Investigating Processing in Processing Instruction

Dissertation

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

Maria Alley, M.A.

Graduate Program in Slavic and East European Languages and Literatures

The Ohio State University

2011

Committee:

Daniel E. Collins, Co-Advisor

Wynne Wong, Co-Advisor

Diane Birckbichler
Abstract

The present study investigates the effects of processing of the target form as a component of input-based focus-on-form instructional intervention, known in previous research as Processing Instruction (PI), on the acquisition of the directional/locational case distinction in Russian. The first part of the experiment designed for this study attempts to test whether PI is a viable instructional approach for Russian as a second language. The first part of the experiment also tests the claims made in previous PI research that not all input-based instructional interventions are created equal: interventions that push learners to make correct form-meaning connections are more beneficial in promoting SLA than those that do not. Some SLA researchers have also claimed that opportunities for production (pushed output) during practice promote deeper processing than do opportunities to process the input (e.g. Izumi, 2002). The second part of the experiment in this study attempts to test whether opportunities to produce the target forms in addition to processing would make the instructional treatment even more beneficial in terms of SLA for this target form.
Dedication

This dissertation is dedicated to my husband John, for his love and unconditional support of everything I have ever done.
Acknowledgments

I would like to thank two advisors, whom I was privileged to work with in preparing this dissertation. I am tremendously thankful to Dr. Wynne Wong for introducing me to the subject of input enhancement, for sharing her expertise on this subject with me and for her guidance throughout the entire process of this project. My sincere thanks also go to Dr. Daniel Collins for his critical comments and encouragement throughout the whole process. I would also like to thank Dr. Diane Birckbichler for her thoughtful comments during the defense of this dissertation. This work would not be possible without them. I would also like to thank Jiangyong (Matt) Yin for his help with the statistical analysis in this study.
Vita

1994.............................................................High School 19, Ukhta, Russia

2000.............................................................B.A. Teaching Foreign Languages, Komi State Pedagogical Institute, Syktyvkar, Russia

2002.............................................................Graduate Associate Teaching Award, The Ohio State University

2003.............................................................M.A. Slavic Linguistics, The Ohio State University

2000-2005......................................................Graduate Teaching Associate, Department of Slavic and East European Languages and Literatures, The Ohio State University

2005.............................................................Oral Proficiency Certification in Russian

2005-2007......................................................Assistant Director of Language Programs, Department of Slavic and East European Languages and Literatures, The Ohio State University

2007 to present...............................................Acting Director of Language Programs, Department of Slavic and East European Languages and Literatures, The Ohio State University
Languages and Literatures, The Ohio State University

2008...............................................................Grant for Enhancement of GTA training and ongoing support ($10,000), University Center for the Advancement of Teaching, The Ohio State University

2010...............................................................Grant for Enhancement of GTA training and ongoing support ($10,000), University Center for the Advancement of Teaching, The Ohio State University

Publications


Fields of Study

**Major Field:** Slavic and East European Languages and Literatures
# Table of Contents

Abstract ........................................................................................................................................... ii  
Dedication ...................................................................................................................................... iii  
Acknowledgments ........................................................................................................................... iv  
Vita .................................................................................................................................................. v  
List of Tables .................................................................................................................................. xi  
List of Figures ................................................................................................................................. xiv  
List of Terms.................................................................................................................................... 1  
Chapter 1: Introduction .................................................................................................................. 2  
Chapter 2: Literature Review .......................................................................................................... 8  
  2.2. Focus-on-Form Instruction....................................................................................................... 8  
  2.3. Model of SLA ....................................................................................................................... 12  
  2.4. Model of Input Processing ...................................................................................................... 15  
  2.6. Studies on PI and SI Activities ............................................................................................. 22  
    2.6.1. Summary and Limitations of Research on PI and SI Activities .................................. 35  
  2.7. Studies on Meaningful Output ............................................................................................... 37  
    2.7.1. Summary and Limitations of Research on Meaning-based Output ......................... 44
2.8. Research on Pushed Output

2.8.1. Summary and Limitations of Research on Pushed Output

2.9. Studies that Address the Issue of Processing

2.9.1. Summary of Research that Addresses the Issue of Processing

2.10. The Present Study

2.10.1. Experiment 1

2.10.1.1. Research questions

2.10.1.2. Hypotheses

2.10.2. Experiment 2

2.10.2.1. Research questions

2.10.2.2. Hypotheses

Chapter 3: Research design and methodology

3.1. Experiment 1

3.1.1. Overview of the experiment

3.1.2. Target forms

3.1.3. Participants

3.1.4. Materials

3.1.4.1. Consent Form

3.1.4.2. Background Questionnaire

3.1.4.3. Assessment tasks
4.3.1.1. Results for production (ANOVA) ................................................................. 100
4.3.1.2. Results for interpretation (ANOVA) ......................................................... 105
4.3.2. Logistic Linear Model .................................................................................. 109
4.3.2.1. Results for production (LLM) ................................................................. 109
4.3.2.1. Results for production (LLM) ................................................................. 110
4.4. Summary of results (Experiment 2) .............................................................. 111

Chapter 5: Discussion and Conclusions .................................................................. 112

5.1. Experiment 1 ................................................................................................. 112
5.2. Experiment 2 ................................................................................................. 118
5.3. Observations on Participants’ Performance .................................................... 123
5.4. Study Limitations and Directions for Future Research ................................. 125
5.5. Conclusions .................................................................................................. 129

References ............................................................................................................. 131

Appendix A: Background Questionnaire ............................................................. 137
Appendix B: Input Processing Instructional Packet ............................................. 138
Appendix C: Input – Processing Instructional Packet .......................................... 148
Appendix D: Output + Processing Instructional Packet ........................................ 158
Appendix E: Pre-test (all treatment groups) .......................................................... 169
List of Tables

Table 1. SLA processes. (from VanPatten and Cadierno, 1993) ........................................ 13
Table 2. Principles of VanPatten’s Model of Input Processing. (from Lee and VanPatten, 2003) .......................................................................................................................... 18
Table 3. Russian nominal declension for the masculine noun park ‘park’ ...................... 64
Table 4. Russian nominal inflection for the feminine noun škola ‘school’ ...................... 64
Table 5. Summary of assessment task versions ................................................................ 72
Table 6. Summary of treatment procedures in Experiment 1 ........................................... 81
Table 7. Summary of treatment procedures in Experiment 2 ........................................... 86
Table 8. Descriptive statistics for production pre-test for Input + Processing and Input – Processing treatments ......................................................................................... 90
Table 9. Descriptive statistics for production post-test for Input + Processing and Input – Processing treatments ......................................................................................... 90
Table 10. Effect for time and interaction between time and treatment for Input + Processing and Input – Processing groups in repeated measures ANOVA for production measures .................................................................................................................. 92
Table 11. Descriptive statistics for interpretation pre-test for Input + Processing and Input – Processing treatments ......................................................................................... 94
Table 12. Descriptive statistics for interpretation post-test for Input + Processing and Input – Processing treatments ................................................................. 94

Table 13. Effect for time and interaction between time and treatment for Input + Processing and Input – Processing groups in repeated measures ANOVA for interpretation .................................................................................................................. 95

Table 14. Estimated marginal means for Input + Processing and Input – Processing groups on production measures in LLM ........................................................................................................ 98

Table 15. Estimated marginal means for Input + Processing and Input – Processing groups on interpretation measures in LLM ........................................................................................................ 99

Table 16. Descriptive statistics for production pre-test for Input + Processing and Output + Processing treatments ...................................................................................................................... 101

Table 17. Descriptive statistics for production post-test for Input + Processing and Output + Processing treatments ...................................................................................................................... 101

Table 18. Effect for time and interaction of time and treatment for Input + Processing and Output + Processing groups in production in repeated measures ANOVA .................. 104

Table 19. Descriptive statistics for interpretation pre-test for Input + Processing and Output + Processing treatments ...................................................................................................................... 106

Table 20. Descriptive statistics for interpretation for Input + Processing and Output + Processing treatments ...................................................................................................................... 106

