S,M | M | - |
| **2** | S,M | S,M | M | - |
| **11** | S,M | S,M | S | S |

Overall, now 14 students now show emergence of Stage 2 morphology compared to only 8 students on the pre-test. Likewise, two more participants have shown Stage 3 morphology to emerge. At Stage 3, the pattern continues to hold that learners show emergence first of Stage 3 morphology, then syntax. Likewise, Stage 4 morphology continues to show development before Stage 4 syntax, and no learner has acquired Stage 5 syntax or morphology between the pre-test and the post-test. There are no errors in this table; the stages continue to emerge in the order predicted (C of S = 1.0, C of R = 1.0). Table 45 shows a similar pattern for the delayed post-test.

**Table 45. Stages for all learners on the delayed post-test in Study 3**

| | STAGE 2 | STAGE 3 | STAGE 4 | STAGE 5 |
|---|---|---|---|---|
| **16** | - | - | - | - |
| **20** | S | - | - | - |
| **17** | S | - | - | - |
| **8** | S | - | - | - |
| **5** | S | - | - | - |
| **6** | S | - | - | - |
| **3** | S,M | - | - | - |
| **21** | S,M | - | - | - |
| **13** | S,M | - | - | - |
| **15** | S | S | - | - |
| **12** | S,M | M | - | - |
| **14** | S,M | M | - | - |
| **10** | S,M | M | - | - |
| **18** | S,M | S,M | - | - |
| **4** | S,M | S,M | - | - |
| **19** | S,M | M | M | - |
| **2** | S,M | S,M | M | - |
| **1** | S,M | S,M | M | - |
| **9** | S,M | S,M | M | - |
| **11** | S,M | S,M | S | S |
| **7** | S,M | S,M | S,M | S |

Overall, the gains made at Stage 2 remain; many learners show emergence of Stage 2 syntax and morphology, and syntax emerges before morphology at this stage. At Stages 3, 4 and 5, more students have shown emergence of syntax compared to the pre-test; now, 12 participants have Stage 3 or higher syntactic structures. At Stage 4, morphology continues to emerge before syntax. The implicational table has a perfect fit (C of S = 1.0, C of R = 1.0).

This results presented in this section establish that the hypothesized order of acquisition of the four stages is upheld. Only one learner showed a skipped stage, Stage 4 morphology without Stage 3 syntax or morphology, but given that this learner only showed Stage 2 syntax on the post-test and the delayed post-test, it is likely that the Stage 4 morphology produced by this learner was not indicative of a larger developmental pattern. The next section compares stage

gains made by learners at the same initial stages by group—Stage 3-instructed, Stage 4-instructed, or Control—in syntax and morphology, syntax, and morphology.

### 5.2.3 Stage Changes by Group

The question of whether instruction on the *next* or *next + 1* stage of syntax and morphology aided learners in making stage gains is discussed in this section by comparing stage gains on the pre-test, post-test and delayed post-test using the Chi-square test. If a participant gained one or more stages, they were given a 1. If a participant did not gain any stages or regressed one or more stages, they were given a 0. In the first section, stage gains in either syntax or morphology will be compared, followed by stage gains in syntax and morphology separately.

#### 5.2.3.1 Syntax and Morphology

Table 46 shows the total number of participants, regardless of initial stage, who gained one or more stages between any of the three combinations of tests as well as how many participants in each group made stage gains between any segment of the testing period, e.g. between the pre and post-test.

**Table 46. Stage gains in syntax and morphology for all learners**

| Test Range | Treatment groups | | |
|---|---|---|---|
| | **Stage 3-instructed** | **Stage 4-instructed** | ***Control*** |
| Pre-Post | 2/10 (20%) | 1/8 (12.5%) | 1/3 (33.3%) |
| Pre-Delayed | 3/10 (30%) | 3/8 (37.5%) | 1/3 (33.3%) |
| Post-Delayed | 4/10 (40%) | 2/8 (25%) | 1/3 (33.3%) |

Overall, more gains were made in the Stage 3-instructed group than in the other two groups; 4/10 participants in this group gained one or more stages between the post-test and delayed post-test. For the Stage 4-instructed group, three participants made gains, and all three made gains between the pre-test and the delayed post-test. One and the same participant in the *Control* group made gains between all three testing measures. Chi-square tests showed no significant differences in stage gains by group from pre- to post-test, $\chi^2$ (2, $N$ = 21) = .63, $p$ = .77, pre- to delayed post-test, $\chi^2$ (2, $N$ = 21) = .11, $p$ = .69, or from post- to delayed post-test, $\chi^2$ (2, $N$ = 21) = .45, $p$ = .67.

#### 5.2.3.2 Syntax

This section presents the gains made in syntax. One participant had already acquired all five stages in Syntax (Participant 11), therefore his results were excluded. The analysis of syntax stage gains begins with learners who began the study at Stage 2. Results of participants (*n=16*) who began the study at Stage 2 are shown in Table 47.

**Table 47. Stage gains in syntax by learners at Stage 2**

| Test Range | Treatment groups | | |
|---|---|---|---|
| | **Stage 3-instructed** | **Stage 4-instructed** | **Control** |
| Pre-Post | 1/8 (13%) | 0/6 (0%) | 0/2 (0%) |
| Pre-Delayed | 3/8 (38%) | 2/6 (33%) | 0/2 (0%) |
| Post-Delayed | 3/8 (38%) | 2/6 (33%) | 0/2 (0%) |

When isolating just gains made in syntax, both the Stage 3-instructed group and the Stage 4-instructed group show similar gains, e.g. 38% of the Stage 3 instructed group and 33% of the Stage 4 instructed group made gains between the pre-test and delayed post-test. Gains made by any of the three groups were largely found on the delayed post-test and not the immediate post-

test. The gains made for the five participants in the experimental groups were that they all showed emergence of Stage 3. Stage 3 was the target of instruction for the Stage 3-instructed group, but Stage 4 was the target for the Stage 4-instructed group; therefore, the two participants in the Stage 4-instructed group failed to acquire the stage it was taught, but it did show changes to the next stage, Stage 3. Chi-square tests showed no significant differences between the groups on any of the three measures: pre to post, $\chi^2$ (2, $N$ = 16) = 1.1, $p$ = .63), pre to delayed, $\chi^2$ (2, $N$ = 16) = 1.1, $p$ = .28), or post to delayed, $\chi^2$ (2, $N$ = 16) = 1.1, $p$ =.28).

A description follows of the three learners, one from each group, that began the study at Stage 3. Participant 2 from the Stage 3-instructed group remained at Stage 3 on the post-test and delayed post-test. Participant 14 from the Stage 4-instructed group moved down to Stage 2 on the delayed post-test, and Participant 7 moved from Stage 3 on the post-test to Stage 5 on the delayed post-test. Given that only three learners were at Stage 3, statistical tests were not performed. To sum up this section, the instruction on Stages 3 and 4 syntax showed no significant change between the groups.

#### 5.2.3.3 Morphology

Most participants (*n*=12) began the study at Stage 1 morphology. Several began at Stage 3 (*n=5)* or Stage 4 (*n*=4). To begin, Table 48 displays stage gains made in morphology by participants at Stage 1.

**Table 48. Stage gains in morphology by participants at Stage 1**

| Test Range | Treatment groups | | |
|---|---|---|---|
| | Stage 3-instructed | Stage 4-instructed | Control |
| Pre-Post | 3/6 (50%) | 2/5 (40%) | 0/1 (0%) |
| Pre-Delayed | 3/6 (50%) | 3/5 (60%) | 0/1 (0%) |
| Post-Delayed | 2/6 (33.3%) | 1/5 (20%) | 0/1 (0%) |

As with the results for the syntax, several participants in both experimental groups gained stages in morphology, e.g. 50% of Stage 3-instructed learners between the pre-test and delayed post-test and 60% for the Stage 4-instructed learners on the same measure. No significant differences were found between the groups using Chi-square tests: pre to post, $\chi^2$ (2, $N$ = 12) = 0.89, $p$ = .67), pre to delayed, $\chi^2$ (2, $N$ = 12) = 1.2, $p$ = .50), or post to delayed, $\chi^2$ (2, $N$ = 12) = .62, $p$ =.59).

Given that no participants began the study at Stage 2, Table 49 shows the gains made by the five participants that began the study at Stage 3 morphology.

**Table 49. Stage gains in morphology by participants at Stage 3**

| Test Range | Treatment groups | | |
|---|---|---|---|
| | **Stage 3-instructed** | **Stage 4-instructed** | **Control** |
| Pre-Post | 0/2 (0%) | 0/1 (0%) | 1/2 (50%) |
| Pre-Delayed | 1/2 (50%) | 0/1 (0%) | 1/2 (100%) |
| Post-Delayed | 1/2 (50%) | 0/1 (0%) | 0/2 (0%) |

As seen in Table 49, two participants made gains on the post-tests: From the Stage 3-instructed group, Participant 1 from the Stage 3-instructed group gained Stage 4 on the delayed post-test, and Participant 7 from the Control group gained Stage 4 on the post-test and maintained it on the delayed post-test. No significant differences were found between the groups using Chi-square tests: pre to post, $\chi^2$ (2, $N$ = 5) = 1.9, $p$ = .60), pre to delayed, $\chi^2$ (2, $N$ = 5) = 0.8, $p$ = .80), or post to delayed, $\chi^2$ (2, $N$ = 5) = 1.9, $p$ =.60).

As for the three learners that began the study at Stage 4 (Participants 2, 9 and 11), Participant 11 went down to Stage 3 on the post-test and delayed post-tests. Participants 2 and 9 maintained Stage 3 on both post-tests. Participant 17 showed Stage 4 morphology but not Stage 3 on the post-test, but went back to Stage 1 morphology on both post-tests. This difference suggests that her performance on the pre-test may not have allowed for a complete picture of her

developmental stage. In fact, a closer look at the Stage 3 and 4 structures produced by Participant 7 shows that this learner met the emergence criteria for Stage 4 due to lexical variety: she produced enough predicative adjectives with plural *–s* to contrast with predicative adjectives without plural *–s*, but the corresponding noun phrase adjectives were left largely unmarked: e.g. **mi abuelos son um meyores y uh ricos y simpaticos.* 'my (sing) grandparents (pl) are old (pl) and rich (pl) and nice (pl).

#### 5.2.3.4 Summary of Stage Changes

To sum up, no significant differences were found between any of the groups on stage gains made between the pre-test and post-test, the pre-test and the delayed post-test or between the post-test and delayed post-test. In other words, participants from all three groups made comparable stage gains in syntax and morphology. In terms of the research questions of this study, learners gained stages whether instructed on the *next, next + 1* or *next +2* stage, or whether they received no instruction as is the case for the control group.

The next section will present the overall production of PT structures for the syntax and morphology separately in order to determine whether changes in production were brought about after the instructional periods.

### 5.2.4 Overall Production of PT Structures

As in Study 2, this section will compare the overall production (means and standard deviations) of structures produced at each stage (2, 3, 4 and 5) for each of the three groups on the pre-test, post-test and delayed post-test. All datasets were found to be non-normally distributed; therefore non-parametric methods were used to compare the results. The Kruskal-Wallis test was utilized

to compare the means between the groups, and Wilcoxon signed rank tests were used to compare the means within each group over the three testing measures. Post-hoc tests were performed using the Mann-Whitney test. Section 5.2.3.1 will present the results for the syntax followed by the results for the morphology in Section 5.2.3.2.

#### 5.2.4.1 Syntax

Production counts of structures produced for each stage (Stage 2, 3 and 4) of syntax are presented in the following sections. The first analysis involves results from the participant (16) that began the study at Stage 1. Participant 16 only produced isolated lexical items until the delayed post-test when he produced 2 SVO structures. Most learners began the study at Stage 2, SVO, which is the topic of the next section.

##### *Stage 2 (SVO) learners*

Table 50 shows the means and standard deviations of production of all PT structures for those learners that began at Stage 2 (*N=16)* on the pre-test, post-test and delayed post-test. While a Kruskal-Wallis test showed no significant differences in production between the three groups, both of the experimental groups made significant changes over the three testing periods on production of Stage 2 and 3 structures. For the Stage 3-instructed group, Wilcoxon signed ranks tests showed a significant increase in Stage 2 SVO structures from the pre-test to the delayed post-test ($z$=-2.1, $p$=.02) and between the post-test and delayed post-test ($z$=-2.25, $p$=.02). The Stage 4-instructed group also increased Stage 2 SVO structures from the pre test to the post-test ($z$=-1.7, $p$=.06). Stage 3 structures, topicalized clauses, also increased for both of the Stage 3 and Stage 4-instructed groups on the delayed post-test. For the Stage 3-instructed group, production of Stage 3 structures increased between the pre-test and delayed post-test ($z$=-2.04,

*p*=.03). The Stage 4-instructed group showed a significant increase at Stage 3 structures between the pre-test and delayed post-test, *z*=-2.04, *p*=.03, and between the post-test and delayed post-test, *z*=-2.04, *p*=.03. As for the Control group, production remained steady for all structures on the post-test and delayed post-test.

