Grammar Acquisition and Processing Instruction

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Secondary and Cumulative Effects

Alessandro G. Benati and James F. Lee

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From James F. Lee:

A fortuitous meeting at the 2005 Applied Linguistics Association of Australia in Melbourne brought me together with Alessandro Benati, who has, ever since, been motivating me to work and work and work. Over the course of the conference we exchanged ideas on language processing, second language learners, Processing Instruction and avenues for collaboration. This work is our third collaboration and arguably the most important in terms of the theoretical framework in which we conduct our research. Whereas our previous work moved the practice of Processing Instruction forward, the present work directly contributes to the theory of input processing. We must acknowledge and thank Bill VanPatten for his groundbreaking theorising and the line of research on Processing Instruction he spawned. His work drives ours.

Introduction

The research we present in this book establishes a unique line of research within the Processing Instruction model by assessing the transfer-of-training effects of this approach to grammar instruction on the way learners make form–meaning connections. In this work we will refer to direct or primary effects as well as to transfer-of-training effects. Each investigation of the effects of Processing Instruction has isolated and targeted for treatment a particular linguistic feature. Learners' knowledge of the target linguistic feature is assessed prior to treatment (pre-testing) and then again after treatment (post-testing). Their increased knowledge of the target linguistic item, resulting from the treatment, is what we refer to as a direct or primary effect. If the treatment also resulted in increased knowledge of some other linguistic item in addition to the target linguistic item, then we would have a transfer-of-training effect. We further categorise the transfer-of-training effects as being secondary effects or cumulative effects. We refer to an effect as secondary if the two linguistic items under focus present L2 learners with a similar processing problem. Word final morphology such as present tense *-s* and past tense *-ed* in English present L2 learners with similar processing difficulties. If Processing Instruction on past tense *-ed* also affected present tense *-s*, we would call it a secondary effect. Word final morphology such as French *imparfait* (past imperfective) and word order permutations such as French *faire* causative constructions present L2 learners with very different processing problems. Processing instruction on these two linguistic items attempts to instil very different processing strategies. Yet, if Processing Instruction on the French *imparfait* also affected French *faire* causative constructions, we would call it a cumulative effect.

As detailed in our review of literature in Chapter 2, research on Processing Instruction (PI) has so far focused on measuring only direct or primary effects on learning a specific/targeted linguistic feature. Typically, the research has compared Processing Instruction with traditional output-oriented instruction and/or meaning-based output instruction. The results of the empirical research have consistently shown that Processing Instruction is a better approach to grammar instruction than are output-based approaches, because those receiving PI develop knowledge of the target as measured by both interpretation and production tasks, whereas those receiving output-based instruction typically develop only knowledge of target as measured by production tasks not by interpretation tasks.

Processing Instruction is a very effective approach to grammar instruction in that it teaches L2 learners to alter inappropriate processing strategies as well as helping them instil appropriate ones. We have accumulated a large body of positive results that have measured the primary effects of Processing Instruction. Even so, no research has yet been conducted to determine, what, if any, are the transfer-of training effects of this approach. In his critical review of the then extant research on Processing Instruction, Lee (2004) generated 11 hypotheses and stated that they showed a robust future for Processing Instruction research. Indeed, we pursue two of the hypotheses in our current work:

- *Hypothesis 9:* learners who receive training on one type of processing strategy for one specific form will appropriately transfer the use of that strategy to other forms without further instruction in PI.
- *Hypothesis 11:* the cumulative effects of PI will be greater than its isolated effects. (Lee, 2004: 322)

The main aims of this book are to provide empirical evidence that will show that second language (L2) learners receiving Processing Instruction can transfer their training on one linguistic feature to other forms or linguistic features without further instruction on the other forms and to determine what the cumulative effects of PI might be. The data were gathered in order to address the following two questions.

- *Question 1:* Will learners who receive training on one type of processing strategy for one specific form appropriately transfer the use of that strategy to other forms without further instruction in PI?