Table 21. Effect for time and interaction between time and treatment for Input + Processing and Output + Processing groups on interpretation measures in repeated measures ANOVA ...................................................................................................................... 107
Table 22. Estimated marginal means for Input + Processing and Output + Processing groups on production measures in LLM ............................................................... 109

Table 23. Estimated marginal means for Input + Processing and Output + Processing groups on interpretation in LLM ................................................................. 110
List of Figures

Figure 1. Sample slide from Activity 2 in the PI treatment in Comer and deBenedette (2010) .............................................................. 35

Figure 2. Estimated marginal means for Input + Processing and Input – Processing groups on production measures in repeated measures ANOVA ........................................ 93

Figure 3. Estimated marginal means of Input + Processing and Input – processing groups on interpretation measures in repeated measures ANOVA ........................................ 96

Figure 4. Estimated marginal means of Input + Processing and Output + Processing groups on production measures in repeated measures ANOVA ................................. 105

Figure 5. Estimated marginal means for Input + Processing and Output + Processing groups on interpretation measures in repeated measures ANOVA ................................. 108
#### List of Terms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACC</td>
<td>Accusative case</td>
</tr>
<tr>
<td>ANOVA</td>
<td>Analysis of variance</td>
</tr>
<tr>
<td>CLT</td>
<td>Communicative Language Teaching</td>
</tr>
<tr>
<td>COMP</td>
<td>Comprehension</td>
</tr>
<tr>
<td>EnI</td>
<td>Enriched Input</td>
</tr>
<tr>
<td>ESL</td>
<td>English as a Second Language</td>
</tr>
<tr>
<td>IE</td>
<td>Input Enhancement</td>
</tr>
<tr>
<td>FEM</td>
<td>Feminine</td>
</tr>
<tr>
<td>L1</td>
<td>First Language</td>
</tr>
<tr>
<td>L2</td>
<td>Second Language</td>
</tr>
<tr>
<td>LLM</td>
<td>Logistic Linear Model</td>
</tr>
<tr>
<td>MASC</td>
<td>Masculine</td>
</tr>
<tr>
<td>MDI</td>
<td>Meaning-Based Drills Instruction</td>
</tr>
<tr>
<td>MOBI</td>
<td>Meaningful Output-based Instruction</td>
</tr>
<tr>
<td>MOI</td>
<td>Meaningful Output Instruction</td>
</tr>
<tr>
<td>NOM</td>
<td>Nominative</td>
</tr>
<tr>
<td>O</td>
<td>Pushed Output</td>
</tr>
<tr>
<td>OVS</td>
<td>Object-Verb-Subject word order</td>
</tr>
<tr>
<td>PREP</td>
<td>Prepositional case</td>
</tr>
<tr>
<td>PRES</td>
<td>Present tense</td>
</tr>
<tr>
<td>SG</td>
<td>Singular</td>
</tr>
<tr>
<td>SI</td>
<td>Structured Input</td>
</tr>
<tr>
<td>SLA</td>
<td>Second Language Acquisition</td>
</tr>
<tr>
<td>SVO</td>
<td>Subject-Verb-Object word order</td>
</tr>
<tr>
<td>PI</td>
<td>Processing Instruction</td>
</tr>
<tr>
<td>TI</td>
<td>Traditional Instruction</td>
</tr>
<tr>
<td>TR</td>
<td>Text Reconstruction</td>
</tr>
</tbody>
</table>
Chapter 1: Introduction

Grammar instruction remains one of the most debated areas in the field of second language acquisition (SLA) and language pedagogy. The grammar component of language proficiency has traditionally occupied a central role in various language teaching methodologies that had a major impact on the history of language teaching. Even today, as Wong (2005, p. xvii) points out, language learning is often equated with the learning of grammar.¹

Questions of grammar instruction continue to be vital within the framework of communicative language teaching (CLT), which moved the instructional focus from language as means in itself to the message it carries and stressed the importance of real-life communication in the target language in promoting SLA. Classroom practices as they concern grammar instruction vary widely in classrooms around the world. Questions about when and how to teach grammar and even whether to teach it at all continue to be debated. Some CLT classrooms have followed the more traditional approach to grammar instruction, first proposed by Paulston (1972), providing learners with a combination of explicit rule explanation and production activities, which move from mechanical to meaningful to communicative drills. At the same time, claims have been made that grammar instruction does not affect acquisition, i.e., the development of the implicit

¹ For a detailed overview of grammar instruction see Wong (2005).
linguistic system (e.g., Krashen, 1985). Thus, in some CLT classrooms instruction on the formal properties of language has been virtually absent.

Explicit grammar instruction has often been seen as particularly important and even necessary for some languages that are less commonly taught and more challenging for speakers of English, like Russian. For example, Leaver et al. (2004) argue that some features of Russian, such as the verbal system or the flexibility of Russian word order, which have no parallel in English, are “more readily learned through direct instruction and repetition” (p.126).

As researchers and teachers continue exploring the notion of grammar instruction and its role in the process of language acquisition, SLA research conducted in the last few decades helps shape our understanding of what successful grammar instruction is. One such important finding concerns the essential role that input, defined as the comprehensible meaning-bearing target language that a learner hears or sees, plays in the process of SLA. All SLA researchers today agree that input is a necessary condition for acquisition to occur (e.g. Gass, 1997; Wong, 2005). At the same time, SLA research indicates that simple access to even large amounts of input may not be a sufficient condition for language acquisition of all target forms in all learning contexts and that some kind of attention to the formal properties of language may have facilitative effects on the attainment of high levels of accuracy, the rate of acquisition and the ultimate level of L2 attainment (e.g., Nassaji and Fotos, 2004; Norris and Ortega, 2000). A substantial body of research exists on the role of form-focused instruction, i.e., instruction that in some way draws learners’ attention to the formal properties of the second language (L2). This research reveals that integration of focus on meaning and focus on form may be
important in promoting SLA in some learning contexts (e.g., Long, 1991; Doughty and Williams, 1998). Findings about the crucial role of input and the integrated attention to meaning and form in SLA have prompted researchers to explore the different ways, which could help make L2 features more salient in the input and provide learners with opportunities to make correct form-meaning connections to promote their SLA.

The concept of input enhancement was introduced by Sharwood Smith (1981, 1991) and defined as any pedagogical intervention designed to deliberately make specific L2 forms in the input more salient in order to draw learners’ attention to these forms. Input enhancement techniques, which include, among others, typographically enhancing target forms in the written input (e.g., bolding or capitalizing), flooding oral or written input with multiple samples of the target form, and consciousness-raising tasks have expanded the repertoire of form-focused instructional techniques.

Structured input (SI) activities, often investigated in research as part of one type of form-focused grammar instruction called Processing Instruction (PI), are created with learner input processing strategies in mind; they push learners to notice and process the target forms in oral and written input and to alter any incorrect strategies they use in making form-meaning connections. In general, this line of research has found that SI and PI have positive effects on L2 acquisition (e.g., Collentine, 1998; VanPatten and Cadierno, 1993; Wong and VanPatten, 2004; Wong, 2004b, Lee and Benati, 2007). However, the superior results of SI and PI did not obtain in some of the previous studies. It has been argued that the reason that SI and PI treatments have not been uniformly effective is that not all of the treatments tested in previous research that claimed to include SI activities actually considered learner processing strategies or required learners
to process the target forms. Thus, according to Wong (2004b: 61), “PI has sometimes been mistakenly reduced to be any kind of input practice.” The claim that not all input-based instructional treatments are created equal has been supported by Marsden (2006), who found that learners who engaged in SI activities did much better in both production and interpretation than learners who engaged in input-based activities that did not require processing of the target forms.