**Table 50. Production of syntax for Stage 2 learners**

| **Treatment group** | **PT structures** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ***Stage 3 Group*** *(n=8)* | **SVO (Stage 2)** | | **TOP (Stage 3)** | | **SV-INV (Stage 4)** | | **SUB-CL (Stage 5)** | |
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| Pre | 21.5 | 14.4 | 0.9 | 1.0 | 0.1 | 0.4 | 0.1 | 0.4 |
| Post | 22.1 | 11.8 | 1.0 | 1.8 | 0.1 | 0.4 | 0 | 0 |
| Delayed | 31.3 | 19.0 | 2.1 | 2.1 | 0.4 | 0.5 | 0.3 | 0.7 |
| **Stage 4 Group** (n=6) | **SVO (Stage 2)** | | **TOP (Stage 3)** | | **SV-INV (Stage 4)** | | **SUB-CL (Stage 5)** | |
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| Pre | 9.7 | 6.0 | 0.2 | 0.4 | 0.2 | 0.4 | 0 | 0 |
| Post | 16.7 | 11.6 | 0.3 | 0.5 | 0 | 0 | 0 | 0 |
| Delayed | 19.3 | 13.7 | 2.3 | 1.9 | 0.2 | 0.4 | 0.2 | 0.4 |
| ***Control*** *(n=2)* | **SVO (Stage 2)** | | **TOP (Stage 3)** | | **SV-INV (Stage 4)** | | **SUB-CL (Stage 5)** | |
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| Pre | 24 | 11.3 | 0 | 0 | 0 | 0 | 0 | 0 |
| Post | 27 | 1.4 | 0.5 | 0.7 | 0 | 0 | 0 | 0 |
| Delayed | 26.5 | 9.2 | 0.5 | 0.7 | 0 | 0 | 0 | 0 |

*Note.* The shaded areas indicate the stage that was the topic of instruction for the experimental groups.

In sum, the participants who began the study at Stage 2 in the Stage 3-instructed group produced more Stage 2 and Stage 3 structures on the delayed post-test after instruction on Stage 3. In other words, instruction on Stage 3, the next stage, resulted in these learners producing more

structures at their present stage as well as the next stage, Stage 3. As for those at Stage 2 in the Stage 4-instructed group, production on Stage 3 structures increased on the delayed post-test, i.e. the *next* stage. No changes were found on the instructed stage, the *next* + 1 stage.

### *Stage 3 (Topicalization) learners*

As for participants (*N=3*) that began the study at Stage 3 (topicalization), Table 51 shows the number of structures produced at each stage on the pre-test, post-test and delayed post-test.

**Table 51. Production of Stage 3 participants on the pre-, post-, and delayed post-tests**

| **PT structures** | **Treatment groups** | | |
|---|---|---|---|
| | **Stage 3-instructed** | **Stage 4-instructed** | **Control** |
| **SVO** | **P2** | **P14** | **P7** |
| Pre | 34 | 26 | 28 |
| Post | 47 | 19 | 37 |
| Delayed | 42 | 24 | 59 |
| **TOP** | | | |
| Pre | 4 | 2 | 8 |
| Post | 3 | 3 | 6 |
| Delayed | 5 | 1 | 14 |
| **SV-INV** | | | |
| Pre | 0 | 2 | 1 |
| Post | 0 | 1 | 2 |
| Delayed | 0 | 0 | 11 |
| **SUB-CL** | | | |
| Pre | 0 | 1 | 1 |
| Post | 0 | 0 | 0 |
| Delayed | 0 | 0 | 15 |

*Note.* The shaded areas indicate the stage that was the topic of instruction for the experimental groups.

For the two participants in the experimental groups, little change is seen over the three tests, for example Participant 2 produces 4, 3 and 5 Stage 3 structures on the three tests respectively. Participant 7, however, shows a tremendous increase on the delayed post-test across all stages, e.g. from 28 to 59 SVO structures, or from 1 to 15 subordinate clauses. The data from this participant appears to be an outlier given the drastic changes from this participant on the delayed post-test, as well as this participants' language background. This participant reported being an advanced speaker of Hebrew, French, and an intermediate to advanced speaker of Italian. It is likely that this learner was able to change more rapidly during the five weeks of the testing period given her already developed proficiency in two Romance languages, as well as a Semitic language, Hebrew.

### *Stage 5 (subordinate clauses) learners*

Given that no learner began the study at Stage 4 syntax, this section presents the results for one learner that began the study at Stage 5 syntax. His production at all stages on all three tests is shown in Table 52.

**Table 52. Production of Stage 5 Subordinate Clauses for Participant 11**

| **Stage 2** | | | **Stage 3** | | | **Stage 4** | | | **Stage 5** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Pre* | *Post* | *Del.* | *Pre* | *Post* | *Del.* | *Pre* | *Post* | *Del.* | *Pre* | *Post* | *Del.* |
| 28 | 47 | 24 | 14 | 18 | 16 | 5 | 7 | 3 | 10 | 13 | 11 |

*Note.* The shaded areas indicate the stage that was the topic of instruction for the experimental groups.

As demonstrated in Table 52, Participant 11 produced a similar amount or less structures at each stage after instruction on Stage 4 syntax, for example, at Stage 4, he produced 5 on the pre-test, 7 on the post-test and 3 on the delayed post-test. A summary of the results of the effect of instruction on production of the PT structures follows in the next section.

### *Summary of Production of Syntax*

In sum, the only significant differences within the groups were found for learners that began the study at Stage 2, SVO, or Stage 3, topicalization. The groups largely performed the same on Stages 4 and 5 structures over the two post-tests. The changes in production were seen at Stages 2 and 3. Learners at Stage 2 in the Stage 3-instructed group showed increased production of Stage 2, SVO word order, on both post-tests, as well as increased production from the pre-test to the delayed on the target of instruction, Stage 3 topicalization. Regarding the research questions of this study, this indicates that instruction on the *next* stage was beneficial at increasing production of that stage as well as the previous stage. Participants that began the study at Stage 2 in the Stage 4-instructed group received instruction on Stage 4 syntax, the *next + 1* level, but only showed improvement in production of Stage 3, topicalized clauses, between the pre-test and the delayed post-test. In other words, instruction on the *next* + 1 stage resulted in improvements on the *next* stage. The Control group showed no significant changes between the testing measures.

Given the differing initial stages for learners, Table 53 shows a summary of the significant results for learners at the same stage on the pre-test and according to the actual target of instruction.

**Table 53. Target and effect of instruction for syntax**

| Target of instruction | Initial stage of learners | | | |
|---|---|---|---|---|
| | **Stage 1 learner (*n*=1)** | **Stage 2 learners (*n*=16)** | **Stage 3 learners (*n*=3)** | **Stage 5 learner (*n*=1)** |
| Next stage | | Sig. differences at Stage 2 and Stage 3 on the delayed post-test. | No sig. changes | - |
| Next + 1 stage | | Sig. differences at Stage 3 on the delayed post-test. | | - |
| Next + 2 stage | No sig. change | | | |
| Already acquired stage | | - | No sig. changes | No sig. changes |

Unlike in Study 2, instruction on the *next* or *next + 1* stage of syntax did result in significant changes for the two experimental groups. In both groups, learners increased production of Stage 2 and 3 structures on both testing measures. Regarding the research questions of this study, this result shows that both instruction on the *next* or *next + 1* stage was effective at advancing learners beyond their current stage to production of structures at the next stage, Stage 3. Notably, instruction on the *next + 1* stage had no effect on learners producing Stage 4 structures; instead, instruction on the *next + 1* level had the effect that learners continued to advance along the PT hierarchy, a result which mirrors the result in Study 2 that instruction on the *next + 1* morphology resulted in learners improving production on the *next* stage rather than the *next + 1* stage.

#### 5.2.4.2 Morphology

This section presents the results of the raw production of morphology at Stages 2, 3, 4 and 5. Since no student produced Stage 5, subjunctive morphology, or relative clauses, or contexts for either, Stage 5 is not included here. The results were analyzed according to raw production of the structures, obligatory contexts and percent application out of obligatory contexts. The means and standard deviations will be given for each of the 3 stages; obligatory contexts and percent application will be discussed if found to be significantly different.

##### *Stage 1 (lexical items) learners*

Most of the participants (*N=12)* in Study 3 were at Stage 1 morphology on the pre-test. Table 54 shows the production results for these learners by group.

**Table 54. Production at all stages by learners at Stage 1**

| **Treatment groups** | **PT structures** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Stage 3 Group** *(n=6)* | **Pl –s (Stage 2)** | | **NP-Agr (Stage 3)** | | **PO-Agr (Stage 4)** | | **SUBJ (Stage 5)** | |
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| Pre | 2.5 | 1.6 | 1.7 | 1.6 | 0.3 | 0.8 | 0 | 0 |
| Post | 4.2 | 2.9 | 2.8 | 2.9 | 0 | 0 | 0 | 0 |
| Delayed | 5.8 | 5.5 | 3.5 | 3.9 | 1.3 | 2.4 | 0 | 0 |
| **Stage 4 Group** (*n*=5) | **Pl –s (Stage 2)** | | **NP-Agr (Stage 3)** | | **PO-Agr (Stage 4)** | | **SUBJ (Stage 5)** | |
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| Pre | 1.2 | 2.2 | 1.0 | 2.2 | 0 | 0 | 0 | 0 |
| Post | 4 | 2.1 | 2.2 | 2.5 | 0.4 | 0.9 | 0 | 0 |
| Delayed | 6.2 | 3.6 | 3.6 | 3.8 | 0.6 | 1.3 | 0 | 0 |
| **Control** *(n*=1) | Pl –s (Stage 2) | | NP-Agr (Stage 3) | | PO-Agr (Stage 4) | | SUBJ (Stage 5) | |
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| Pre | 3 | N/A | 2 | N/A | 0 | N/A | 0 | N/A |
| Post | 1 | N/A | 1 | N/A | 2 | N/A | 0 | N/A |
| Delayed | 3 | N/A | 0 | N/A | 2 | N/A | 0 | N/A |

*Note.* The shaded areas indicate the stage that was the topic of instruction for the experimental groups.

Given that there was only one participant in the Control group at Stage 1, Mann Whitney tests were performed comparing just the Stage 3-instructed group and Stage 4-instructed groups, and no significant differences were found. However, over time, both Stage 3 and Stage 4-instructed groups showed increased production of the target structures. The Stage 3-instructed group improved steadily on production of Stage 2 plural *–s* over the three tests. This change was close to significant between the pre-test and post-test, $z$=-1.89, $p$=.06. This group also showed a close

to significant change between the post-test and delayed post-test on contexts for Stage 4 predicative adjectives, $z$ =-1.83, $p$ = .06.

The Stage 4-instructed group showed changes in production of several structures as well as contexts. Wilcoxon signed ranks tests showed close to significant changes on plural *–s* between the pre-test and post-test, $z$=-1.83, $p$=.06 as well as between the pre-test and delayed post-test, $z$=-2.03, $p$=.03. For NP-agreement, Stage 3, contexts for agreement within the noun phrase increased from the pre-test to the post-test, $z$=-2.03, $p$=.03. Production of agreement also increased from the pre-test to the delayed post-test, $z$=-1.84, $p$=.06, as did contexts for noun phrase agreement, $z$=-1.83, $p$=.06. Contexts for predicative object agreement also increased from the pre-test to the delayed post-test, $z$=-1.84, $p$=.06.

The participant from the Control group maintained about the same low production levels for the morphology, e.g. 2 cases of NP-agreement on the pre-test and 1 on the post-test.

### *Stage 3 (NP-agreement) learners*

Five participants began the study at Stage 3, NP-agreement. Their production is shown in Table 55.

**Table 55. Production at all stages of learners at Stage 3**

| PT structures | Treatment groups | | | | |
|---|---|---|---|---|---|
| | Stage 3-instructed | | Stage 4-instructed | Control | |
| | P1 | P4 | P14 | P6 | P7 |
| **Plural -*s*** | | | | | |
| Pre | 5 | 8 | 11 | 7 | 8 |
| Post | 5 | 7 | 9 | 4 | 14 |
| Delayed | 7 | 13 | 7 | 2 | 29 |
| **NP-Agr** | | | | | |
| Pre | 4 | 7 | 14 | 8 | 8 |
| Post | 7 | 3 | 6 | 6 | 17 |
| Delayed | 8 | 11 | 9 | 4 | 33 |
| **PO-Agr** | | | | | |
| Pre | 2 | 1 | 0 | 1 | 1 |
| Post | 0 | 0 | 1 | 3 | 5 |
| Delayed | 6 | 1 | 0 | 0 | 6 |
| **SUBJ** | | | | | |
| Pre | 0 | 0 | 0 | 0 | 0 |
| Post | 0 | 0 | 0 | 0 | 0 |
| Delayed | 0 | 0 | 0 | - | - |

*Note.* The shaded areas indicate the stage that was the topic of instruction for the experimental groups.

Production of plural –*s* showed gains for three participants (1, 4 and 7) and declines for two (14 and 6). For the two learners in the Stage 3-instructed group, NP-agreement showed important gains on the delayed post-test, from 4 on the pre-test to 8 on the delayed post-test for Participant 1 and from 7 to 11 for Participant 4. Participants 14 and 6 showed declines in production for NP-agreement, e.g. from 14 to 9 for Participant 14 and 8 to 4 for Participant 6. Predicative object agreement remained steady for most of the participants, except Participant 1 who showed a large increase on the delayed post-test. In sum, the instruction on Stage 3 for these learners already at Stage 3 did result in some gains in production on Stage 3 structures. The instruction on Stage 4 for Participant 14 resulted in no increases in production of the target structures. As mentioned in previous sections, participant 7 remains an outlier in the drastic changes seen between pre-test,

post-test and delayed post-test, for example, from 8 cases of NP-agreement on the pre-test to 33 on the delayed post-test.

### *Stage 4 (PO-agreement) learners*

Two learners from the Stage 4-instructed group, Participants 9 and 11, began the study with Stage 4 morphology and one from the Stage 3-instructed group, as shown in Table 56.