In Chapter 3, we present research on the acquisition of Italian as a second language. L2 learners of Italian will receive PI focused on noun–adjective agreement (*-o* and *-a* at end of words). They will be taught to develop a word final processing strategy appropriate to Italian. Can they then transfer that training to another word final morphological form? Can these L2 learners also process future tense forms located at the ends of words?

In Chapter 4 we present research on the acquisition of English as a second language. L2 learners of English will receive PI focused on past tense *-ed* that occurs in word final position. This form is made redundant when accompanied by a lexical temporal indicator. L2 learners will be taught to rely on the morpheme to assign tense, an appropriate processing strategy for this linguistic feature of English. Can they then transfer that training to another word final temporal morpheme? Can these L2 learners also process present tense forms located at the ends of words?

- *Question 2:* What are the cumulative effects of receiving PI instruction on the different types of processing strategies needed for different types of linguistic features?

In Chapter 5 we present research on the acquisition of French as a second language. L2 learners of French will receive PI focused on French past imperfective aspect, the *imparfait*, which occurs as a word final morpheme and can be made redundant with a lexical temporal/aspectual indicator. L2 learners will be taught to rely on and process the morpheme as a tense and aspect indicator. Can they then transfer that training to another word final verb morpheme? The other linguistic feature we assess is the French subjunctive, a form that is triggered by the meaning expressed in the main clause of the sentence. We also explore if learners can transfer their training on processing verb morphology to the appropriate processing of a word-order phenomenon, the French causative construction with *faire*.

Research on Processing Instruction has so far investigated its effects in isolation. That is to say, one study has investigated the relative effects of Processing Instruction on one specific form. Another study has investigated another set of learners and taught them via Processing Instruction to process a different linguistic form. PI research has, to date, taken the appropriately conservative approach of assessing the direct effects of instruction, seeking only to determine if Processing Instruction would indeed alter inappropriate processing strategies and/or instil appropriate ones. As seen in Chapter 2, the empirical evidence has shown that Processing Instruction has been highly effective across many types of forms and in many languages.

In this volume we will present the results of new and unpublished empirical work that investigates transfer-of-training effects, both secondary and cumulative, of Processing Instruction. This is achieved by:

(1) presenting and explaining the processing principles as part of the input processing model so that readers can appreciate the foundation on which our work is based;
(2) reviewing the empirical research conducted, to date, on the primary effects of Processing Instruction;
(3) presenting the results of three studies that have investigated transfer of training effects (secondary and cumulative effects) for Processing Instruction; and, finally,
(4) drawing appropriate conclusions about transfer-of-training effects and indicating possible future directions for research in the PI model.

Contents

In Chapter 1 we provide a synopsis of VanPatten's theory of input processing, (VanPatten, 1996, 2003, 2004b). This theory captures as a set of Principles what second language learners do with meaning-bearing, comprehensible input. We first present the theory as VanPatten does, as a set of principles. The two major principles of this theoretical model (the

Primacy of Meaning Principle and the First Noun Principle) are reviewed along with their corollaries. After presenting these principles, we undertake to demonstrate their empirical underpinnings. In doing so, we further explicate the scope of each principle. This chapter provides the theoretical background for the empirical work presented in Chapters 3, 4 and 5, in which the transfer-of-training effects of Processing Instruction are measured.

Chapter 2 is divided into two parts. In Part 1 we review all the research to date on the effects of Processing Instruction that has addressed a specific processing problem. Research on the effects of PI has been conducted using both syntactic and perceptual strategies. Within this research framework (which intended to measure the primary effects of Processing Instruction), we can identify various lines or strands of research. In this chapter we revise four main lines of reserach.