In addition, it has been claimed that input-based instructional techniques, including PI, will not work for morphologically rich languages like Russian (Leaver, Rifkin and Shekhtman, 2004). In their discussion, Leaver et al. seem to equate input-based instructional interventions, such as PI, to naturalistic language learning environments, which provide learners with “more and more input, that is, more time on task”; they argue that several linguistic features of Russian that are particularly challenging for L2 learners of Russian whose L1 is English, such the aspectual system, cannot be acquired without what they refer to as “direct instruction”, which includes explication and controlled practice. The authors suggest that the amount of comprehensible input needed to acquire this complex linguistic system is much larger than what can realistically be provided to learners in the classroom context through authentic materials and in the time available. Similarly, the first study to provide empirical evidence for the comparative effects of PI and traditional instruction (TI) on the acquisition of Russian grammatical forms, Comer and deBenedette (2010), found no difference between the two treatments.

Based on this research, the present study attempts to test whether PI, as an instructional technique for grammar instruction, may be advantageous in L2 acquisition
of Russian noun case forms. The target form chosen for this study is the same form investigated in Comer and deBenedette (2010)—the directional/locational distinction expressed by Accusative and Prepositional case forms. The first part of the experiment designed for this study (hereafter Experiment 1) attempts to test the claims that input-based instructional interventions that are designed with learner input processing strategies in mind are more advantageous than input-based interventions that are not. In other words, Experiment 1 focuses on the quality of the input and the tasks provided to learners in input-based instructional treatments and attempts to find out what aspect of the input-based instructional treatments is responsible for the success documented for these treatments in previous research. Is it just the provision of comprehensible meaning-bearing input, or is it the combination of the input and processing of the target forms?

Another strand of PI research compares PI with instructional treatments containing output or production practice. These studies have generally found that meaningful output-based treatments have facilitative effects, especially in production tasks. In interpretation tasks, the results have been more mixed. While some studies found equal effects for PI and meaning-based output (MOI) (e.g., Morgan-Short and Wood Bowden, 2006), others indicated that PI was more effective than MOI (e.g., Benati, 2005). However, it is not clear that all instructional treatments tested in previous research actually encouraged processing. In addition, Izumi and colleagues (e.g., Izumi, Bigelow, Fijuwara and Fearnow, 1999; Izumi, 2002) argue that opportunities for output during instruction (“pushed output”) promote deeper processing (noticing and learning) of the target forms than is possible in attending to the input. Their findings suggest that
instructional treatments that provide learners with opportunities to produce output during treatment are more beneficial for acquisition than instructional treatments that did not.

If processing is critical in promoting SLA (Experiment 1), and if output encourages deeper processing (Izumi et al., 1999; Izumi, 2002), will processing plus pushed output be more beneficial than processing plus input? The second part of the experiment (hereafter Experiment 2) was designed to test this claim. More specifically, Experiment 2 attempts to single out the modality of the practice (input vs. output) and attempt to test which of the two is more effective in combination with the processing component.

The next chapter presents the review of the previous research with specific focus on the two variables described above—processing of the target form and input-based and output-based form-focused instructional treatments. Chapter 3 lays out the design
Chapter 2: Literature Review

2.1. Introduction

This chapter will review the literature relevant to the present study. It will examine such concepts as grammar or form-focused instruction, the model of second language acquisition (SLA), input enhancement techniques, Processing Instruction (PI) and its effects on L2 acquisition as compared to other input- and output-based form-focused instructional techniques. The research questions and predictions for the study will also be presented.

2.2. Focus-on-Form Instruction

The main goal of focus-on-form instruction is to deliberately draw learners’ attention to specific linguistic forms or features of L2 at different points during the learning process in order to aid acquisition.²

Most SLA researchers today agree that in some contexts a combination of focus on meaning and focus on form is necessary for successful L2 acquisition (e.g., Doughty and Williams, 1998, Lightbown and Spada, 2006, Norris and Ortega, 2000). Evidence in favor of inclusion of focus-on-form instructional techniques into the learning process

² In this dissertation, the term focus-on-form instruction refers to any instructional technique that aims to draw learners’ attention to L2 form, while maintaining the focus on meaning.
comes from several sources. First, several studies into the effectiveness of formal instruction demonstrated that it may be effective in promoting SLA, when compared to more naturalistic learning environments. Based on a review of twelve studies on the effects of formal instruction on SLA, Long (1983) concludes that there is enough evidence that formal instruction is beneficial for learners of different ages (children and adults), of different proficiency levels (intermediate and advanced) and in learning contexts with different levels of exposure to L2 outside of class. Formal instruction seems to positively affect both the rate and the success of acquisition. \(^3\) Similar conclusions were reached by Norris and Ortega (2011) in an analysis of forty-nine studies on the effectiveness of L2 instruction published between 1980 and 1998. The authors state, “…not only does focused L2 instruction make a consistently observable difference that is very unlikely to be attributable to chance, but it also seems to make a substantial difference”. (p. 193).

Second, studies on largely or entirely meaning-focused immersion programs, such as the oft-cited French immersion programs in Canada, have demonstrated that, while learners in those programs commonly attain high and sometimes even native-like levels of fluency, listening and reading comprehension and confidence in using L2, they often fall short in reaching expected target-like levels of accuracy, despite the fact that these learners have been exposed to large amounts of meaningful input and opportunities for

---

\(^3\) Long (1983) is not differentiating between the different types of form-focused instruction and is mainly concerned with the importance of grammar instruction in general. One of the major goals of Long’s analysis is to respond to the Monitor Theory proposed by Krashen (1982), which postulates that exposure to an optimal amount of comprehensible input is the necessary and sufficient condition for L2 acquisition.
interaction.\textsuperscript{4} This proved especially true for certain features of L2 that are more rarely available in the input, even in content-based instruction (Harley and Swain, 1984).\textsuperscript{5}

It became increasingly clear that in the context of instructed SLA, learners simply may not have access to sufficient amounts of input containing target form samples for all of the target forms in all speech styles in order to successfully acquire them. Certain target forms, which are less frequent or are restricted to a specific style of speech, are disadvantaged in this respect (Lightbown and Spada, 2006, Wong, 2005). A similar argument, although not empirically tested, was put forth by a group of researchers and teachers of Russian (Leaver et al., 2004), who, citing several major differences between English and Russian, which present substantial challenges to L2 learners of Russian whose first language is English, argue that “[t]he amount of comprehensible input needed to acquire this system is far beyond that which one can get in a classroom through authentic materials alone and in the time available” and advocate the use of explicit grammar instruction, although not necessarily mechanical drills (p. 127). It is argued that in order for L2 learners to be able to achieve higher levels of language proficiency and to become both fluent and accurate in L2, attention to formal properties of the target language is essential, in addition to provision of ample amounts of comprehensible meaning-bearing input (Leaver et al., 2004).

Third, research on input processing indicates that even when target forms are available in the input, learners do not necessarily notice or attend to these forms in a way

\textsuperscript{4} Harley and Swain (1984) describe French immersion programs in Toronto and Ottawa, where English-speaking students received curriculum instruction in French from first to tenth grade (up to seven years of immersion), with classes in English gradually becoming part of the curriculum beginning in second to fourth grade.

\textsuperscript{5} Similar results were obtained by Lightbown and Spada (1994) for French-speaking 5\textsuperscript{th} and 6\textsuperscript{th} graders in intensive ESL programs in Quebec.
that would aid acquisition (e.g., VanPatten, 2003, Wong, 2005). Wong (2005) states, “Unfortunately, all the input that the learners are exposed to is not viable for acquisition. Because it is not possible to pay attention to everything in the environment, learners cannot take in all the input that they are exposed to.” (p. 27). Research indicates that all input that learners are exposed to is filtered by their internal mechanisms (e.g., Gass, 1997, VanPatten, 2003, Wong, 2005). Thus, it has been argued that instructional interventions, which take these internal mechanisms into account and help learners appropriately focus their attentional resources while processing input promote acquisition.

In addition, previous research indicates that even if learners succeed in noticing target forms in the input, they do not always make the appropriate form-meaning connections. As learners attempt to understand the message that the input contains, they are guided by the internal strategies they naturally possess in processing the input. These input processing strategies are not always efficient. For example, learners who are native speakers of English tend to interpret words in sentence-initial position as the subject of the sentence, a processing strategy that is not optimal for languages like Spanish. Focus-on-form instruction may be beneficial in making L2 forms more salient in the input and helping learners acquire the target forms.