**Table 56. Production of PT structures for learners at Stage 4**

| PT structures | Treatment groups | | |
|---|---|---|---|
| | Stage 3-instructed | Stage 4-instructed | |
| | P2 | P9 | P11 |
| **Plural -*s*** | | | |
| Pre | 7 | 6 | 19 |
| Post | 6 | 6 | 15 |
| Delayed | 5 | 13 | 12 |
| **NP-Agr** | | | |
| Pre | 7/12 | 5/5 | 22 |
| Post | 5/5 | 8/9 | 15 |
| Delayed | 4/5 | 9/13 | 10 |
| **PO-Agr** | | | |
| Pre | 5/5 | 4/6 | 5 |
| Post | 8/8 | 11/13 | 0 |
| Delayed | 10/12 | 5/7 | 3 |
| **SUBJ** | | | |
| Pre | 0 | 0 | 0 |
| Post | 0 | 0 | 0 |
| Delayed | 0 | 0 | 0 |

*Note.* The shaded areas indicate the stage that was the topic of instruction for the experimental groups.

As seen in Table 56, no significant improvements in production were found for Participant 11 after instruction on Stage 4 morphology; in fact, production of NP-agreement declined from 22 on the pre-test to 10 on the delayed post-test. As for Participants 2 and 11, production and contexts rose for Stage 2, 3 and 4 structures, for example, from 5/5 to 9/13 NP-agreement structures for Participant 9. Likewise, PO-agreement structures rose from 5/5 to 10/12 for

Participant 2. These results suggest that the instruction on Stage 3 or 4, i.e. both already acquired stages for these learners, led them to notice and produce more of these structures on the post-tests.

### *Stage 4 no 3 (PO-agreement no NP-agreement)*

As discussed previously (Section 5.2.2.3), Participant 17 began the study at Stage 4 but not 3 morphology; her production is shown in Table 57.

**Table 57. Production of morphology for Participant 17**

| **Stage 2** | | | **Stage 3** | | | **Stage 4** | | | **Stage 5** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Pre* | *Post* | *Del.* | *Pre* | *Post* | *Del.* | *Pre* | *Post* | *Del.* | *Pre* | *Post* | *Del.* |
| 4 | 4 | 2 | 4/8 | 3/4 | 0 | 8/10 | 2/5 | 4/8 | 0 | 0 | 0 |

*Note.* The shaded areas indicate the stage that was the topic of instruction for the experimental groups.

As illustrated in Table 57, Participant 17 produced Stage 3 structures on the pre-test and post-test, but not enough to meet the emergence criteria. Production and contexts of Stage 3 structures also declined, from 8/10 to 2/5 on the post-test. In sum, instruction on Stage 3 for this learner had little effect on increased production of Stage 3 or 4 structures. In the next section, the results of the production of morphology are summarized.

### *Summary of Production of Morphology*

In sum, as seen in this section, while no significant differences in production were found between the groups, both the Stage 3 and Stage 4-instructed groups showed gains in production of several of the structures at Stages 2, 3 or 4. As for the learners who began the study at Stage 1, multiple significant increases over time were found in production and contexts for Stages 2, 3 and 4. The Stage 1 learners in the Stage 3-instructed group showed one close to significant

change (p = .06): they produced more Stage 2 plural *–s* structures between the pre-test and the post-test. In other words, this group received instruction on NP-agreement, which is the *next + 1* stage for them; no significant changes were found in production of NP-agreement for this group; instead, the instruction aided learners to produce the *next* stage, plural –s marking.

For the participants at Stage 1 in the Stage 4-instructed group on the pre-test, multiple changes were found in production in plural *–s*, NP-agreement and predicative object marking, as seen in Table 50. This group produced more plural – *s* marking on the post-test and the delayed post-test and more NP-agreement in the short-term between the pre-test and the post-test. They also produced more obligatory contexts for NP-agreement and predicative object marking on the delayed post-test. These results indicate that for this group learners did produce more of the most basic marking, plural – *s* on the noun over the long-term, as well as more NP-agreement in the short-term. This shows that instruction on predicative object marking (Stage 4), which was the *next + 2* stage for these learners, was effective at aiding learners to produce plural marking on lexical items (Stage 2) and within the noun phrase (Stage 3); in addition, learners increased production of obligatory contexts of both NP-agreement and predicative object marking, but, importantly they were unable, even with instruction, to increase production of marking of obligatory predicative object contexts. That is, they could produce the obligatory structure for inter-phrasal agreement, but they could not produce the morphology yet. The next section summarizes the effect of instruction according to which stage it addressed for the learners in this study.

The aim of instruction for the two experimental groups was to determine whether instruction geared at a structure found at a higher stage, i.e. the *next + 1* stage, or at a higher degree of markedness, would compare to instruction geared at a less marked structure, or a

structure found at a lower stage, i.e. the *next* stage. All in all, participants in this study were taught the *next +1* stage or the *next + 2* stage or a stage they had already acquired. Table 58 summarizes the effect of instruction in terms of the target of instruction.

**Table 58. Target and effect of instruction for morphology**

| **Target of instruction** | **Initial stage of learners** | | | |
|---|---|---|---|---|
| | **Stage 1 (lexical items) learners (*n=1*2)** | **Stage 3 (NP-agreement) learners (*n*=5)** | **Stage 4 (PO-agreement) (*n*=3)** | **Stage 4 no 3 (PO- no NP-agreement) (*n*=1)** |
| Next stage | - | No sig. changes | No sig. changes | |
| Next + 1 stage | Nearly sig. differences at Stage 2 (plural – *s)* on the post-test and Stage 4 (PO-agreement) contexts on the delayed post-test | - | | |
| Next + 2 stage | Sig. differences at Stage 2 on delayed and Stage 3(NP-agr) contexts on post.<br><br>Nearly sig. differences at Stage 2 on post, Stage 3 prod. and contexts on delayed, and Stage 4 contexts on delayed. | - | | |
| Already acquired stage | - | No sig. changes | No sig. changes | |
| Skipped stage | | | | No sig. changes |

Overall, the two main teaching conditions were instruction on the *next + 1,* NP-agreement, or the *next + 2* stage, predicative object marking. Both conditions resulted in changes in production, but a broader effect was found for teaching predicative object marking in that learners improved production on plural *–s* marking and NP agreement as well as contexts for predicative object

marking. On the other hand, instruction on NP-agreement alone resulted in improvement on only production of plural *–s* marking and only in the short term on the immediate post-test. Some effect was also found for teaching NP-agreement for learners who had already acquired this stage (*n=2):* both production and obligatory contexts for NP-agreement improved on the delayed post-test.

In terms of the research questions of this study, the first questions were whether instruction on the *next* or *next + 1* stage can facilitate development. Given that no learner was at Stage 2 morphology, only a few learners were actually instructed on the *next* level, but statistical tests were not run given that the group sizes were less than 5. Instruction on the *next + 1* level was found to be effective at advancing learners to the *next* level (Stage 2), but the changes were marginally significant. However, instruction focused at the *next + 2* level was found to have a wider-reaching effect. Stated in terms of markedness, instruction on the most marked end of the hierarchy of morphology (lexical < phrasal < interphrasal) led to the most widespread gains across the three kinds of morphemes. Instruction on the middle member of the trio, phrasal morphemes, also led to gains, but only on the least marked item, lexical morphemes. The theoretical implications of these results will be discussed in Section 5.3.

### 5.2.5 Stage Change and Production

As in Study 2, a combined analysis has also been conducted of the production of those learners who gained stages on the post-test and delayed post-test. This analysis is potentially informative as to the relationship between production of PT structures and stage emergence, as discussed in

Section 4.2.4 of Study 2. The production and stage changes for syntax will be discussed first, followed by the morphology.

### 5.2.5.1 Syntax

Table 59 shows the participants who gained one or more stages in syntax along with the production of Stages 2 (SVO), Stage 3 (XP-adjunction) and Stage 4 (SV-inversion) structures on the pre-test, post-test and delayed post-test.

**Table 59. Production of Stages 2, 3 and 4 syntax for learners who gained a stage**

| Test range | PT structures | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Stage 2 structures | | | Stage 3 structures | | | Stage 4 structures | | |
| | Pre | Post | Delayed | Pre | Post | Delayed | Pre | Post | Delayed |
| **Stage 3-instructed** | | | | | | | | | |
| 1 | **24** | **32** | **38** | 1 | 2 | **3** | 0 | 0 | 1 |
| 4 | **53** | **44** | **68** | 1 | 0 | **4** | 1 | 0 | 0 |
| 18 | **20** | **25** | **45** | 3 | 1 | **6** | 0 | 0 | 1 |
| 19 | **22** | **22** | **27** | 0 | **5** | 1 | 0 | 1 | 1 |
| **Stage 4-instructed** | | | | | | | | | |
| 9 | **8** | **31** | **32** | 1 | 1 | **5** | 0 | 0 | 1 |
| 15 | **8** | **4** | **7** | 0 | 0 | **4** | 0 | 0 | 0 |
| **Control** | | | | | | | | | |
| 7 | **28** | **37** | **59** | **8** | **6** | **14** | 1 | 2 | **11** |

*Note.* The shaded and bolded areas indicate that the stage was considered to be acquired.

As seen in Table 59, all learners that gained any stages in syntax started at Stage 2 and gained Stage 3 either on the post-test or the delayed post-test. The range of Stage 2 structures produced on the pre-test was considerable, between 8 and 53 tokens; a similar range exists of Stage 2 structures for those Stage 2 learners that did not gain stage 3 syntax (from 7 to 34 Stage 2 structures). This indicates that production of structures at the preceding level did not indicate emergence of Stage 3. This result raises the question, as discussed in Study 2, as to when learners move to the next stage, given that all ready learners with similar initial production levels of earlier stage structures did not advance to subsequent stages, while some did.

Next, an analysis of the production of those who gained stages compared to those who did not was conducted and displayed in Table 60. Independent samples t-tests were conducted for the largest group of learners at the same stage, those that began the study at Stage 2 syntax (*N=16)*.

**Table 60. Production Means and Stage Gains for Stage 2 Learners**

| **Testing range** | **PT structures** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **SVO (Stage 2)** | | **TOP (Stage 3)** | | **SV-INV (Stage 4)** | | **SUB (Stage 5)** | |
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| **Pre** | | | | | | | | |
| Gain *(n=6)* | 22.5 | 16.5 | **1.0**[1] | 1.1 | 0.2 | 0.4 | 0.2 | 0.4 |
| No Gain *(n=10)* | 14.3 | 9.0 | **0.2**[1] | 0.4 | 0.1 | 0.3 | 0 | 0 |
| **Post** | | | | | | | | |
| Gain *(n=6)* | 26.3 | 13.3 | 1.5 | 1.9 | 0.2 | 0.4 | 0 | 0 |
| No Gain *(n=10)* | 17.3 | 8.4 | 0.2 | 0.4 | 0 | 0 | 0 | 0 |
| **Delayed** | | | | | | | | |
| Gain *(n=6)* | **36.2**[2] | 20.2 | **3.8**[3] | 1.7 | **0.7**[4] | 0.5 | 0.5 | 0.8 |
| No Gain *(n=10)* | **20.2**[2] | 10.8 | **0.9**[3] | 0.9 | **0**[4] | 0 | 0 | 0 |

[1]This difference was significant ($p$=.05)
[2] This difference was significant ($p$=.06)
[3]This difference was significant ($p$=.00)
[4] This difference was significant ($p$=.00)

As seen in Table 60, these two groups differed in production on several stages and tests. No differences were found in SVO production, Stage 2, on the pre-test, but by the delayed post-test, the group that gained Stage 3 was producing a significantly higher amount of Stage 2 and 3 structures compared to those that did not gain a stage. In other words, once they have gained the next stage, their production of the preceding stage also rose. The two groups did differ in initial production of Stage 3 structures, a fact which could explain why these six learners were able to acquire Stage 3 and produce significantly more than those that did not gain Stage 3. Although these learners gained Stage 3 and not Stage 4, their production of Stage 4 structures on the

delayed post-test is also significantly different from those that did not gain a stage; this suggests that these learners have continued to produce more tokens of subsequent stages during the testing period. In sum, those that gained stages also showed increased production amounts compared to those that did not gain stages.

### 5.2.5.2 Morphology

In this section, the morphological production of all learners that gained a stage in morphology will be discussed. Table 61 shows the production of Stage 2 (plural *–s),* Stage 3 (NP-agreement), and Stage 4 (PO-agreement) on the pre-, post-, and delayed post-tests.

**Table 61. Production of Stages 2,3 and 4 morphology for learners who gained a stage**

| Test range | PT structures | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Stage 2 structures | | | Stage 3 structures | | | Stage 4 structures | | |
| | Pre | Post | Delayed | Pre | Post | Delayed | Pre | Post | Delayed |
| **Stage 3** | | | | | | | | | |
| 1 | **5** | **5** | **7** | **4/5** | **7/7** | **8/8** | 2/3 | 0/4 | **6/8** |
| 3 | 3 | **6** | **8** | 4/6 | 1/2 | 0/4 | 0/0 | 0/1 | 0/2 |
| 4 | **8** | **7** | **13** | **7/9** | 3/6 | **9/11** | 1/5 | 0/7 | 1/12 |
| 18 | 4 | **5** | **14** | 1/4 | 1/5 | **7/10** | 0/1 | 0 | 0/5 |
| 19 | 4 | **7** | **9** | 3/4 | **7/7** | **8/9** | 2/2 | 0/1 | **6/7** |
| **Stage 4** | | | | | | | | | |
| 10 | 0 | 3 | **10** | 0 | 3 | **9/10** | 0 | 2/3 | 3/3 |
| 12 | 5 | **6** | **9** | 5 | **6/7** | **6/7** | 0/4 | 0/11 | 0/11 |
| 13 | 0 | **6** | **7** | 0 | 0/6 | 2/3 | 0 | 0/0 | 0/1 |
| **Control** | | | | | | | | | |
| 7 | **8** | **14** | **29** | **8/9** | **17/20** | **33/36** | 1/2 | **5/5** | **6/26** |

*Note.* The shaded and bolded areas indicate that the stage was considered to be acquired.