(1) First of all, we provide a summary of the findings of the existing body of research that has compared the effects of Processing Instruction to other types of instruction, the former having focused on language processing and the latter having emphasised language production. That is, traditional instruction consists of form-focused output practice, whereas meaning-based output instruction consists of communicatively-focused output practices. The fundamental question Processing Instruction had to address at the outset was whether or not it was effective instruction.
(2) We revise the empirical work conducted on measuring the effects of the individual components of Processing Instruction. Processing Instruction comprises of two elements: explicit information about the grammatical item, including information about processing strategies, and structured input activities. The question as to which element was the causal variable in the positive findings of PI emerged early in the trajectory of PI research.
(3) We summarise very recent research on the effects of Processing Instruction delivered via different modes (i.e. online vs. pencil and paper) or in different contexts (i.e. virtual or classroom). The question this strand of investigation addressed was whether a self-guided learner doing work online would be more, less, or equally influenced by Processing Instruction.
(4) Finally, we evaluate classroom-based studies that have manipulated Processing Instruction materials with the idea of potentially increasing the number of form–meaning connections learners would make. To that end, the research compared the effects of using Processing Instruction materials that had undergone input enhancement techniques with the same materials that lacked those enhancements.

In Part 2 of the chapter, we present Processing Instruction as a viable approach to grammar instruction. We review a set of guidelines for developing structured input activities and look very closely at the activities that learners are engaged in and how they are derived from the input processing principles presented in Chapter 1.

In Chapter 3 we present the results of our first investigation of transfer-of-training effects of Processing Instruction on the acquisition of Italian. In this work we focused on what we have termed the secondary effects. We investigated whether learners who are exposed to Processing Instruction on one linguistic item will transfer that training and use it to process another linguistic item that presents a similar processing problem to the first. The two linguistic items we selected for this investigation were Italian noun–adjective agreement and the morphological future tense. These two forms are respectively affected by two processing problems/principles: *The Preference for Nonredundancy Principle* and *The Lexical Preference Principle*. In the case of the first processing problem, adjective ending in Italian is an agreement feature affected by this principle. We isolate gender agreement. Here is an example. In the sentence *la ragazza bella* the adjective (*bella*) must agree in number and gender with the noun it modifies (*ragazza*). This feature of grammar (*a* = singular feminine) is highly redundant, as there are a number of *-a* markers of feminine gender (*la ragazza bella*). It is also very low in semantic value, as it does not contribute very much to the meaning of the utterance. There is no difference in meaning between *ragazza bella* and *ragazza bello*; the difference is grammaticality.

Future tense morphology is also word final, but it is affected by the Lexical Preference Principle. If learners can establish the temporal framework or assign tense with a lexeme (a content word), then they do not need the verb form to also do that. For example in the sentence *Domani Paolo giocherà a Pallone* both the lexical item *domani* and the *-à* verb ending communicate future tense. According to the Lexical Preference Principle learners will naturally rely on the lexical item over the verb inflection in order to gather semantic information. Unlike adjective agreement, future tense morphology has semantic value and, in the absence of a lexical temporal indicator, would be the only way to assign tense. The two linguistic items are formally similar (word final) but represent different processing problems. Processing Instruction on adjective agreement in Italian directs learners to process the ends of words. Would learners receiving PI transfer that training to another linguistic item and thereby be able to process Italian future tense forms? The main question in the first study is, does processing instruction on adjective agreement aid learners in processing future tense?

Because this is the first study on transfer-of training effects for PI, we compared PI with another type of instruction. Processing Instruction

(which is input-based) was compared with traditional output-based instruction. Three groups were used. One group received Processing Instruction and a second group received traditional output-based instruction. The third was a control group that did not receive instruction on the target items over the duration of the experimental treatments. Pre-tests and post-tests were developed for this study and consisted of an aural interpretation task and a written form-completion text. All groups received pre-tests on both linguistic features. After the pre-tests learners were randomly assigned to one of three groups. The two treatment groups received instruction only on the first linguistic feature (adjective agreement). After the end of the instructional period all three groups were administered post-tests on both the target linguistic feature (adjective agreement) and the additional linguistic feature (future tense). Learners' performance on the future tense post-tests will allow us to measure any possible secondary effects on processing and production.