This dissertation is concerned with focus-on-form techniques, which provide learners with opportunities to process the target forms during practice, both in input-based and output-based instructional interventions.

---

6 OVS word order in Spanish and the associated processing strategy have been extensively researched (e.g., VanPatten and Cadierno, 1993, VanPatten and Oikkenon, 1996, Fernandez, 2008)
The next sections discuss a model of SLA and the essential role that input plays in this process, as well as the focus-on-form instructional techniques, which rely on the provision of L2 input.

2.3. Model of SLA

It is widely recognized today that SLA is a complex set of multiple processes and that to date no single theory of language or psychology has been able to fully explain how language acquisition happens (Lee and VanPatten, 2003). One of the prevalent models of SLA, developed by VanPatten (1996), posits at least three different SLA processes, which are depicted in Table 1 below.

According to this model, in order for acquisition to occur, learners must be exposed to large amounts of meaningful comprehensible input. Input is defined as all L2 language that a learner hears or sees that is meaningful in nature. In other words, input must contain a message that needs to be communicated and comprehended, thus giving the receiver of this message a reason to attend to it. Input also contains linguistic information about the L2 structure that the learner is acquiring (Wong, 2005).

There is a general agreement in SLA today that input is a necessary, although not necessarily a sufficient, condition for SLA (e.g., Gass, 1997; Lee and VanPatten, 2003; Wong, 2005). However, as mentioned above, not all the input that a learner is exposed to is automatically incorporated into his/her L2 developing linguistic system, because a learner cannot attend to and take in all the available input in the surrounding environment. The available input can only become usable for acquisition if a learner
succeeds in a) noticing both the meaning of a target form and its linguistic representation\(^7\) and b) making the appropriate form-meaning connections.\(^8\)

<table>
<thead>
<tr>
<th>I</th>
<th>II</th>
<th>III</th>
</tr>
</thead>
<tbody>
<tr>
<td>input</td>
<td>intake</td>
<td>developing system → output</td>
</tr>
<tr>
<td>I = input processing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II = system change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>III = output processing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1. SLA processes. (from VanPatten and Cadierno, 1993)\(^9\)

If these requirements are met, a part of the available input turns into *intake*, which in turn has the potential to be incorporated into and change the learner’s developing system. Thus, *input processing* refers to how learners initially perceive and process the linguistic data in the language they hear or see. *Intake* refers to the linguistic data that learners are able to notice and extract from the meaningful message to which they are attending. In other words, intake is the part of input that is usable for acquisition.

---

\(^7\) Whether or not “noticing” a target linguistic form in the input is a necessary condition for SLA and what exactly “noticing” means is a point of debate among SLA researchers (see, for example, Truscott, 1998). However, there is a general consensus that some kind of awareness or attention to the target form is necessary for a learner to make the correct form-meaning connections and eventually acquire the form (Nassaji and Fotos, 2004).

\(^8\) Following Wong (2005), *form* here is defined broadly as a linguistic representation of a referential real-world meaning. In this sense, *form* could be a part of verbal or nominal morphology, a preposition, an article or word order in a sentence.

\(^9\) For other theoretical models of SLA see Bialystok (1978) and Gass (1997). It should be noted that all these models recognize the fundamental role that input plays in the SLA process.
Learners are able to hold this information in their working memory for further processing and internalization in the developing system (Lee and VanPatten, 2003).

The developing system (learner’s interlanguage) is in a constant state of flux: the new linguistic data that enter the developing system cause the system to constantly restructure itself to accommodate the incoming linguistic data. The linguistic data that have become a part of the developing system may then be accessed by the learner in production and is termed output (VanPatten, 1996).

In this model, input and output represent two separate processes that contribute to SLA in important, but different ways. The arrows in the model move from left to right, demonstrating the directionality of the processes involved. While input creates and feeds the linguistic data into the developing system, making SLA an input-dependent process, output is seen as essential in developing production strategies, L2 fluency and accuracy in accessing the developing system (VanPatten, 1996).

Some researchers assign output a more central role in SLA, beyond the development of production strategies (e.g., Swain, 1985, 1993; Izumi et al., 1999; Izumi, 2002). Swain (1993) posited that, in addition to comprehensible input, L2 learners should be provided with opportunities to produce L2 forms in a way that “pushes” them to extend their linguistic repertoire in order to express the intended meaning as precisely and accurately as possible. Swain argued that the act of engaging in L2 production, “pushed output”, promotes deeper, more syntactic processing of the target forms by the learners, as opposed to more semantic processing input, because learners may understand the meaning of the input without noticing the formal properties of the language. It is claimed that pushed output allows learners to notice the mismatches between their
intended meaning and their current abilities (the *noticing function* of output). Output also gives learners an opportunity to analyze their own production (the *metalinguistic analysis function* of output) and to test hypothesis about how the target forms function in the language (the *hypothesis testing function* of output). VanPatten (2002) agrees that output allows learners to notice the mismatches between their own L2 and the available input, drawing learners’ attention to those features in the input. This makes learners better “input processors” and provides learners with more opportunities to make form-meaning connections (ibid.: 762). Several studies have attempted to empirically test whether opportunities to produce oral or written output have positive effects on learners’ acquisition of L2 grammar (e.g., Izumi et al., 1999; Izumi, 2002; Wong, in press). The vast majority of SLA researchers today are in agreement that in many contexts neither input nor output are sufficient conditions for SLA to occur and that both have a major role to play in this process.

### 2.4. Model of Input Processing

A considerable amount of research has been conducted to find out how learners perceive input and what they pay attention to in the input and why (e.g., Glisan, 1985; Gass, 1989; McDonald and Heilenman, 1992). VanPatten (1996, 2000, 2004) proposed a model of input processing principles to explain how learners derive linguistic data from the message when their primary focus is on meaning. These natural input processing strategies (outlined in Table 2 below) are not necessarily very effective. They can and
often do lead learners to ignore or misinterpret L2 forms in the input. This diminishes the amount of intake, which may inhibit L2 acquisition.

The first principle in VanPatten’s Input Processing model, the Primacy of Meaning principle, is based on the assumption that, when learners perceive input, they first try to understand the message it communicates before paying attention to how that message is encoded linguistically. This principle is related to the communicative value of the target forms in the input string—in other words, the meaning that a particular form contributes to the overall meaning of a sentence. Generally, if the meaning that a form encodes can be retrieved elsewhere in the input string, its communicative value diminishes and makes it less noticeable for the learner in the input string.

For example, in the Russian sentence in (1), the meaning of pastness is encoded by two forms: the adverb včera ‘yesterday’ and the past tense verbal ending –la in rabotala ‘worked’. While this redundancy diminishes the communicative value of both forms, the Primacy of Meaning principle predicts that the adverb ‘yesterday’ will have the higher communicative value of the two, in accordance with subprinciples P1a (the Primacy of Content Words) and P1b (the Lexical Preference) of the Input Processing model.

(1)  Včera  ja  rabotala.
Yesterday  I-NOM  work-PAST.FEM

VanPatten’s first principle predicts that an L2 learner trying to understand sentence (1) will rely primarily or exclusively on the adverb ‘yesterday’ to derive the
meaning of pastness from this sentence and may not notice or disregard the past tense ending of the verb ‘worked’. The communicative value of the form ‘worked’ goes up, however, if the adverb is removed from the sentence, as in sentence (2) below. Here the learner has to rely solely on the past tense ending of the verb to understand that the action took place in the past.

(2)  *Ja rabotala.*

<table>
<thead>
<tr>
<th>I-NOM</th>
<th>work-PAST.FEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>worked.</td>
</tr>
</tbody>
</table>

Another subprinciple of the Primacy of Meaning principle, subprinciple P1e, posits that learners can process forms with lower communicative value only if the message they are attending to is otherwise comprehensible. If learners struggle with comprehension of the message, they may not have attentional resources left over to allow them to also pay attention to form. Thus, it has been suggested that learners, especially beginners, should first be given sentence-level input before discourse-level input (Wong, 2005).