For the Stage 3-instructed group, stage gains were made either at Stage 2 (P3, P18, and P19), Stage 3 (P18 and P19), or Stage 4 (P1 and P19). For the two learners that gained Stage 3 (P18 and P19), their production of the preceding stage, Stage 2, was a low of 4 tokens. For those that gained Stage 4 (P1 and P19), both showed emergence or nearly emergence of Stage 3 structures on the pre-test, more robust production of Stage 3 structures on the post-test, and finally emergence of Stage 4 on the delayed post-test. At the same time, many learners who did not

gain any stages also showed similar levels of production of Stage 3 structures on the pre-test and the post-test. In the Control group, P7 shows emergence of Stage 4 structures on the post-test; however, this production of Stage 4 has clearly just emerged given that it is marked in only 6/26 obligatory contexts on the delayed post-test.

In order to speak to the question of whether production amounts related to stage gain, the production amounts of those learners that gained a stage was compared to those that did not gain a stage by independent samples t-tests. Table 62 shows the results of those learners that began the study at Stage 1, which were the majority of the participants in this study (*N*=12).

**Table 62. Production means and stage gains for Stage 1 learners**

| **Test range** | **PT structures** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **PL –S (Stage 2)** | | **NP-AGR (Stage 3)** | | **PO-AGR (Stage 4)** | | **SUBJ (Stage 5)** | |
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| **Pre** | | | | | | | | |
| Gain *(n=6)* | 2.7 | 2.2 | 2.2 | 2.1 | 0 | 0 | 0 | 0 |
| No Gain *(n=6)* | 1.3 | 1.4 | 0.7 | 1.0 | 0.3 | 0.8 | 0 | 0 |
| **Post** | | | | | | | | |
| Gain *(n=6)* | **5.5**[1] | 1.4 | 3.0 | 2.9 | 0.3 | 0.8 | 0 | 0 |
| No Gain *(n=6)* | **2.2**[1] | 2.3 | 1.8 | 2.2 | 0.3 | 0.8 | 0 | 0 |
| **Delayed** | | | | | | | | |
| Gain *(n=6)* | **9.5**[2] | 2.4 | **5.3**[3] | 3.6 | 1.5 | 2.5 | 0 | 0 |
| No Gain *(n=6)* | **2.0**[2] | 1.7 | **1.2**[3] | 2.4 | 0.7 | 1.0 | 0 | 0 |

[1]This difference was significant (*p*=.01)
[2] This difference was significant (*p*=.00)
[3]This difference was significant (*p*=.04)

Table 62 shows that both groups, those that gained a stage and those that did not, were similar on the pre-test on production of the four stages. The learners that gained Stages 2 and 3 on the post-test or delayed post-test, however, did show significantly higher production of Stage 2 and 3 structures on the post-test and the delayed post-test. This shows that production on preceding

stages did not influence whether learners gained a stage or not. Given that all six learners that gained a stage were in the experimental groups, it is clear that instruction aided these learners to gain the stages instructed as well as increase production of these structures. However, at the same time, five of the six learners that did not gain a stage were in the experimental groups as well, and they did not increase production nor did they gain stages after instruction.

#### 5.2.5.3 Summary of Stage Change and Production

In sum, this look at production of those learners who made stage gains in syntax or morphology shows that higher or lower levels of production did not indicate when stage gains were made or not for the learners, which is the same conclusion that was drawn in Study 2. This shows that it is not necessary for a learner to produce a large amount of tokens of their current stage in order to gain subsequent stages, a fact which reflects the philosophy of the emergence criteria that it is sufficient to look at a few structures in order to decide if a learner is able to process certain structures. At the same time, it is true that Stage 1 (lexical items) learners that gained Stage 2 (plural *–s)* on the post-test or delayed post-test produced more tokens of Stage 2 and Stage 3 (NP-agreement) structures than those learners who did not gain Stage 2. This result implies that learners did not merely show emergence of the morphology, but were actively producing multiple tokens of the target structures. This topic will be discussed more fully in the Discussion, Section 5.3.

### 5.2.6 Summary of Results

In this section, multiple analyses have been presented regarding the progress through the PT hierarchy for the participants in this study. Namely, stage gains were first analyzed by group; although many participants in each group did gain stages, no significant differences were found between the groups. However, an analysis of the differences in production of the target structures between and within the groups did find some important differences due to the instructional intervention. A summary of the results follows.

- **Stage Gains**
  - No advantages were found for either of the two instructional groups on stage gains.
- **Production of syntax**
  - Instruction on the *next* stage, Stage 3 (XP-adjunction), resulted in increased production of the current stage, Stage 2 (SVO), and the instructed stage on the delayed post-test.
  - Instruction on the *next + 1* stage, Stage 4 (SV-inversion), resulted in increased production of Stage 3 (XP-adjunction) structures on the delayed post-test.
- **Production of morphology**
  - Instruction on the *next* stage resulted in little change in production.
  - Instruction on the *next + 1* stage, Stage 3 (NP-agreement), resulted in marginally significant increased production of Stage 2 (plural *–s)* and Stage 4 (PO-agreement) structures on the post-test and delayed post-test for the Stage 3-instructed group.

- Instruction on Stage 4 (PO-agreement), the *next + 2* stage resulted in increased production of Stage 2 (plural *–s)* structures on the delayed post-test and Stage 3 (NP-agreement) contexts on the post-test. Other structures that improved at marginally significant levels were Stage 2 structures on the post-test (*p=.06*), Stage 3 production and contexts on the delayed post-test (*p=.06*), and Stage 4 contexts on the delayed post-test (*p=.06*).

- **Stage gains and production**
  - The learners who gained Stages 3 or 4 in syntax on the post-tests showed higher production of Stage 3 structures on the pre-test, and this difference persisted on the delayed post-test. These learners also showed higher tokens of Stage 2 and Stage 4 syntactic structures on the delayed post-test.
  - Those that gained Stage 2 or higher in morphology produced more tokens of Stage 2 and 3 morphology on the post-test and delayed post-test compared to those who did not gain stages.

In sum, while participants in the instructed groups did not make more stage gains compared to the control group, the production of the targeted structures did increase after instruction for several PT structures in syntax or morphology. For both syntax and morphology, effects of instruction were seen whether teaching the *next, next + 1 or next +2* stage. Overall, however, the farthest-reaching effects of instruction were seen for instruction on the *next + 2* stage of morphology. Unlike for Study 2, instruction on syntax did have an effect in that learners increased production of the target syntactic structures as well as structures they were already producing. The control group showed no significant changes between the pre-test, post-test and

delayed post-test on any of the measures. The theoretical implications of these results will be discussed in further detail in the next section.

## 5.3 DISCUSSION

The aim of Study 3 was to investigate whether instruction geared at subsequent stages (Stages 3 and 4) of the PT hierarchy would be effective at aiding learners to advance through the PT hierarchy in terms of stage gains or increased production of the target items. As in Study 2, two principal hypotheses on the target of instruction were targeted: the Teachability Hypothesis and the Projection Model. Discussion of both hypotheses follows in Section 5.3.1 and 5.3.2 in accordance with the results of Study 3.

### 5.3.1 Teachability Hypothesis: *next* or *next + 1?*

Study 2 showed that instruction on the *next* or *next + 1* stage could facilitate development in production at those stages, providing counter-evidence to the claim of the Teachability Hypothesis that instruction is only effective for a stage for which a learner is psycholinguistically ready. In Study 3, the Stage 2 learners instructed on the next stage, Stage 3 syntax, topicalization, showed significant gains in production on the post-test and delayed post-test. They also improved production of the preceding stage, Stage 2 (SVO). The Stage 2 learners in the Stage 4-instructed group that were instructed on the *next + 1* stage (SV-inversion), made gains on

production of Stage 3 (XP-adjunction) syntax on the post-test and delayed post-test. In effect, instruction on the *next* or *next + 1* stage in syntax resulted in learners gaining the *next* stage.

As for morphology, results are nearly identical to those for syntax: the Stage 1 learners that were instructed on the *next + 1* stage, Stage 3 (NP-agreement), improved on the *next* stage, Stage 2 (plural *–s*). Likewise, instruction for Stage 1 learners on the *next + 2* stage, Stage 4 (PO-agreement), resulted in learners improving production of the *next* and *next + 1* stages. In other words, instruction on either the *next + 2* or *next + 1* stage of morphology resulted in production gains within both groups on the instructed stage as well as stages already acquired. In sum, regarding the Teachability Hypothesis, instruction does not have to be directed at the *next* stage in order to be effective; in fact, as Study 2 and Study 3 show, instruction geared at subsequent stages, e.g. *next + 1* or *next + 2*, was the most effective at aiding learners in increasing production of the instructed PT structures.

### 5.3.2 Projection Model: interphrasal, phrasal, and lexical morphology

The Projection Model predicts that instruction on more marked items on a hierarchy, e.g. the Noun Phrase Accessibility Hierarchy, will result in a projection effect: that is, learners will learn not only the instructed item, but items of lesser markedness on the same hierarchy. For example, the stages of morphology are in a hierarchy of markedness, with plural *–s* lexical morphemes at the least marked end (e.g. *papeles)*, phrasal morphemes (e.g. *los papeles* 'the papers) in the middle, and inter-phrasal morphemes as the most marked stage (e.g. *los papeles son blancos* 'the papers are white'). The Stage 3-instructed group in this study was taught the middle, or lesser-marked, items, phrasal morphemes, while the Stage 4-instructed group was taught the most

marked item, interphrasal morphemes. In accordance with the predictions of the Projection Model, indeed, greater changes in production were found for the Stage 4-instructed group than the Stage 3-instructed group. The Stage 4-instructed group produced more Stage 2 lexical morphemes and Stage 3 phrasal morphemes, as well as more obligatory contexts for Stage 3 and Stage 4 interphrasal morphemes. In comparison, the Stage 3-instructed group only increased production of Stage 2, lexical morphemes, and the differences were only marginally significant. Clearly, instruction on the most marked item resulted in learners producing more items across the entire hierarchy, while instruction on a lesser-marked item only showed an effect on the least marked item. The support for the Projection Model is strengthened by the results of Study 2; the group in Study 2 that received instruction on interphrasal morphemes, Stage 4, not only showed increased production and obligatory contexts for interphrasal morphemes, but also for phrasal morphemes (Stage 3) and plural *–s* (Stage 2). Likewise, for syntax, that Stage 2 learners in Study 3 instructed on the *next + 1,* Stage 4 SV-inversion, stage of syntax also increased at Stages 2 and 3, suggests that instructing stages past the *next* stage can help learners to advance along the hierarchy.

Regarding research question #3, whether instruction is more effective when geared at the *next* or *next + 1* stage, the results of the instruction of morphology show that instructing the most marked stage, interphrasal morphemes, the *next + 2* stage, resulted in more global gains across the morphological hierarchy than teaching phrasal morphemes, the *next + 1* stage, and a lesser marked member of the hierarchy.

### 5.3.3 Implications for the PT hierarchy

Overall, implicational scaling showed the stages predicted by PT to be acquired in the order predicted for this beginning group of learners, which confirms the results of Study 1 and Study 2. One discrepancy remains with this group: the emergence of Stage 3 and Stage 4 morphology before Stage 3 and 4 syntax. Unlike in Studies 1 and 2, which found emergence of syntax before morphology at all stages, in this study, multiple learners at each testing measure, the pre-test, post-test or delayed post-test, showed emergence of Stage 3 morphology or Stage 4 morphology before the syntactic phenomena at each stage. On the other hand, Stage 3 syntax did emerge before morphology for two learners (P15 on the delayed post-test; P2 on the pre-test) and Stage 4 syntax before morphology for one learner (P11 on the post-test and delayed post-test). This result could be indicative of a larger developmental pattern, i.e. morphology emerges syntax, but it is more likely that the discrepancy between this result and the results from Study 1 and Study 2 is due to the effect of classroom instruction and to the nature of the task. The students in Study 3 are the most basic Spanish class offered at the University of Pittsburgh; in other words, it is assumed that they are true beginners of Spanish. The study began during Week 6 of the semester; in the weeks preceding the experimental period, the instruction largely focuses on vocabulary and morphology, verbal or phrasal. In terms of content, much focus is on description: e.g. identification and description of people, places and things in terms of their personality, physical characteristics, origin, colors, etc. In other words, these students had been learning how to produce simple clauses with verbal morphology and to describe people, places or things. The task for the testing sessions also elicited descriptions, which is precisely one skill that this group of learners had been focusing on in the classroom. In that sense, the persistence of Stage 3 and 4 morphology before syntax is likely a relic of the instruction in the weeks prior to the data

collection period. As the students in the next Spanish class did not show such a developmental pattern, it is likely again that the morphology emerging before syntax is a short-term effect of the classroom instruction.

Another issue for PT theory raised in Studies 2 and 3 is the issue of when learners advance to subsequent stages. It is clear from the results of both studies that skipping stages is not a common pattern; in other words, learners do acquire subsequent stages in order. The only counter-evidence to this pattern were the students in Study 2 who had gained Stage 5 syntax but not Stage 4 syntax or morphology. As discussed in Section 4.3.3, this anomaly is potentially due to a problem with the testing instrument at eliciting Stage 4 syntax. Therefore, the prediction of PT that learners must be ready to acquire subsequent stages, defined as at the preceding stage, is confirmed for the most part. However, the issue of defining developmental readiness persists from Study 2: how can we explain which learners advance to subsequent stages? As in Study 2, many learners in Study 3 were *ready* to advance to the next stage, given that they were at the preceding stages of instruction, but they did not. The analysis comparing production of those learners that gained stages with those who did not attempted to shed some light on whether production could account for when learners gained stages or not. Both Studies 2 and 3 showed that learners who gained stages and those who did not produced similar tokens of morphology on the pre-test, but that those who gained Stage 2 or Stage 3 morphology showed higher amounts of that morphology on the post-tests. For syntax, Study 2 showed no important differences in production on any of the tests, but in Study 3, the group of those that gained stages 3 or 4 in syntax did produce more Stage 3 structures on the pre-test, which suggests that higher production on the preceding stage in this case may have aided these learners in gaining the stages on the post-tests. However, it is clear that it is not necessary for production levels of a learner's current

stage to be at a certain level in order for a learner to advance to the next stage. It is sufficient that a learner has met the emergence criteria for preceding levels in order to continue to acquire subsequent levels.