In Chapter 4 we present the results of a classroom study that also investigated secondary transfer-of-training effects of Processing Instruction, but this time we investigated native speakers of Korean learning English as a second language. It is important for generalising the results of Processing Instruction that we investigate different second languages as well as learners with different native language backgrounds. We selected two linguistic items from English for this investigation: the past tense marker -*ed* and the third person singular present tense marker -s. As temporal markers both linguistic items are affected by the Lexical Preference Principle, which is that, if there are lexical temporal indicators present, learners would prefer to use these to establish the time frame. In essence, a lexeme would make the verb morphology redundant. The following sentence, for example, doubly conveys past time: 'Yesterday the dog chased the cat up the tree'. Once learners establish the temporal framework with a lexeme (content word, 'yesterday'), then they do not also need the verb form to do that. In the absence of a lexical temporal indicator, the verb morphemes become very important for establishing time. The present tense marker -*s* presents another processing problem in that it carries not only temporal information but (unlike the past tense marker) also indicates person and number. The processing problem for learners is that in English the subject of the verb must be stated explicitly, which always makes the person/number feature of the morpheme redundant. Given that Processing Instruction on past tense helps learners process the ends of words, because it directs their attention there to find the form and connect it to its meaning, would learners receiving Processing Instruction on past tense transfer the strategy and use it to process present tense? The main question in the study is: does processing instruction on past tense aid L2 learners' processing of future tense?

As in Chapter 3, we compared Processing Instruction with another type of instruction. Processing Instruction (input-based) was compared with traditional output-based instruction and, again, three groups were used. One received Processing Instruction and a second group received traditional output-based instruction. The third was a control group that did not receive instruction on either of the target items (past tense and present tense) over the duration of the experimental treatments. Pre-tests and post-tests were developed for this investigation and consisted of an aural interpretation task and a written form-completion text. All three groups received pre-tests on both linguistic features. After the pre-tests learners were randomly assigned to one of three groups. The two treatment groups received instruction only on the first linguistic feature (past tense *-d*). After the end of the instructional period all three groups were administered the post-tests on both the target linguistic feature (past tense *-d*) and the additional linguistic feature (present tense, third person singular *-s*). Learners' performance on the present tense, third person singular *-s* post-tests will allow us to determine whether there are any secondary effects of Processing Instruction, and if those effects are found in the area of processing or production or both.

In Chapter 5 we present the results of a classroom study that explored both secondary and cumulative transfer-of-training effects. The learners were native speakers of English learning French. The form targeted for instruction was the French past imperfective tense, the *imparfait*, which is a verb final morphological marker. As with the other tense markers discussed above in relation to Chapters 3 and 4, this past imperfective tense marker is subject to the Lexical Preference Principle. Its meaning can be conveyed via lexical temporal aspectual indicators, for example, 'every summer of my childhood' conveys past imperfective time. The French subjunctive mood marker is also affected by the Lexical Preference Principle, albeit in a different way. Unlike tense morphemes, this mood marker is completely redundant. It can be realised only in the presence of a lexical marker. Additionally, the subjunctive occurs in a subordinate clause while the lexical marker is the verb in the independent clause. The subjunctive, therefore, is also subject to the Sentence Location Principle. It does not occur in a favoured processing location. The first question we aim to address is: would learners receiving Processing Instruction on the *imparfait* transfer that training to another linguistic item and thereby be able to process French subjunctive mood forms? The first question in this study is: does processing instruction on verb tense and aspect aid learners in processing mood markers in subordinate clauses?

This study makes another very important contribution to our knowledge base by investigating what we have termed cumulative effects. The French *imparfait* is a tense and aspect verb morpheme. The French faire