The second principle of VanPatten’s Input Processing model, the First Noun Principle, focuses on how word order affects how learners process input. This principle posits that early and intermediate L2 learners tend to interpret the first noun (phrase) of a sentence as its subject and the second noun (phrase) as the object, if Subject-Verb-Object (SVO) word order is the most common word order in their L1 (as it is in English) (e.g., VanPatten and Cadierno, 1993). When learning an L2 with a different syntactic structure,
like Spanish or Russian, English-speaking learners are likely to apply the familiar word order and misinterpret target L2 sentences.

**Principle 1 (P1). The Primacy of Meaning Principle.** Learners process input for meaning before they process it for form.

**P1a. The Primacy of Content Words Principle.** Learners process content words in the input before anything else.

**P1b. The Lexical Preference Principle.** Learners will tend to rely on lexical items as opposed to grammatical form to get meaning when both encode the same semantic information.

**P1c. The Preference for Nonredundancy Principle.** Learners are more likely to process nonredundant meaningful grammatical form before they process redundant meaningful forms.

**P1d. The Meaning-before-nonmeaning Principle.** Learners are more likely to process meaningful grammatical forms before nonmeaningful forms irrespective of redundancy.

**P1e. The Availability of Resources Principle.** For learners to process either redundant meaningful grammatical forms or nonmeaningful forms, the processing of overall sentential meaning must not drain available processing resources.

**P1f. The Sentence Location Principle.** Learners tend to process items in sentence initial position before those in final position and those in medial position.

**Principle 2 (P2). The First Noun Principle.** Learners tend to process the first noun or pronoun they encounter in a sentence as the subject or agent.

**P2a. The Lexical Semantics Principle.** Learners may rely on lexical semantics, where possible, instead of word order to interpret sentences.

**P2b. The Event Probabilities Principle.** Learners may rely on event probabilities, where possible, instead of word order to interpret sentences.

**P2c. The Contextual Constraint Principle.** Learners may rely less on the First Noun Principle if preceding context constrains the possible interpretation of a clause or sentence.

Table 2. Principles of VanPatten’s Model of Input Processing.
(from Lee and VanPatten, 2003)
For example, in the Russian sentence in (3), the word order is the same as in English (SVO). Learners who are confronted with sentences like sentence (3) below are likely to correctly interpret it as follows:

(3) Nina *vidit* Boris.
Nina see-PRES.3SG Boris-ACC
Nina sees Boris.

Sentence (4), on the other hand, expresses the same meaning as (3), but uses a different word order (OVS), also typical for Russian (where word order is determined pragmatically, by the information structure of the sentence).

(4) Boris *vidit* Nina.
Boris-ACC See-PRES.3SG Nina-NOM
Nina sees Boris.

The First Noun Principle of the Input Processing model predicts that an L2 learner encountering this sentence will have a tendency to interpret the first noun in this sentence (*Boris*) as the subject, leading the learner to misinterpret it as “Boris sees Nina”. When this happens, learners may deliver the wrong intake into the developing system, which may hinder acquisition of the target form.\(^\text{10}\)

The principles from VanPatten’s Input Processing model given in Table 2 are based on research on L1 and L2 processing (see VanPatten, 2000 for a detailed

\(^{10}\) Subprinciples P2a, P2b and P2c of the First Noun Principle posit that, instead of relying on word order to interpret sentences in the input, learners may also rely on other cues, such as lexical semantics, event probabilities and context.
However, as is recognized by VanPatten, the model is far from being complete; further research is needed into the various processing strategies employed by L2 learners with various first languages. In principle, though, the general principles of the model, especially as they relate to the communicative value of the target forms, apply to all L2 learners, irrespective of the language they are acquiring or the specifics of their learning situation (VanPatten, 2000).

2.5. Processing Instruction

Processing Instruction (PI) is defined by VanPatten (2002: 764) as a “type of grammar instruction or focus on form derived from the insights of IP (input processing).” PI is concerned with the input processing strategies learners use in processing L2 input. The goal of PI is to (1) identify any faulty strategy or strategies that learners use in processing an L2 target forms and (2) to structure the input and the tasks to push learners to process the target forms correctly in order to get meaning. PI attempts to find ways to maximize learners’ opportunities for intake, “pushing” them to use more effective input processing strategies and abandon any non-optimal strategies.

PI consists of three major stages: (1) First, the learners are provided with explicit information about the linguistic form or structure to be acquired in their L1; (2) then they are given information, again in their L1, about ineffective input processing strategies that L2 learners are likely to use in trying to comprehend the target form; and (3) learners complete a series of tasks in which they hear or read a series of L2 sentences and are asked to react to the informational content of those sentences relying on form to get the meaning. These tasks are called Structured Input (SI) activities. SI activities are grammar
practice activities, in which input is manipulated so that learners must process the target forms correctly in order to interpret meaning.

SI activities have several important characteristics. First and foremost, before an SI activity can be created, it is important to identify the strategy or strategies that learners are using to process that form. Second, the input is “structured” so that learners have to rely on the target linguistic forms in order to correctly interpret the meaning of the message. For example, to help learners apply effective input processing strategies and to pay attention to form, sentences like sentence like (1) are changed into sentences like (2), in which a learner must solely rely on the verb ending in order to interpret the meaning of pastness, without the help of any temporal adverb. Third, because the point of instruction is to help learners make correct form-meaning connections, meaning is always in focus during all SI activities. Learners are asked to answer questions about the propositional content of the L2 utterances they hear or see or to express personal opinions about them. Lastly, SI is input-based. At no time during the instruction phase are learners required to actually produce the target linguistic forms, either orally or in writing.

There are two types of SI activities—referential SI activities and affective SI activities. Referential SI activities require learners to rely on the form to get meaning. These activities have a right and a wrong answer, so that teachers can check whether learners are making the correct form-meaning connections and provide them with feedback on their performance. For example, in an SI activity for past tense forms (see sentence (2), above), learners may be asked to listen to a mixture of sentences in the past and the present forms and for each sentence they hear decide whether the action described in each sentence took place in the past or takes place in the present.
Affective SI activities follow referential SI activities, but they do not have a right or wrong answer. Instead, they require learners to provide some affective response to the information they are receiving. Learners may be asked to express an opinion or a belief about what they hear or see or to state something about themselves. For example, learners may see a list of activities in the past tense and asked to identify those that they did yesterday. The goal of affective SI activities is to strengthen the form-meaning connections by providing learners with additional opportunities to hear and see the target forms used in the meaningful context and to encourage learners to respond to the content of the input in meaningful ways (Wong, 2005).

SI has been investigated both as a separate instructional technique (e.g. VanPatten, 1996; Benati, 2004; Wong, 2004b, 2010) and as a component of Processing Instruction (PI) (e.g., by VanPatten and Cadierno, 1993; Benati, 2004, 2005; Farley, 2004). The next sections discuss the findings of the previous research findings that are relevant for the present study.

2.6. Studies on PI and SI Activities

The first study to empirically test the effects of PI on the acquisition of L2 grammar was that of VanPatten and Cadierno (1993). In their experiment, the researchers compared the effects of PI and traditional instruction (TI), which moved from mechanical form-oriented practice to meaningful and then to communicative drills. The linguistic features investigated in the study were Spanish clitic object pronouns and the OVS word order typical for constructions with these pronouns. The OVS target form was a good
candidate for investigation because there was a clear processing strategy associated with it (the First Noun principle), thus allowing for an instructional intervention that aimed at circumventing the ineffective processing strategies associated with this form.

The subjects in VanPatten and Cadierno’s study, 2nd-year university-level learners of Spanish, whose first language was English, were randomly divided into three treatment groups: TI, PI and a no-instruction or control group. Both of the experimental groups were first provided with explicit information about the target forms, but PI group also received information about how to process the sentences containing the target forms in Spanish.