## 5.4 CHAPTER SUMMARY

To summarize, this chapter presented the teaching experiment with beginning, first-semester students of Spanish. The methodology was identical to Study 2, although instructional materials were tailored to this proficiency level. The analysis of stage gains and production of PT structures expanded on and supported results found in Study 2: mainly, while changes in stage gains were found for the experimental groups, instruction on either the *next*, *next +1,* or even *next + 2* aided learners at producing more structures on the post-test and delayed post-test. The instruction on the *next* stage of syntax, Stage 3 XP-adjunction, resulted in learners producing more Stage 3 as well as Stage 2, SVO, structures; likewise, instruction on Stage 4, SV-inversion, resulted in learners producing more Stage 3 structures. As for morphology, instruction on the *next* stage, Stage 3 NP-agreement (phrasal), led to learners producing more plural marking (Stage 2) and interphrasal agreement (Stage 4), which was close to significant (*p=.06)*. Instruction on Stage 4, interphrasal agreement, the *next + 2* stage, had the most wide reaching consequences: learners in this group changed significantly at Stage 2 plural *–s* marking on the delayed test, as well as contexts for NP-agreement on the post-test. Changes were close to significant (*p=.06)* for Stage 3 NP-agreement on the post-test and contexts for Stage 3 NP-agreement and Stage 4 PO-agreement on the delayed post-test. These results are suggested to support the Prediction Model and question the Teachability Hypothesis.

As for the PT hierarchy, morphology emerged before syntax at Stages 3 and 4 for many of these learners, for which it was proposed that this is due to the timing of the data collection and the classroom instruction, but does not appear to be a tendency sustained over time. As in Study 2, a similar pattern with regards to stage gains and production was found: learners that gained stages did not differ in production on the pre-test compared to those who did not gain stages, but production did differ on the post-tests between those who gained stages and those who did not. The results from Studies 1, 2 and 3 will be summarized and general conclusions drawn in the next and final chapter, Chapter 6.

# 6.0 CONCLUSIONS

The overall aims of this dissertation were to apply the PT stages to the acquisition of Spanish morphosyntax (Study 1) and to test the utility of instructing these stages to classroom learners of L2 Spanish (Studies 2 and 3). In this chapter, the results from Studies 1, 2 and 3 will be summarized and general conclusions presented. Limitations of this study, pedagogical implications, and suggestions for future research will also be discussed.

## 6.1 SUMMARY AND GENERAL DISCUSSION

In this section, the results of applying the PT stages to L2 Spanish (Study 1) and teaching subsequent stages to beginning learners of Spanish (Studies 2 and 3) will be summarized. Two additional issues related to development through the PT stages are then discussed: the relationship between stage gains and production and the development of syntax and morphology. This section concludes with the overall conclusions of the three experiments together.

### 6.1.1 Processability Theory in L2 Spanish

Five stages in syntax and morphology development based on PT were found to develop in order for L2 learners of Spanish at the beginning, intermediate and advanced levels of language study as demonstrated in Study 1 through an analysis of a corpus of oral interviews between speakers and learners. Furthermore, the five ordered stages were maintained for beginning (first and second semester) learners of Spanish before and after instruction on the stages as evidenced by their oral production on two tasks, an answering question task and a story re-tell task in Studies 2 and 3. The stages established for L2 Spanish are shown in Table 63 along with examples from Studies 2 or 3.

**Table 63. PT Stages in L2 Spanish and examples of syntax and morphology**

| PT Stage | L2 Spanish | Example of Syntax / Morphology |
|---|---|---|
| Stage 5 | Subordinate clause formation | *es un chica que um camina en la callo (*calle).*<br>'it's a girl that's walking on the street'.<br>(P9, Study 2) |
| | Subjunctive morphology | *y es necesario que coma frutas y verduras.*<br>'it is necessary that one eats fruits and vegetables.'<br>(P19, Study 2) |
| Stage 4 | SV-inversion | *um qué haces tú en la fin de semana el fin de semana.*<br>'um what do (V) you (S) do on the weekends the weekends' (P21, Study 2) |
| | PO-agreement | *mi (*mis) padres son muy seriosos (*serios)*<br>'my parents are very serious' (P11, Study 3) |
| Stage 3 | XP-Adjunction | *entonces capercita roja llama en la puerta*.<br>'then Little Red Riding Hood knocks on the door'<br>(P2, Study 3) |
| | NP-agreement | *muchas casas* 'many houses' (P14, Study 3) |
| Stage 2 | SVO | *um yo soy una abuela*<br>'um I am a grandmother' (P8, Study 3) |
| | plural *–s* | *personas* 'people' (P9, Study 3) |

The stages shown in Table 63 yield important cross-linguistic support for PT, as no previous study has applied the current PT stages to acquisition of Spanish, a language with variable word order and rich morphology. The morphological structures predicted at Stages 2 and 3, plural marking on nouns and noun phrase agreement, reflect and support Di Biase and Kawaguchi's (2002) result for morphological development of second language Italian, another Romance language. The predictions for Spanish word order were based on the general principles

predicted by PT, as no previous study has analyzed the development of word order of a Romance language from the PT framework. Overall, the results from Study 1, 2 and 3 mark a contribution to typological plausibility of PT.

Based on these stages established for L2 Spanish in Study 1 and shown in Table 63, Studies 2 and 3 addressed the effect of explicit instruction on the PT stages for beginning learners of Spanish, the results of which are discussed in the next section.

### 6.1.2 Instructional intervention on PT stages: Teachability Hypothesis or Projection Model?

Regarding the effect of instruction on the PT stages in Studies 2 and 3, beginning learners of L2 Spanish were given two 30-minute sessions of classroom instruction on successive PT stages in syntax and morphology. The instruction consisted of 10 minutes of explicit, teacher-led instruction followed by 20 minutes of small-group oral practice and concluded with a teacher-led review. Spontaneous oral production (a story re-tell and answering personal questions task) was tested before instruction, several days after instruction, and three weeks later. The following list summarizes the significant results from the teaching experiment with second semester learners of Spanish in Study 2 who were taught Stage 4 (PO-agreement and SV-inversion) or Stage 5 (subordinate clause and subjunctive).

1) Learners gained stages in syntax or morphology after instruction on the post-test (Stage 4-instructed, 2/11 or 18%; Stage 5-instructed, 3/11 or 27%; Control 3/14 or 21%) and the delayed post-test (Stage 4-instructed, 4/11 or 36%; Stage 5-instructed, 4/7 or 57%; Control 3/6 or 50%), but no advantage was found for the instructed groups vs. the control group.

2) Participants showed little changes in syntax production on the post-test or delayed post-test after instruction on the *next, next + 1, next +2,* or already acquired stages.

3) The Stage 3 learners instructed on the *next* stage, Stage 4 PO-agreement morphology, produced more Stage 3 NP-agreement and contexts for NP-agreement than the Control group on the delayed post-test. These learners also showed significant gains in production of Stage 4 PO-agreement and contexts on the post-test and Stage 2 plural *–s* marking and Stage 3 NP-agreement and contexts on the delayed post-test.

4) The Stage 3 learners in the Stage 5-instructed group instructed on the *next + 1* stage, Stage 5 subjunctive morphology, produced more subjunctive morphology on the post-test compared to the Stage 3 learners in the Stage 4-instructed group and the Control group.

5) Those learners that gained stages in syntax or morphology did not show higher production of these structures on the pre-test compared to those who did not gain stages, but on the post-test those that gained Stage 4 in morphology did show higher production of Stages 2 and 3 morphology compared to those who did not gain stages.

The participants in Study 3 were first-semester students of Spanish and were instructed on Stage 3 (NP-agreement and XP-adjunction) or Stage 4 (PO-agreement and SV-inversion). Results are summarized below.

1) Some learners gained stages regardless of the instructional variable, e.g. on the post-test (Stage 3-instructed, 2/10 or 20%; Stage 4-instructed, 1/8 or 12.5%; Control 1/3 or 33%) and the delayed post-test (Stage 3-instructed, 3/10 or 30%; Stage 4-instructed, 3/8 or 37.5%; Control, 1/3 or 33%), but no significant differences were found between the experimental and control groups.

2) Instruction on the *next* stage of syntax, Stage 3 topicalized clauses, resulted in increased production for Stage 2 learners on the delayed post-test of Stage 2 SVO and Stage 3 topicalized clauses. Instruction on the *next + 1* stage of syntax, Stage 4 SV-inversion, resulted in higher production of Stage 3 structures for Stage 2 learners on the delayed post-test as well.

3) The learners at Stage 1 of the Stage 3-instructed group, taught the *next + 1* stage, Stage 3 NP-agreement, made close to significant increases in production of Stage 2, plural *–s* marking (*p=.06)* on the post-test and contexts for Stage 4 predicative adjectives on the post-test (*p=.06).*

4) The learners at Stage 1 of the Stage 4-instructed group, taught the *next + 2* stage of PO-agreement, made significant increases in production of Stage 2 plural *–s* marking on the delayed post-test and contexts for NP-agreement on the post-test, and close to significant gains (*p=.06*) on Stage 3 NP-agreement on the post-test, and contexts for Stage 3 NP-agreement and Stage 4 PO-agreement on the delayed post-test.

5) Those learners that gained stages in morphology did not show higher production of structures on the pre-test, but those that gained stages did show higher production of the acquired stages as well as previous stages on the post-tests compared to those learners that did not gain stages. For syntax, learners that gained Stage 3 produced more Stage 3 structures on the pre-test compared to those that did not gains stages.

Overall, while the instructed groups did not show an advantage in terms of stage gains, the instructed groups did make significant increases in production over the three testing measures, while the control group did not show any significant changes. These increases showed a similar pattern in effect of instruction. Namely, instruction on subsequent stages did have a uni-

directional effect in that instruction on higher stages tended to lead to higher production at already acquired stages. In other words, instruction of a more marked element in the hierarchy potentially had an effect on lower, less marked items in the hierarchy. The reverse effect was not observed; instruction on a lower stage never led to increased production of a higher stage. In sum, the Projection Model, which predicts that instruction on more marked items can affect less marked items, appears to be supported with the combined results of Study 2 and 3, given that participants tended to increase production of the instructed structures as well as preceding structures in the hierarchy on the post-tests. To illustrate, the Stage 3 participants instructed on Stage 4 morphology in Study 2 made gains on Stage 4, Stage 3 and Stage 2 production and / or contexts. For syntax instruction in Study 3, instruction on Stage 3 syntax for Stage 2 learners resulted in increased production of Stage 2 and Stage 3; likewise, Stage 4 instruction for the Stage 2 learners showed an effect at Stage 3 structures. For morphology in Study 3, the same pattern holds: the learners at Stage 1 in the Stage 3-instructed group improved production of Stage 2, and the learners at Stage 1 in the Stage 4-instructed group improved production and / or contexts for Stages 4, 3 and 2. In no cases did instruction on a lower stage, e.g. Stage 2 lead to increased production of a higher stage, e.g. Stage 3 or 4.

Furthermore, for morphology, the most widespread gains were found for the instruction aimed at the Stage 4 PO-agreement, the most marked end of the morphology hierarchy (lexical > interphrasal > phrasal). For instance, in Study 2, the Stage 4-instructed group increased production and contexts for Stage 4 phrasal morphemes on the post-test as well as Stage 3 interphrasal and Stage 2 lexical morphemes. The Stage 4-instructed group in Study 3 was instructed the same topic, PO-agreement, or interphrasal agreement, and also showed widespread gains at Stage 4, Stage 3 and Stage 2. On the other hand, the Stage 3-instructed group in Study 3

was instructed on the middle member of the hierarchy, phrasal morphemes, and only showed marginally significant gains in production of the least marked member of the hierarchy, lexical morphemes (plural *–s)*. In sum, that learners in the instructed groups increased production of not only the instructed structures, but also related structures in the hierarchy, lends support to the Projection Model.

A further look at the results together from Studies 2 and 3 raises several common points of discussion. As mentioned previously, no significant differences were found between the groups in terms of stage gains based on emergence criteria, but frequency of production of the target structures was found to be significantly different for several of the instructed groups as compared to the control group. What does this mean for PT theory? A look at the analysis of production frequency and stage gains may add to this discussion (see next section). Second, the relationship between syntactic and morphological development was discussed throughout the results of all three studies. In Study 1 and Study 2, syntax developed before morphology almost uniformly for all learners. However, the most beginning learners in Study 3 showed emergence of Stage 3 and 4 morphology before syntax. In addition, syntax globally seemed to improve less than morphology; in Study 1, instruction had no effect on syntax production, and in Study 3, morphology instruction showed more widespread changes than syntax production. These issues will be discussed in the following sections.

### 6.1.3 Relationship between stage gains and production frequency

This dissertation looked at stage emergence as well as production of tokens of structures across all five stages. Results showed that learners in all groups gained stages with no advantage for any particular treatment conditions. These results are comparable to Mackey's (1995, 1999) study on

the role of interaction on learners producing developmentally more advanced questions in English based on PT. Mackey (1995) found increased production of more developmentally advanced questions as well as stage gains for all the groups in her study. Learners participated in paired tasks with a native speaker: Interactors (interactive tasks), Unready (interactive tasks but learners were at a lower developmental stage), Observer (watched interactive tasks with a native speaker and a learner), Scripted (native speakers followed a script for the interactive tasks) and Control (did not participate in any tasks). Overall, the Control and Scripted groups showed the least stage gains (14% and 16% respectively), while the Interactors, Unready, and Observer groups showed the greatest sustained stage increase (71%, 86%, and 57%). As in this dissertation, even the Control group and one of the experimental groups, the Scripted group, showed stages gains; however, unlike in this dissertation, an advantage was clearly found for the experimental groups that participated in interaction or observed interaction. It is likely that the participants gained more stages in Mackey's teaching experiment because of two factors: the kind of tasks (interaction based) and the focus only on question forms. Again, learners in Mackey's study participated in three treatment sessions one-on-one with native speakers of 15-25 minutes in length, and questions were targeted by all the tasks and treatments. Therefore, each learner had 45-75 minutes of exposure to question forms. The instructional periods for Study 2 and Study 3 in this dissertation took place in a more traditional classroom format; an instructor presented the grammatical topics explicitly, then learners practiced the structures in pairs and as a whole class. It follows that learners had 30 minutes of group syntax instruction and 30 minutes of group morphology instruction, in other words, the learners in this dissertation had less overall instruction time than those participants in Mackey's study. In addition, learners were instructed on both syntax and morphology in this dissertation, which in general were two disparate topics

with no continuity, the result of which might have been that learners internalized less than they would have if the instruction had been intensely focused on one grammatical structure, namely, question forms as in Mackey's study.

An additional topic addressed in this dissertation that has not been explored in previous research is the relationship between stage gains and production amounts. The question was raised as to whether higher tokens of preceding stages could determine when a learner gained subsequent stages, i.e. did learners tend to produce high amounts of stages they had already acquired before gaining subsequent stages, or could learners with merely emergence of already acquired stages advance to next stages? The answer to these questions, as demonstrated in Study 2 and Study 3 is that learners gained subsequent stages whether preceding stages showed merely emergence of preceding structures or higher amounts of production of preceding structures. In other words, as predicted by PT, the only necessary criteria for a learner to gain subsequent stages is to have gained the preceding stage. Still, some patterns were found with regards to production and stage gain. Regardless of a learner's production amounts prior to gaining subsequent stages, a pattern that emerged in Study 2 and 3 is that once learners gained subsequent stages, their production of those stages as well as stages they had already acquired did increase. For example, those Stage 3 learners that gained Stage 4 morphology in Study 2 also showed significantly higher production of Stage 3 morphology on the post-test.

Therefore, an important implication of this analysis is that once a stage has been acquired, the production levels may continue to increase at already acquired stages for both syntax and morphology. The progression seen in this study then is from emergence of a structure to increased production of structures at recently acquired or already acquired stages. A more advanced step is likely automatization of production of PT structures across tasks of varying

cognitive complexity, as suggested by Kawaguchi and Di Biase (in press). In sum, while the treatment in this study did not produce widespread stage gains for the instructed groups, the results of Studies 2 and 3 offer some explanation as to the relationship between stage gains and production amounts. Namely, learners gained subsequent stages regardless of how much of preceding stages they were producing; for example, a learner who just met the emergence criteria at Stage 2 was as likely as a learner who demonstrated widespread use of Stage 2 structures to gain Stage 3 on the post-tests. However, when comparing the learners who did gain stages with those who did not, those that did gain stages also showed increased production of the acquired stages as well as preceding stages, which allows for a more complete picture of how learners' production continues to evolve beyond just the level of showing emergence of stages. In that sense, amount of PT structures produced is a solid measure of development after a stage has emerged.

### 6.1.4 Development of syntax and morphology

Another question addressed in this dissertation is whether syntax or morphology emerges first. In Study 1, a cross-sectional look at production by learners of three different levels of proficiency—beginner, intermediate, and advanced—showed that syntax emerged before morphology (cf. Section 3.2.3). Likewise, the high beginning learners in Study 2 showed a similar pattern; syntax emerged before morphology for all learners without exception on the pre-, post-, and delayed post-test. However, the least advanced learners in this dissertation—the true beginning learners in Study 3—showed a clear pattern for morphology before syntax at Stages 3 and 4. At Stage 2, syntax preceded morphology. In other words, these learners first produced Stage 2 syntax (SVO), followed by Stage 2 morphology (plural *–s*), Stage 3 morphology (NP-agreement) then

Stage 3 syntax (XP-adjunction), then Stage 4 morphology (PO-agreement) followed by Stage 4 syntax (SV-inversion). Stage 5 continued the pattern of syntax first, as no learner produced Stage 5 morphology (subjunctive). This pattern of morphology emerging before syntax for these beginning classroom learners is likely due to the focus on lexical items and descriptions at this level; as mentioned previously (Section 5.3.3), the curriculum at this level calls for basic subject–verb agreement, learning of lexical items, and descriptions, which entail matching nouns and adjectives for number and gender, precisely the Stage 3 and 4 morphological procedures. In fact, it is clear that the first semester beginning learners in Study 3 outperform the second semester high beginning learners in Study 2 at morphological marking. This is likely due to the fact that the beginning learners have been taught a handful of explicit grammatical rules, one of which is that nouns and adjectives must match in gender and number. Clearly, the effect of consistent emphasis on morphology in the classroom has short-term benefits so that the beginning learners in Study 3 produced morphology farther along in the hierarchy than syntax. However, this high level of morphological marking for the most beginning learners is likely superficial given that the tendency for the more advanced learners in Studies 1 and 2 is that syntactic procedures precede morphological ones.

In sum, as discussed in Section 2.1.7 (Table 3), Dyson (2009) argued that PT predicts that morphological procedures precede syntactic procedures at Stages 2 and 3; at these two stages, simplified S-procedures are available: canonical word order, which in this case is SVO word order, and XP-adjunction, which allows for phrases such as prepositional phrases to be fronted before canonical word order. In this study, the syntactical procedures were found to precede morphological marking, as shown in Table 64.

**Table 64. Order of emergence of syntax and morphology at Stages 1-5 found in Studies 1,2,and 3**

| Stage | Processing procedure | Structures predicted |
|---|---|---|
| Stage 5 Morphology<br>  <br>Stage 5 Syntax | Inter-clausal morphemes<br>S'-procedure | Inter-clausal morphemes<br>Target word order in subordinate clauses |
| Stage 4 Morphology<br>  <br>Stage 4 Syntax | Inter-phrasal morphemes<br>S-procedure | Inter-phrasal morphemes<br>Target word order |
| Stage 3 Morphology<br>  <br>Stage 3 Syntax | Phrasal procedure<br>Simplified S-procedure | Phrasal morphemes<br>XP-adjunction |
| Stage 2 Morphology<br>  <br>Stage 2 Syntax | Category procedure<br>Simplified S-procedure | Lexical morphemes<br>Canonical word order |

As seen in Table 64, learners produce simplified syntactic structures before acquiring the ability to mark morphological items. As discussed in Section 2.1.6, only Dyson (2009) has directly addressed the order of emergence of syntax and morphology. Dyson showed that PT syntactic structures emerged before the corresponding morphological ones for both ESL learners in her longitudinal study at Stages 2, 3 and 4. Stage 2, canonical word order, was found to be VX or SVX (e.g *um la chica # llama um el casa* 'um the girl knocks um the door' [Participant 15, Study 2]) in Studies 1, 2 and 3 in this dissertation; likewise, Dyson also found SVO to be the first

syntactic structure present from the earliest data collection. The next stage, Stage 3, in this dissertation was XP-adjunction, for example, *porque um los profesores la universidad son muy serios* 'because um the professors the university are very serious' (P7, Study 3). For the ESL learners, likewise, Stage 3 consisted of acquiring negation before verbs, adverb fronting and do-fronting. These two kinds of syntactic structures found to emerge before morphology at Stages 2 and 3 in this dissertation are based on simplified syntactic structures according to PT (cf. Section 2.1.4): Stage 2 canonical word order is based on learners being able to define categories such as 'subject' and 'verb', i.e. category procedure, and Stage 3, XP-adjunction, is based on phrasal procedure, which allows for phrases to be fronted before canonical utterances. In sum, the emergence of these two procedures – category procedure and phrasal procedure – have repercussions for both syntax and morphology. Although Dyson (2009, p. 336) contends that category and phrasal procedures are first and foremost morphological procedures, there is nothing implicit in PT that mandates that these two procedures will first be evident in the morphology. In fact, as both this study and Dyson's (2009) study have shown, learners first tend to show evidence of these basic syntactic procedures before marking the corresponding morphology. This pattern is likely due to two factors: L1 transfer and the nature of the task.

The issue of L1 transfer was raised in the extended version of PT by the Unmarked Alignment Hypothesis (Pienemann et al., 2005). Essentially it proposes that L2 learners will initially produce subject-first utterances, in other words, they map the most prominent grammatical role (subject) and the most prominent semantic role (agent) to the most prominent position in c-structure (initial) (p. 229). This knowledge is assumed to be transferred: "The Unmarked Alignment Hypothesis implies that L2 learners know the basic architecture of syntax with its three parallel levels of structures. In other words, it implies that L1 knowledge is

transferred at an abstract level" (p. 231). In that case, that Stage 2 syntax emerges before morphology is not surprising: if learners can transfer the three levels—a-(argument) structure, f-(functional) structure, and c-(constituent) structure—their initial utterances will have internal structure once they move beyond producing just isolated lexical items. For example, participant 8 in Study 3 shows production of some isolated words with no structure, e.g. *caperucita roja adios para tt (*?) y madre* 'little red riding hood good-bye for ? and mother', as well as utterances with internal structure, *caperucita roja está en la ciudad* 'little red riding hood is in the city'. These learners that have not acquired Stage 2 morphology but Stage 2 syntax show very simplified canonical utterances: subject, verb, and optional object. Contexts for talking about multiple objects, i.e. marking plurality, may exist or not be present. For instance, participant 10 when describing the pictures says *flor bonito* 'flower pretty' to describe pictures of multiple flowers.

This leads to a discussion on the nature of the tasks: especially in the picture description task, utterances with agent-first structure are vital to complete the task, e.g. "little red riding hood is doing *x"*. On the other hand, the procedure of marking plurality, such as mentioning "pretty flowers", is not as necessary to the completion of the task, nor is the information as basic as the agent-first pattern used to describe the pictures and the story sequence. In addition, learners might have other resources to express plurality, for example, using quantifiers such as "mucho" or "dos". When phrasal morphology starts to emerge at Stage 3, syntax remains the base of all utterances with phrasal morphology not vital in order to complete the task. At Stage 3, again, the syntax involved is basic concatenation of a descriptor—adverbs, prepositions, or even question words—in front of basic word order. The morphology however, requires not only the processing procedure of matching information within in a phrase, but is a redundant grammatical procedure

not necessary for a learner to make himself/herself understood; it is evident that learners that have developed Stage 3 syntax but not morphology are showing the ability to include more information beyond Stage 2 syntax, e.g. Participant 7 (Study 2) produces *usualmente uh dio regalos pequeño (*pequeños) uh # cerca # de cincuenta dolas dolores (*doláres)* 'usually uh gave small gifts uh around fifty dollars'. This learner produces an example of Stage 3 syntax, but she has not yet acquired Stage 3 morphology, as evidenced by the lack of plural marking on *pequeño* 'small'. Overall, this learner marks interphrasal morphology only 3 out of 9 contexts and fails to meet the emergence criteria. This variability in rule production—that she does produce the appropriate morphology in a small percentage of cases—reinforces that the morphology emerges later than the syntax at this stage, likely due to the focus of learners' attention to producing structured utterances to the detriment of phrasal morphemes. In fact, that the beginning learners in Study 3 were marking Stage 2 and 3 morphology before Stage 2 and 3 syntax, as discussed at the beginning of this section, reinforces this point: when instruction is intensely focused on morphology, as discussed for the first semester learners, learners are able to produce more of it in oral production.

Regarding the effect of instruction on syntax and morphology, Studies 2 and 3 suggest that effect of instruction on morphology production was more widespread than syntax. That morphological instruction would be more widespread and evident in the short-term than instruction on syntax, especially for the beginning learners in Study 3, is not surprising. The morphological procedures taught in this dissertation are very simple rules that learners could likely recite, e.g. mark plurality on all adjectives referring to the same noun, and implement some of the time. This notion of grammatical simplicity was noted by Krashen (1982): that some rules, like plural *–s*, are "easy to describe" although production may be more difficult, i.e. they

may be “late-acquired” (Krashen, 1982, p. 91). On the other hand, the syntactic rules taught in Studies 2 and 3 are both optional, i.e. the rules taught can alter in different pragmatic contexts, and opaque, i.e. the relationship between the form and the meaning is not transparent, both of which are notions of grammatical complexity in L2 acquisition discussed by DeKeyser (2005). In that sense, the syntactic rules were complex, which could contribute to the fact that stage gains in this area did not show up until the delayed post-test for the most part. In addition, learners are accustomed to continual instruction on morphology in the classroom, while syntax instruction of the PT structures, is for the most part disregarded in beginning Spanish L2 textbooks and classrooms. Overall, these results suggest that although the natural order of acquisition is syntax before morphology, it may be temporarily altered through instruction.

### 6.1.5 Overall Conclusions

In sum, the goals of this dissertation were to test not only the stages of PT for the L2 acquisition of Spanish, but also to test two potential models of how classroom instruction could influence progress through these stages for beginning learners: the Teachability Hypothesis and the Projection Model. A summary follows of the results found in this dissertation and the implications for each theoretical model.