In terms of practice, the TI group engaged in written and oral production of the target forms for the entire duration of treatment and never engaged in interpretation activities. Practice moved from mechanical form-oriented tasks (transformation and substitution drills) to meaningful simple-sentence answers to questions to more open-ended communicative question-and-answer and conversation practice. PI engaged in activities that required the learners to listen to or read sentences containing object pronouns and to respond to the propositional content (i.e., to attend to the meaning) of each utterance. The PI treatment included both referential and affective SI activities. The referential SI activities required the learners to demonstrate in some way that they had correctly assigned argument structure to the input string. For example, the learners had to pick a picture or an English rendering that best represented what they had read or heard. The affective SI activities used in this study required the learners to state whether they agreed or disagreed with the statements they heard or read, or whether these statements
were true or not true for them. At no time during treatment were the subjects in PI group required to produce the target forms either orally or in writing.

Both of the instructional treatments in VanPatten and Cadierno’s study extended over a period of two days. They were matched in terms of the number of tokens the learners encountered and their time on task. By contrast, the no instruction group or control group received no instruction on object pronouns in Spanish and continued with regular class instruction. The pre- and post-tests used in the study consisted of interpretation and written-production (sentence completion based on visual cue) tasks; they were administered to all three groups before the experiment (pre-test), immediately after the two-day treatment (post-test), one week (delayed post-test 1), and one month after the experiment (delayed post-test 2).

The results of VanPatten and Cadierno’s experiment showed that the PI group performed better than both the TI and the no-instruction group the interpretation task, while there was no significant differences between TI and the no-instruction group on the immediate post-test interpretation task. In terms of the written-production task, there were no significant differences between the TI and PI group, despite the fact that the PI group had never engaged in production during treatment. In other words, while TI had a positive effect on the learners’ production of the target form, PI had a positive effect on both on the interpretation and the production of the target form. The post-tests showed that these gains were maintained over time.

The results of this study allowed the authors to argue that processing instruction was a more effective type of focus-on-form instruction, because it “altered the way in which the subjects processed input, which in turn had an effect on the developing system
and what the subjects could access during production” (VanPatten and Cadierno, 1993: 53). TI was argued to be a less effective type of focus-on-form instruction, as it did not seem to have any effect on the subjects’ ability to interpret and produce the target forms. The authors further claimed that TI did not seem to alter the nature of the learners’ developing system and thus did not lead to acquisition.

The basic argument that VanPatten and Cadierno make for SLA can be summarized as follows. Considering the crucial role of input in the process of SLA, focus-on-form instruction directed at how learners process input and derive intake from it (PI) is more beneficial than the type of focus-on-form instruction operationalized in their study as TI (production-based instruction, which includes mechanical practice). PI provides learners with the information and practice necessary to become more effective input processors, which, in turn, positively effects their acquisition. As such, PI provides learners with very explicit grammar instruction, but not in the traditional sense, because it is directed at the input processing stage of the acquisition process.

Since the original VanPatten and Cadierno (1993) study, a series of replication and follow-up investigations have been conducted in order to test whether VanPatten and Cadierno’s results are generalizable to other learner populations, other settings, languages and grammatical structures. However, the results of these studies have been mixed.

Several studies found that PI was as effective or even more effective than other focus-on-form instructional techniques. For example, Cadierno (1995) found that PI was more effective than TI\(^\text{11}\) in promoting the acquisition of another grammatical structure,

\(^\text{11}\) Both treatments (PI and TI) were operationalized in Cadierno (1995) in the same way as in VanPatten and Cadierno (1993).
Spanish past tense verb morphology, which is associated with another input processing strategy, the Lexical Preference principle. The results showed that the PI group outperformed both the TI and the control group on the interpretation task; there were no significant differences between the TI and the control group. On the production task, both the TI and PI groups performed better than the control group, with no significant differences between TI and PI. These gains held over the three post-tests (over one month after treatment).

VanPatten and Wong (2004) examined the effects of PI and TI on the acquisition of another structure, the French causative construction, exemplified in (5) below.¹² In one type of these constructions, the underlying subject of the second verb appears preverbally, as an object pronoun. The processing strategy associated with this target form is connected with the First Noun Principle, delineated in the Input Processing model. When encountering sentences like sentence (5), L2 learners of French tend to disregard the first verb *font* ‘make’ and process only the second verb, *travailer* ‘to work’. At the same time, they tend to overlook the presence of a secondary agent (*me*) while interpreting the first noun as the subject. Thus they misinterpret the sentence as “My professors work hard for me”.

(5)  *Mes professeurs me font travailler beaucoup.*

My professors me make work hard.

My professors make me work hard.

¹² This study was a replication of Allen’s (2000) study on the effects of PI and TI on the acquisition of the French causative by fourth-semester L2 learners of French, which is discussed below in greater detail.
As in the original VanPatten and Cadierno (1993) study, VanPatten and Wong’s SI activities in the PI treatment consisted of both referential and affective activities. Special care was taken to make sure that the learners had to rely on the target forms to interpret meaning, as opposed to relying on lexical semantics and event probabilities.

The results showed that the PI group outperformed the TI and the control groups in interpretation, though TI group outperformed the control group. On production measures, there was no difference between the PI and TI groups, both of which outperformed the control group. However, when a specific test-taking strategy applied by some participants was taken into account, PI proved superior to TI, while both were superior to the control group in production.

Lee and Benati (2007) extended this line of research to non-Romance languages. They investigated the comparative effectiveness of SI in the acquisition of two Japanese structures: past forms and affirmative and negative present forms, associated with the Lexical Preference Principle and Sentence Location Principle, respectively. Twenty-seven Italian-speaking beginning-level learners of Japanese were divided into two treatment groups, SI and TI. The results for both target forms showed that the learners in the SI group significantly improved on both interpretation and production measures, while the learners in the TI group improved only in production. Another study that found benefits for PI include Cheng (2004), who investigated the Spanish ser/estar.

However, a number of studies do not corroborate the superior performance of PI as compared to TI. For example, in a replication of VanPatten and Cadierno’s (1993)”

13 Several participants made all sentences on the production test causative construction, irrespective of whether the form was required or not. Thus, it was difficult to tell whether these participants actually learned the form.
study, Allen (2000) compared the effects of PI, TI and the no-instruction group on the acquisition of the French causative construction by fourth-semester high school L2 learners of French. This target form is associated with the First Noun Principle in the Input Processing model, described above.

Allen’s results indicated that the PI and TI groups performed equally well on the interpretation task. In terms of the production task, but that the TI group outperformed the PI group on the production task. However, the results of Allen’s study should be interpreted with caution. While the first critical requirement of PI (identifying the processing problem) was met in this study, the SI activities and some of the assessment materials used during the experiment did not necessarily push learners to rely on the target form to get meaning. For example, in an assessment interpretation task, the learners heard sentences like sentence (6) below and saw two accompanying pictures: (a) Mme Duval packing a suitcase and (b) M. Duval packing a suitcase. The learners had to pick which of the two pictures best described the sentence.

(6)  *Mme Duval fait faire la valise à M. Duval.*

Mrs. Duval has Mr. Duval pack the bag.

Because the names of both Mrs. and Mr. Duval appear in sentence (6), learners encountering this sentence could rely on this information to interpret the meaning and to complete the task. In other words, it was clear that Mme Duval did not pack Mr. Duval’s bags, since the name of Mr. Duval is also mentioned in the sentence. VanPatten’s Input Processing model (see section 2.3) posits that learners may rely on lexical semantics
(subprinciple P2a), event probabilities (subprinciple P2b) and contextual cues (subprinciple P2c), instead of word order whenever possible. Other items in the PI treatment tested in Allen (2000) allowed learners to use event probabilities in order to answer questions.\footnote{See VanPatten and Wong (2004) for a detailed discussion of the methodological differences between Allen (2000) study and the original VanPatten and Cadierno (1993) study.}

Thus, it is difficult to judge whether learners in the PI group in Allen’s study did in fact process the target forms or, alternatively, whether they were simply able to complete the tasks without making appropriate form-meaning connections. PI, as operationalized in Allen’s study, seemed to have lost its most defining characteristic — pushing learners to rely on the target form to complete the task. Thus the conclusions drawn in the given study remain questionable.