First, the five processing procedures predicted by PT (word/lemma > category > phrasal > S- procedure > S’- procedure) were clearly found to emerge in the order predicted for L2 learners of Spanish. Syntax at all stages tended to emerge before morphology, although some effect of classroom instruction was found to alter this tendency temporarily at the most beginning stages of language learning. Another issue relevant to PT theory discussed in this dissertation was the relationship between stage gain and production frequency. The emergence criteria, i.e.

the first systematic use(s) of a structure (see Section 3.1.2.1), was implemented to determine whether a learner had gained the ability to process the PT stages, but production amounts were also compared in order to determine how much of the PT structures these learners were producing in relationship to when they gained stages. It was shown that it was sufficient for learners to show emergence of a preceding stage in order to gain a subsequent stage. When learners gained subsequent stages, production of already acquired stages tended to increase. This analysis is important to PT because it demonstrates that there is no relationship between production amounts and stage gains: learners could merely satisfy the emergence criteria of the preceding stage structure, or show a high command of the rule in question, and still be at the same stage. While this issue reflects the intention of the emergence criteria, i.e. to address when a learner initially can process a procedure, there is also a need in L2 research to address how learners progress to a native-like level of language production. This gap in PT is also reflected in Kawaguchi and Di Biase's (in press) study that demonstrated that learners' showed varying command of PT stages depending on the task. These results also highlight the fact that language learners even from very beginning stages can process all five PT stages, as pointed out by Hudson (1993) and Spinner (2007, 2011); indeed, the learners in Studies 2 and 3 were only first and second semester students of Spanish, yet many had acquired all five syntactic stages in terms of the emergence criteria. This fact raises a very simple question: so then what? The aspects of interlanguage that are left undefined and unexplained in PT are amplified by this fact: if beginning classroom learners have already shown emergence of these processing procedures, then when and how do they achieve mastery of these procedures? PT focuses on emergence of a structure to capture the fact that the procedural skills have been acquired—but beyond

emergence, it is not clear how a learner progresses from emergence, to varied production of the PT structures, to mastery, all of which are essential questions in second language acquisition.

As for the role of order of instruction on the PT stages, instruction on the PT stages aimed at the *next* or *next* + *x* stages was effective at increasing learners' production of the next stages as well as their current stage. This result provides important evidence that disconfirms the prediction of the Teachability Hypothesis that only instruction on the *next* stage is effective.

Although the Teachability Hypothesis is mentioned frequently in texts on second language acquisition under the umbrella of PT (e.g. Larsen-Freeman & Long, 1991, p. 251-69; Ellis, 2008, p. 861), especially given the robustness of the PT hierarchy (e.g. for L2 German, English, Italian, and Japanese), the two are often conflated. However, the assumption that formal instruction is limited in efficacy by the processing limitations of learners is a separate hypothesis related to PT that has not been clearly addressed in previous research. The only teaching experiment that has shown that only *ready* learners can learn the next stage is Pienemann's own (1984) study on the acquisition of L2 German word order by elementary school children. Of the studies that have tested the Teachability Hypothesis (see Table 5 in Section 2.3.1), experimental studies all have shown that both *ready* and *unready* learners advanced after instruction, specifically, the teaching experiments by Mackey (1995, 1999), Spada and Lightbown (1999), and Farley and McCollam (2004). Other studies purportedly addressing the Teachability Hypothesis have confirmed the hierarchies in German or English word order acquisition, namely, the studies by Pienemann (1987), Ellis (1989), and Boss (1996). This dissertation has shown that learners overall continue to gain the PT stages and increase production of PT structures in the predicted order after instruction, which is also what Ellis (1989) and Boss (1996) found. However, that instructed learners continue to show the same order of emergence of the PT

structures does not mean that instruction has to be targeted at the next developmental stage in order to be effective. Both Ellis (1989) and Boss (1996) claim to support the Teachability Hypothesis in this aspect, but teaching experiments by and large have not supported that instruction has to target the next stage in order to affect learners' production or stage gains. Case in point, in this dissertation, instruction on subsequent, *next, next + 1,* or *next + 2* stages did aid learners at producing more of the target PT structures, a result which echoes results from teaching experiments on the Teachability Hypothesis that have shown that both *ready* and *unready* learners gained stages or increased production after instruction on higher-level stages. In fact, this dissertation has offered a more stringent test of the Teachability Hypothesis: since the learners' beginning stages were clearly delimited on the pre-test and instruction precisely separated into Stage 3, 4 or 5 syntax or morphology, the analysis of stage changes and production on the post-tests plainly delimit whether instruction aimed at the *next, next + 1, next + 2* or even the *next + 3* stage could affect learners language development through the stages. This design is unlike previous studies that have offered mixed-stage input, e.g. Spada and Lightbown (1999) and Mackey (1995, 1999).

One might argue that the Teachability Hypothesis only concerns stage gains, not production frequency. However, Pienemann's original empirical study (published in Pienemann 1984, 1989) which proposed the Teachability Hypothesis is based on frequency of rule application, not on stage emergence, as discussed in Section 2.3.1. In that sense, although Pienemann purported to look at the "first systematic usage" of a structure (Pienemann, 1984, p. 191), the criteria as to whether learners showed stage gains or not was not clearly defined or implemented as has been done in current PT research: it was done on a case-by-case basis based on whether learners consistently applied the rules. Furthermore, the increases in production

found in Studies 2 and 3 when teaching the *next* or *next + 1* stage add to the body of evidence that contradicts the Teachability Hypothesis, both in terms of stage gains and production frequency for *ready* and *unready* learners. In particular, Spada and Lightbown (1999) found similar patterns in stage gains in L2 English. After an hour a day for two weeks of intensive exposure to Stages 4 and 5 questions, 29% of Stage 2 learners (79/144 participants) gained Stage 3, 18% of Stage 3 learners (7/39 participants) gained Stage 4, and no Stage 4 learners (0/25) gained Stage 5. This shows the same pattern observed in this dissertation: instruction on higher stage items, in this case, Stage 4 or 5, was effective at learners producing more structures at subsequent stages, e.g. Stages 3 or 4. Mackey (1995, 1995) likewise observed that the learners who were ready, defined as at the preceding stage of instruction, or unready, defined as at other stages prior to the preceding stage of instruction, benefited from interaction on questions in L2 English both in terms of higher production of the targeted questions and stage gains.

Overall, then, the general picture that this dissertation has shown is that instruction in general is beneficial even when focused at more marked structures in the PT hierarchy, whether syntax or morphology, contra the Teachability Hypothesis. These findings yield support for the Projection Model, which claims that instruction on marked items can lead to development of less marked items, but not vice versa. That instruction on the most marked member of the hierarchy, for example, interphrasal morphemes, led to the widest gains in production on lesser marked members of the hierarchy, e.g. phrasal and lexical morphemes, directly supports the Projection Model.

All in all, the results in this dissertation provide further support for the PT hierarchy for L2 Spanish, but refute the core of the Teachability Hypothesis that instruction is only effective for those that are psycholinguistically ready, i.e. at the preceding stage. Indeed, it is clear that

the Teachability Hypothesis is simply not true: instruction does not need to be directed at only the *next* processable stage in order for learners to advance; on the contrary, teaching subsequent, more difficult stages may have even more far-reaching effects than teaching only the *next* stage as shown in this dissertation. As for naturalistic learners, who are exposed to unstructured input potentially containing all PT stages, classroom learners likewise can progress to subsequent stages even when the input includes structures that are two or more stages beyond a learners' stage. In sum, learners are able to continue the progression in stage emergence predicted by PT regardless of whether the input is targeted at the next or subsequent developmental stages.

## 6.2 PEDAGOGICAL IMPLICATIONS

The beginning Spanish students in Study 2 and 3 were chosen because the curriculum for these two courses teaches many of the elements of the PT hierarchy, mostly in morphology. The first semester learners from Study 3 first learn about matching nouns and adjectives for gender and number within and across the noun phrase in the beginning weeks of language instruction. Given the results of this study, it seems that this method of introducing learners to matching number across and within the noun phrase at the same time is the most effective way of learners producing this rule spontaneously rather than following the sequence of acquisition in PT. In other words, contrary to the predictions of the Teachability Hypothesis, instruction solely focused on the *next + 1* stage or *next + 2* stage did filter down to show increased production of previous stages; therefore, instruction on more marked items is most likely to have the farthest reaching effects. In that sense, exposing students to language that requires marking interphrasal

morphemes from the beginning of language study might be the most influential at learners' marking all three kinds of morphemes.

As for Stage 5 morphology (subjunctive), this topic arose in the normal sequence of classroom instruction for the second semester learners of Study 2 a week after this study concluded, which makes the results pertinent for this group of learners. Unlike with Stage 2-4 morphology, Stage 5 morphology was shown to be more difficult to produce by the participants who were taught it as evidenced by the fact that only two participants produced subjunctive morphology on the post-test and none on the delayed post-test. At the same time, many learners were able to produce the contexts for the subjunctive, unlike what Collentine (1995) concluded. Collentine had suggested that learners did not have the syntactic structure ready in order to produce subjunctive morphology in subordinate clauses. These results from Study 1, 2 and 3 in this dissertation show that learners can produce subordinate clauses from very early stages of language learning. This result is encouraging for these beginning learners of Spanish: structurally, they can produce contexts, namely subordinate clauses, for the subjunctive. However, marking it in spontaneous production is clearly more late acquired. These results have important implications for the standard sequence of instruction in Spanish language education: while second semester learners can produce the context for subjunctive and can likely understand the rule for the subjunctive presented to them, its marking in spontaneous conversation is likely to be delayed. This result does not imply that the subjunctive should not be taught to learners at these levels of language learning, but it is important that instructors are aware of what students likely can produce orally at the beginning stages of language learning.

As mentioned in the Introduction, the Teachability Hypothesis is often cited jointly with PT in texts on second language acquisition (Larsen-Freeman & Long, 1991, p. 251-69; Ellis,

2008, p. 861) and, given the strong evidence for the PT hierarchy, the Teachability Hypothesis is often included as a valid corollary. Even in teacher training literature, for example, VanPatten (2003) discusses teaching third person *–s*, a Stage 4 procedure in L2 English, to learners who are not ready: "Research applied to instructed L2 settings has confirmed that learners who have not built up the procedures required for a stage cannot move on to that stage during instruction" (VanPatten, 2003, p. 66). This quote highlights the main prediction of the PT hierarchy that learners acquire the stages in a hierarchical manner and that learners acquire stages when they are ready. However, it also implies that instruction on a stage past the learner's next stage would not be effective: for example, learners instructed on Stage 4 must be at Stage 3, i.e. have the procedures "built up", in order to gain the instructed stage. The results in this dissertation, along with the studies by Mackey (1995, 1999) and Spada and Lightbown (1999) call for a reassessment of the effect of instruction on the PT stages: even though learners do gain stages in order, instruction need not be targeted at the next developmental stage in order to aid learners at gaining or increasing production of subsequent stages.

Overall, this dissertation has drawn important pedagogical implications for PT theory: all five PT structures in Spanish are typically taught as early as the first two semesters of language learning, and as shown in Study 1 and 2, this teaching sequence does match the fact that many second semester learners had already acquired, according to the emergence criteria, all five syntactic structures and most of the morphological ones, with the exception of subjunctive morphology. Even given the variability in stages inherent in classroom learners, as supported by the results in Study 2 and 3, instruction focused on subsequent stages can be beneficial for learners at varied stages. In sum, it is not necessary to target only the next stage, as implied by

the Teachability Hypothesis; instead, instruction targeted at more marked items can and does aid learners' language development.

## 6.3 SUGGESTIONS FOR FUTURE RESEARCH

Future studies might address several limitations that this study encountered. First, in the interest of teaching all of the PT stages in both syntax and morphology, the instruction on structures at each stage in syntax and morphology was relatively limited: each class had 30 minutes of instruction on one PT syntactic stage and one PT morphological stage. It is likely that more intensive exposure to the target syntax and morphology, as in Mackey's (1995, 1999) studies, or in Spada and Lightbown's (1999) study, would have aided to trigger more stage gains for the instructed groups. In addition, the decline in participation between the post-test and delayed post-test in Study 2 resulted in low n-sizes overall. A higher number of participants might shed more light on stage gains and production over time. In addition, given that most of the syntactic gains in production were found on the delayed post-test, it would be interesting to include another delayed post-test several months after the instructional period in order to analyze production and stage gains over a longer period of time.

Regarding PT theory, other points to consider in future analyses are that limited structures were tested at each stage in Study 1 and instructed in Studies 2 and 3: future studies are needed to address further grammatical structures in L2 Spanish, such as verbs with non-canonical mapping such as *gustar* 'to like', interphrasal clitics, or subject/verb agreement. Almost all learners in this study were capable of producing inflected verbs for tense and person; it remains a question of future analysis where subject/verb agreement fits in the PT hierarchy. As

discussed in Study 1, verb agreement marking is not considered to be a procedure that requires feature unification, i.e. Stage 4 interphrasal procedure, which is what it is in English: in Spanish, it was proposed to be Stage 2 category procedure (see Section 3.3.2), but an LFG-based analysis and a full distributional analysis of subject/verb agreement by learners would be needed to determine this. Other concerns for PT theory are exploring the emergence of syntax before morphology in other languages; as both Dyson (2009) and this study have shown syntax to precede morphology.

As for the effect of instruction on the stages of PT, more research is needed comparing varying teaching methods: it was noted previously the difference in results between Mackey's (1995, 1999) study that used interaction as the basis for enforcing exposure to questions and this study that used an explicit grammar lesson. Given that Mackey found greater stage changes than were found in this dissertation, future research comparing varying types of input would be important. Likewise, tasks with varying cognitive demands such as the timed task used in Kawaguchi and Di Biase (in press) are needed in order to shed light on the level of automatization for learners at the same stages. As for Pienemann's original teaching experiments (1984, 1987, 1989), those were based on an earlier conceptualization of the emergence criteria and on stages of German word order; this dissertation used the latest formalization of the emergence criteria (Pallotti, 2007) and looked at emergence and production frequency of syntax and morphology for PT stages in L2 Spanish, which has allowed a complete picture of the effect of instruction on progression through the PT stages. Still, as in Pienemann (1987), a longitudinal study, would complement the results of this study.

Overall, the application of PT to Spanish morphosyntax was found to be a plausible explanation of stages through which beginning learners pass in acquiring oral production skills.

Although learners acquire these PT stages in order, the teaching experiment showed that instruction focused on subsequent PT stages can help students increase production of PT structures at that stage as well as intermediate stages. In fact, stage gains were similar across groups after instruction: no advantage was found for instruction on the *next* vs. the *next + x* stages, but learners in both groups did gain stages, which suggests that instruction need not only be targeted at the *next* stage in order for stage gains to occur. In terms of production frequency, after instruction on the *next + 1* or *next + 2* stages learners were able to produce structures that in principle were not processable. These results question the main claim of the Teachability Hypothesis that instruction only focused on the *next* stage can accelerate the natural acquisition process.

## APPENDIX A

## PHRASES CONSIDERED TO BE ROTE LEARNED CHUNKS

| | |
|---|---|
| *No sé* | 'I don´t know' |
| *Depende* | 'It depends' |
| *Se llama* | 'his/her/its name is' |
| *Me gustaría* | 'I would like' |
| *Es que* | 'the thing is that' |
| *Lo siento* | 'I'm sorry' |
| *Qué va* | 'no way' |
| *Sabes* | 'you know' |
| *Lo que pasa es que* | 'the thing is that' |
| *Da igual* | 'it doesn't matter' |
| *Creo* | 'I think' |
| *Que más da* | 'it doesn´t matter' |
| *Lo que sea* | 'whatever' |
| *Como se dice* | 'how do you say' |

## APPENDIX B

## INSTRUCTIONS AND SAMPLE PICTURE FROM LITTLE RED RIDING HOOD TASK

*Instructions to the student*: You will see a series of pictures that depict the story of **Caperucita Roja,** or Little Red Riding Hood in English. You will go through the pictures twice:
•**The first time**, describe the scene in each picture (for example, the background, the colors) and describe what is happening in the picture (e.g. the girl is walking along the road)
•**The second time,** now that you have seen all the pictures, tell the story as a whole. (e.g. first, the girl leaves her house…)

**1**

*Vocabulario*
Cesta = basket
Lobo = wolf
Recoger= to pick
Llamar = to knock
Hacha = ax

## APPENDIX C

## ANSWER QUESTIONS TASK

*Instructions:* Below you will find recordings of 10 questions addressed to you. You should listen to each question twice. After listening to the question, record your answer with as much detail as possible. Please answer all questions in order from 1-10.

*Interview questions: Version 1 (English translation)*

1. What's your daily routine like on the weekdays? For example, when do you normally get up?
2. What are your parents like in terms of their personalities?
    a. What are your grandparents like in terms of their personalities?
3. On special occasions, what gifts have you given to your family or friends?
    a. Say three gifts you've given or plan to give and to whom (for example, during the holidays, on birthdays, or for Mother's Day or Father's Day).
4. What are your professors in the university like?
    a. Compare the professors in the university with the teachers in your high school.
5. What did you do last summer?
    a. Tell about a memorable event from last summer.
6. What plans do you have for this summer?
7. In 2012, we have presidential elections. What changes would you like a new administration to make? For example, in terms of immigration or the health system.
8. Imagine that you're a doctor talking to a patient who has serious health problems from being overweight. Give the patient five recommendations and suggestions as to what he should do lead a healthier lifestyle. Use phrases such as *recommend that, suggest that,* or *it's necessary that.*
9. Imagine that you've just arrived in Madrid for a semester abroad. You're talking with your host mother. Ask her at least five questions. For example, you could ask about any of the following:
    a. What the meal schedule is like
    b. What her daily routine is like
    c. Ask about the neighborhood (e.g. bus stops, restaurants, grocery stores)
10. Imagine that you get a chance to have an interview with a person who is part of a famous couple, for example, Bill Clinton, or Angelina Jolie. Ask at least five questions about that person's spouse. For example, you could ask about:
    a. The wife or husband's job
    b. their daily life
    c. their children

*Interview questions: Version 2 (English translation)*

1. What's your routine like on the weekends? For example, when do you normally get up?
2. What are your friends like in terms of their personalities?
    a. Do your friends have boyfriends or girlfriends? What are they like together?
3. For what occasions do you give gifts? Say the three latest gifts you gave or plan to give and to whom.
4. What are your classes like in the university?
    a. Compare the classes you're taking now with the classes from high school.
5. What did you do during the winter recess?
    a. Tell about something interesting you did during the winter recess.
6. What plans do you have for Spring Break?
7. What would you like to change about the University of Pittsburgh? For example, in terms of the safety of the students, extracurricular life, or the facilities that the campus offers.
8. Imagine that you're talking to a family member who is trying to lead a healthier lifestyle. Give him or her five recommendations and suggestions as to what he should do to be healthy. Use phrases such as *recommend that, suggest that,* or *it's necessary that.*
9. Imagine that you've just started a new summer internship for a job you may want to have for a career. You're talking with some of the workers at break. Ask them at least five questions about their jobs. For example, you could ask about any of the following:
    a. What their work schedule is like
    b. How much work they have
    c. What they do after work to have fun and relax
10. Imagine that you get a chance to have an interview with the child of a famous figure in history, for example, Malia Obama, President Obama's daughter, or Suri Cruise, the daughter of Tom Cruise and Katie Holmes. Ask at least five questions about that person's father or mother. For example, you could ask about:
    a. Details of their father or their mother's jobs
    b. Their daily life
    c. Their family time spent together

## APPENDIX D

## SAMPLE HANDOUT FOR EXPERIMENTAL GROUPS

**Overview of Complex Sentences**
You already know how to express simple sentences in Spanish with one subject and one verb.

- Juan come manzanas.
- Las manzanas tienen mucho sabor.

To express complex sentences with two or more subjects and/or verbs, you need a connecting word (for example, *porque, que, y).*

- Juan come manzanas **porque** le gustan. (2 subjects, 2 verbs)
- Juan come manzanas **porque** su médico le dijo **que** las manzanas son muy buenas. (3 subjects, 3 verbs)

**Connecting words**
An independent sentence express a complete thought. Two sentences can be combined in order to connect information:

- Juan come manzanas.
- Maria come peras.
- Juan come manzanas **pero** Maria come peras.

Some connecting words that can be used to unify two sentences are:

- y: to unify two thoughts (and)
- o: to indicate alternatives (or)
- así que: to indicate consequence (so)
- pero: to introduce contrasts (but)

**Subordinate clauses**
An independent, or main clause, expresses a complete thought such as:

- Juan come manzanas.

A dependent, or subordinate clause, shares information that is dependent on the main clause in order to understand its meaning.

- Juan come manzanas. [independent]
- Aunque no le gustan. [dependent]
- Juan come manzanas aunque no le gustan.

**Subjunctive**
In dependent clauses, the verb can be in the indicative or subjunctive mood.

1. The *indicative mood* is used in the dependent clause when the main clause expresses true facts or assertions of fact.

- ***Sé*** *que* ***tienes*** *mis libros*. [certainty]
- ***Es cierto*** *que las clases empiezan ahora.* [fact]

2. The *subjunctive mood* is used in the dependent clause when the main clause expresses wishes, possibilities, or unreality. The subjunctive is expressed as a change in morphology on the verb.
    - **Espero que tengas** mis libros. [wishes]

**Contexts for subjunctive**

Some contexts that require subjunctive in the dependent clause are:

1. **Desear, esperar, necesitar, preferir, querer**
    - *Deseo que llegue pronto la primavera.*
    - *José y Cristina prefieren que sus hijos se queden en casa.*
2. **Aconsejar, pedir, permitir, prohibir, recomendar**
    - *Los profesores prohíben que los alumnos usen apuntes durante el examen.*
3. **Es necesario, es importante, es bueno, es mejor**
    - *Es mejor que busques información en la biblioteca.*

**Exercise #1**
Let's complete the following complex sentences by conjugating the verb in the first clause in the **present tense**. In the first column, we will fill in the correct verb to complete the sentence. Then, in the second column, we will decide whether the sentence is in the subjunctive or indicative given the meaning of the main clause.

| Fill in the Blank | Subjunctive or Indicative? |
|---|---|
| <u>*Modelo*</u><br>(Recomendar, yo)<br><u>*Recomiendo*</u> *que busques libros en la biblioteca.* | Subjunctive *(recomendar que)* |
| (tener hambre, yo)<br>1. ____**Tengo hambre**___*pero tengo clase*. | **Indicative** |
| (tener tiempo, ella)<br>2. ___**Tiene tiempo**___ *así que va al gimnasio.* | **Indicative** |
| (esperar, ellos)<br>3. ____**Esperan**____ *que el examen sea fácil.* | **Subjunctive** |
| (permitir, la profesora)<br>4. ____**Permite**___ *que miremos los apuntes en clase.* | **Subjunctive** |
| (ser difícil, la tarea)<br>5. __**La tarea es**___ *difícil y mi profesora no ayuda nada.* | **Indicative** |
| (ser necesario)<br>6. ___**Es necesario**___ *que tengan más impresoras (printers) en los laboratorios.* | **Subjunctive** |
| (pedir, yo)<br>7. __**Pido**_____*que mis profesores me den buenas notas este semestre.* | **Subjunctive** |

**Exercise #2**
With a partner, combine the elements in all three boxes in order to make logical sentences about college life. Begin with the first box, which has the beginning of the sentence, and then add a logical connecting word from the middle box, and a logical second clause from the rightmost box. You should read all parts of the sentence out loud with your partner to work out a logical sentence, and then write the correct sentence in the blank provided. *There is more than one possibility for each sentence. Try to use all of the connecting words at least once.*

| | | |
|---|---|---|
| 1. Los profesores son buenos… | y | …los bibliotecarios te ayudan. |
| 2. Mi compañero de cuarto sabe | o | …las clases empiezan el 5 de enero. |
| 3. Tengo que estudiar … | pero | …Madrid es la capital de España. |
| 4. La biblioteca es enorme… | así que | …me levanto tarde todos |
| 5. Es cierto … | que | |
| 6. Son las once … | | |
| 7. Maribel trabaja todas las tardes… | | |
| 8. Yo sé… | | |

**Note to instructor**: **Answers may vary, below are the best possibilities**:

1. Los profesores son buenos pero dan mucha tarea
2. Mi compañero de cuarto sabe que me levanto tarde todos los días.
3. Tengo que estudiar o no voy a aprobar el examen.
4. La biblioteca es enorme pero los bibliotecarios te ayudan.
5. Son las once y me tengo que ir a clase.
6. Es cierto que Madrid es la capital de España.
7. Maribel trabaja todas las tardes así que ella no tiene tiempo para estudiar.
8. Yo sé que las clases empiezan el 5 de enero.

**Exercise #3**
Take turns asking and answering the following question with a partner

1. ¿Qué sabes de Latinoamérica?. Usa *saber que* o *es cierto que.* Puedes discutir la cultura, la comida, la gente, la geografía, etc.

*Modelo*
*Sé que celebran muchas fiestas interesantes.*
*Es cierto que hay unas montañas muy altas.*

**Note to instructor: Answers will vary. You should have the students talk with their partner, then have several groups share for each question (depending on how much time is left). Please try to correct *relevant* errors to this lesson after the students finish speaking.**

## APPENDIX E

## SAMPLE LESSON FOR CONTROL GROUPS

**Before reading: Un gira por los Estados Unidos**

A. Before touring the United States, scan the text of the reading. What cities will your tour include?

_____

—

B. The following words appear in the reading. Match the words in column II with the synonym of the word in Column 1.

| I | II |
|---|---|
| 1. moderno | a. perfecto |
| 2. magnífico | b. habitante |
| 3. núcleo | c. contemporáneo |
| 4. zona | d. espléndido |
| 5. residente | e. centro |
| 6. ideal | f. área |

C. Scan the paragraph about Chicago to find:

1. Un lugar donde hay libros

_____

2. Un lugar donde hay automóviles

_____

3. Un lugar donde hay casas y apartamentos

_____

4. Un lugar donde hay actors y actrices

_____

D. Scan the paragraph about Boston. What is the country of origin of many of Villa Victor's residents?

_____

**After reading: Un gira por los Estados Unidos**

A. **Ciudades.** Which cities correspond to the following descriptions? *There may be more than one answer.*

**Chicago** **San Diego** **Boston**

1. Hay mucha influencia mexicana.

_____

2. Los murales son una expresión de identidad.

_____

3. Hay festivales latinos.

_____

4. Tiene la primera misión en California.

_____

B. **San Agustín.** Complete the paragraph about Saint Augustine, Florida, with the correct words from the list below. The words are familiar because they appear in the text you have just read.

exhibiciones ciudad cultura costa
Estados Unidos combinación

San Agustín, situada en la (1)_____oeste (*west*) de la Florida, es una (2)_____de la nostalgia del pasado colonial y el espíritu de una (3)_____moderna. Estar en San Agustín es estar en una clase de historia en vivo (*live*). El impacto de la colonización española en la ciudad, y en gran parte de los (4) _____, es enorme. La influencia española es especialmente evidente en San Agustín Antigua: casas coloniales restauradas, bellos patios interiores, balcones (*balcones*) y otros ejemplos de la arquitectura de España. Hay auténticos restaurantes españoles, museos especializados y (5)_____de arte hispano. La pequeña ciudad de San Agustín es un importante centro de (6) _____colonial española y un gran centro turístico. ¿Y la famosa fuete de la juventud (*fountain of youth*) de Juan Ponce de León? Está en el Parque Arqueológico La Fuente de la Juventud.

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