DeKeyser and Sokalski (1996) investigated the effects of “input practice” and “output practice” conditions on the acquisition of object pronouns and conditional by first-year L2 learners of Spanish. The authors attempted to control for the degree of focus on meaning in their experimental treatments, an issue they saw in VanPatten and Cadierno’s (1993) study. Every time an exercise in the output treatment did not require a “certain attention to meaning”, the corresponding exercise in the input treatment was changed to reduce the amount of attention to meaning as well. DeKeyser and Sokalski found that for object pronouns, the input group performed better than the output group in interpretation, while the output group had the advantage in terms of production. For the conditional form, the output treatment was superior to the input treatment on all measures, although these results were not maintained over time.
Once again, while the first stipulation of PI (identifying the processing problem) was respected in DeKeyser and Sokalski’s research design, the second critical characteristic of PI (SI activities that push learners to rely on form to get meaning) was absent. While the change in treatment design for PI solved the issue of the inconsistencies between the two treatments in terms of focus on form vs. focus on meaning, it, once again, changed the nature of PI and made it qualitatively different from the PI treatment in VanPatten and Cadierno’s (1993) study. A closer investigation of the sample exercise for the input group used in DeKeyser and Sokalski’s (1996) study reveals that the learners were not required to process the target forms or to rely on the target form to get meaning; it seems, in fact, that they were not required to attend to meaning at all. Thus, the results of this study are not directly comparable to other PI studies.

Salaberry (1997) examined the effects of input- and output-based practice on the acquisition of the Spanish clitic pronouns. As in DeKeyser and Sokalski (1996), the only difference between the two experimental treatments in Salaberry’s study was that one was input-based and the other output-based. The results showed that the two groups performed at the same level and better than the control group. However, a close investigation of the tasks used in the input-based treatment reveals that, although it did not require production of the target forms, it did not take the processing strategy identified in this study into consideration in constructing practice activities. Thus, the input-based activities used in Salaberry’s study were not identical to the SI activities used in VanPatten and Cadierno (1993), which explains the different results in the two studies.

Like Lee and Benati (2007), Comer and deBenadette (2010) extended this line of research to a non-Romance language—in this case, Russian. They looked at the
comparative effects of PI and TI on the acquisition of noun case endings in the meaning of direction/location by eighteen first-year learners of Russian. These target forms, exemplified in sentences (7) and (8) below, were chosen for investigation because there are clear processing problems associated with them. First, the given forms duplicate information encoded in such sentences lexically (through the verb ‘is walking’ and the prepositions ‘to’ vs. ‘at’); subprinciple P1b of the Input Processing model would predict that learners would more readily rely on such lexical items than on grammatical form to get meaning. Second, the target forms may become redundant and be processed after the more nonredundant items, as predicted by subprinciple P1c. Third, locational/directional phrases typically occur at the end of the sentence and so may be less salient to learners by virtue of their location within a sentence, as predicted by subprinciple P1f. Comer and deBenedette (2010) also point out that these forms encode meaning that the learners’ L1, English, does not code grammatically. If PI works on these forms, it would address one of the concerns expressed in Leaver et al. (2004), who suggest that certain linguistic features of Russian that are particularly challenging for L2 learners of Russian whose L1 is English are so different between the two languages that they may not be acquired through the provision of comprehensible input alone; they require more direct instruction, due to the strong differences between the two languages.

(7)  Boris idët v školu.

Boris-NOM walk-PRES.3SG to school-ACC

Boris is going/walking to the school.
During Comer and deBenedette’s treatment, the PI group first reviewed place vocabulary using a picture recognition task. Then participants were provided with explicit information about the target case distinction and the associated processing strategy. Five input-based activities containing approximately forty-six instances of the target form followed. Two of the activities involved listening, and two reading; one activity used both oral and written cues.

After reviewing place vocabulary, Comer and deBenedette’s TI group was presented with a slide containing a question “Where are you?” along with four answers using one of the target forms, Prepositional case (in the movie theater, at the museum, at work, at a dance). The participants were then provided with several examples of the usage of the second target form, Accusative case in the meaning of direction. Each example was presented on a slide with a picture, a question (e.g., Where is he going?) and an answer using the target form (e.g., He is going to the museum.). The participants listened and repeated all the captions; then they were given explicit information about the Accusative case usage. The TI group then completed two production activities, one writing activity and one speaking activity. In Activity 1, the participants were asked to complete three sentences expressing direction with the correct Accusative case forms of

15 The two target forms were presented differently because learners had already covered one of the target forms, Prepositional case forms of nouns expressing location, prior to treatment. Thus the information about this form presented to learners during treatment served as a review.
the nouns provided in the Nominative case. In Activity 2, the participants worked in pairs
to transform a series of locational sentences into directional sentences. There were
approximately twenty-five instances of the target form in the TI activities.

Because both treatments were conducted with intact classes during regular class
time, Comer and deBenedette’s two treatments were matched for time, not for the
number and type of target forms used in instructional materials. As mentioned above, by
the end of treatment the learners in the PI group were had been exposed to approximately
forty-six target forms, the learners in the TI group to approximately twenty-five. The
results of the pre-test and immediate post-test data analysis showed that, although both
treatment groups made statistically significant gains during treatment, there were no
differences between the two groups on either the production or the interpretation
measures.

However, several factors should be considered in interpreting these results. First,
as in some of the previous studies discussed above (e.g., Allen, 2000), it is not clear that
all of the PI activities designed for Comer and deBenedette’s study actually promoted
target form processing. For example, in Activity 2 of the PI treatment, the participants
were presented with sets of two visuals, one expressing location and the other expressing
destination for the same place. On each slide, both pictures were captioned in the target
language (Where are they (going)? > To school. Where is she? > At school.), as
illustrated on the sample slide from this activity (Figure 1). The participants received
handouts with the same pairs of forms in Russian ( ___ — to school   ____ — at school)
and were required to look at slides and mark each noun on the handout with either a D for
destination or an L for location. Since both visuals on the slide were already labeled with
the correct grammatical form, and since the pictures were clearly indicating direction and location, it seems probable that the participants could have relied on these labels to complete this task instead of relying on the target forms to interpret meaning. In other words, the form-meaning connections, which are an important stipulation in PI, had already been made for the learners in this activity.

Second, it seems that the learners in Comer and deBenedette’s TI group were asked to process the target forms at least at two points during the experimental treatment. This happened first when participants were presented with the captioned pictures for direction and location and were asked questions about them during the “listen and repeat”/explicit information component. Comer and deBenedette acknowledge this limitation of the research design in their discussion. In addition, as mentioned above, in Activity 2 of the TI treatment, the participants were asked to transform locational sentences into directional ones and to provide each other with feedback on the answers.

Third, as Comer and deBenedette point out, the instructional treatments in their study used a much broader range of morphological endings than those in other PI studies, including neuter nouns and soft and hard stem endings. Thus, the treatment time, which was shorter than in previous PI studies, may not have been sufficient for the sheer number of ending distinctions that the learners were expected to acquire. The above factors, in addition to the small group size and the absence of a control group, make it necessary to interpret the results of their study with caution.
2.6.1. Summary and Limitations of Research on PI and SI Activities

The findings from the studies reviewed above are mixed, making it difficult to make clear-cut conclusions about the effects of PI and SI on SLA. Some studies reported an advantage for PI and SI treatments as compared to TI (VanPatten and Cadierno, 1993; Cadierno, 1995; VanPatten and Wong, 2004; Lee and Benati, 2007). Others found no differences between PI and TI on both interpretation and production measures (DeKeyser and Sokalski, 1996 for the conditional; Allen, 2000; Comer and deBenedette, 2010) or...
else found that PI had the advantage in interpretation but TI in production (DeKeyser and Sokalski, 1996 for object pronouns).

One limitation of the existing research on the comparative effectiveness of PI and SI is that research designs have operationalized PI and SI in different ways. As noted above, the two critical requirements of PI are (1) identification of the processing problem and (2) SI activities that push learners to rely on the target form (and nothing else) to get meaning. As discussed in section 2.6, it is not clear whether the participants in all the PI and SI treatments tested in some of the previous research (Allen, 2000, Comer and deBenedette, 2010, DeKeyser and Sokalski, 1996, Salaberry, 1997) were actually pushed to appropriately process the target forms during treatment. Analysis of instructional materials reveals that in several studies, learners could rely on information other than the target forms to complete the tasks (e.g., Allen, 2000; Comer and deBenedette, 2010). Thus, the inferior performance of PI in comparison to TI in these studies may be explained by the fact that the PI treatments tested in these studies were not sufficiently PI-like, as conceptualized in the original VanPatten and Cadierno (1993) study.

However, there is evidence to suggest that PI and SI treatments that do respect both of the major requirements of PI and push learners to process the target forms, have positive results on SLA both in interpretation and in production. Thus, research on PI and SI needs to clearly delineate the processing problems and include SI activities that are designed to push learners to rely on the target forms (and nothing else) to get meaning.

Another limitation is that not all of the previous research designs kept meaning in focus in PI treatments (e.g., DeKeyser and Sokalski, 1996). Considering the fact that the main goal of PI is to help learners make correct form-meaning connections, keeping
meaning in focus is a major stipulation of PI as an instructional technique. Diminishing the degree of attention to meaning in PI, even if it is done in order to more closely match the experimental treatments, as was done in DeKeyser and Sokalski (1996), changes the nature of PI, making any direct comparisons between PI treatments across different studies difficult. Future research designs must necessarily keeping meaning in focus in PI and SI treatments.

A third limitation concerns the fact that some TI treatments (e.g., Allen, 2000; Comer and deBenedette, 2010) actually gave learners some opportunities to process the target forms, rendering TI treatments more PI-like than was intended by the researchers. This caused the problem of “blurring” of instructional treatments, discussed in VanPatten and Wong (2004). Conceivably, the processing component of the TI treatments in the given studies, even though minimal, may have influenced the results. Future research studies attempting to examine the comparative effects of PI and TI need to take special care to carefully isolate the two types of instruction, or isolate and test processing as an independent variable.

2.7. Studies on Meaningful Output

The increasing understanding of the importance of focus on meaning in language learning and the doubtful value of mechanical drills in language acquisition, has prompted researchers to compare PI with more meaningful output-based (MOI) focus-on-form instructional interventions.

---

17 For a detailed discussion of the value of mechanical practice in language acquisition see Wong and VanPatten (2003).
Several studies comparing the effects of PI and MOI have found facilitative effects for meaningful output-based instruction. For example, Farley (2004) compared the effects of PI and MOI on the acquisition of the Spanish subjunctive by fourth-semester L2 learners of Spanish. During treatment, both of Farley’s treatment groups received explicit information about the formation of the subjunctive, its location within a sentence, its usage, and the optimal strategies for processing it; they were then given one example of the usage of a subordinate clause and asked to choose between two ways of the continuing of the sentence, one with a subjunctive form and one with an indicative form. The correct response was provided immediately after the example. After this explanation, the PI and MOI participants each completed ten activities—SI activities for the PI group, and ten meaning-focused production activities for the MOI group.

The results of Farley’s study demonstrate that the effects of PI and MOI on the acquisition of the subjunctive form were equal as measured by both interpretation and production tasks. However, Farley suggests that these results may be explained by the fact that MOI was actually more PI-like than was originally intended in the experimental design. While the MOI participants were involved in oral and written production practice, they were required to express opinions and beliefs, a task that required them to maintain a simultaneous focus on meaning and form. Thus the language produced by some of the participants in the MOI treatment group may have served as incidental input for other participants in the same treatment group. This is also a possibility in Comer and deBenedette’s (2010) study, discussed in section 2.6, above.

In addition, both of the treatment groups in Farley’s study were provided with explicit information about the effective processing strategies in dealing with the target
form, and both completed one task which required the participants to process the target form in a way typical for PI treatments, not for TI treatments. This was done in an attempt to control for the type and amount of explicit information provided to the subjects during treatment, so that any difference between the treatments would be limited to the nature of treatments themselves. However, this may have created another problem with the “blurring” of instructional treatments (Wong and VanPatten, 2004; see section 2.6.1, above). Instead of comparing PI and MOI groups, Farley’s study is in fact comparing PI and PI+MOI groups, which makes it difficult to make clear-cut conclusions about the comparative effectiveness of the PI and MOI treatments.

Similar results were obtained in Morgan-Short and Wood Bowden (2006) who investigated the effects of PI and meaningful output-based instruction (MOBI) on the acquisition of the Spanish word order and object pronouns. Both groups in Morgan-Short and Wood Bowden’s study received the same explicit information about the target forms and the associated processing strategy. The PI activities were adapted directly from VanPatten and Cadierno (1993) to be delivered via computer. The MOBI activities were adapted from the PI materials to allow for opportunities to produce the target forms.

Morgan-Short and Wood Bowden’s results revealed that the PI and MOBI groups performed at the same level in interpretation. In production, the MOBI outperformed the PI and the control group on immediate post-test; however, these differences were gone by the time of the delayed post-test (one week after treatment). In addition, there was a greater drop-off in the delayed post-test scores for the MOBI group. The authors argue that both of these facts may suggest that PI promotes more stable learning gains than does MOBI.
Benati (2005) extended the research on the comparative effects of PI, TI and MOI to a different learning context, Chinese and Greek learners of English. The target form chosen for this study was the simple past tense of verbs in English and the associated Lexical Preference principle. All the experimental groups received the same explicit information about the target forms; however, only PI and MOI participants were also informed of the processing problem addressed in the study. The MOI activities were “structured output activities”, which were developed using the guidelines by Lee and VanPatten (1995). These activities involved the exchange of previously unknown information, required learners to access a specific form or structure to express meaning, with focus on one form and one meaning at a time. The results of Benati’s study showed that the PI group performed better than both the TI and MOI groups on interpretation, while neither of the output-based groups made statistically significant gains in interpretation. The three treatment groups performed at the same level in production.

Keating and Farley (2008) looked at the acquisition of Spanish direct object pronouns by learners in three experimental groups: PI, MOI and meaning-based drills instruction (MDI). MOI, as conceptualized in this study, was designed to share several important characteristics with PI. First, it provided learners with explicit information about the target form and about ineffective processing strategies associated with this form. Second, MOI in this study was designed to provide learners with opportunities to produce the forms “via utterances that are structured so that the target forms are salient to learners during production” (ibid.: 640). The MOI activities in Keating and Farley’s study were output-based versions of the PI activities and attempted to push learners to make form-meaning connections during production practice. The authors even label the MOI
activities in this study as referential and affective, using terms specifically applied to SI activities.

The MDI treatment was also output-based and was completely meaningful (without mechanical drills), but it did not include information about processing strategies or give learners opportunities to process the target forms during treatment. The sample activities available for review reveal that the MOI activities were more focused on the target forms than were the MDI activities. In the referential MOI activities, the learners were given all the information except the target form, which they needed to fill in based on the picture provided, to express a certain meaning. For example, sentence (9) below from the MOI instructional packet, was accompanied by a picture of a girl waving to a boy. In order to fill in the blank with the correct form of the object pronoun in this sentence, the learners first needed to correctly process the meaning of the sentence (who does what to whom) and assign a grammatical role (subject or object) to the noun already provided (‘girl’) to then be able to assign a grammatical role to the word required in the blank. In other words, they had to both process the forms and produce them. In this sentence, the correct answer is Lo ‘him’.

(9) ______ saluda la niña.
    ______ is waving the girl.

By comparison, MDI tasks in Keating and Farley’s study required production of more than just the target form, as demonstrated in sentence (10) below, which was also accompanied by a picture of a guy calling a friend and friend answering the phone. The
correct answer, which is being elicited here, is *Lo llama* ‘calls him’. The learners were required to produce both the verb and the object pronoun, which may have diminished the amount of attention they allocated to the target forms.

(10) ¿Qué hace Juan para hablar con su amigo?

What does Juan do to talk to his friend?

Additionally, MDI activities in Keating and Farley’s study never resulted in complete OVS sentences, sometimes eliciting only partial OV phrases and sometimes even SOV sentences. This meant that while the MOI tasks constantly tried to push learners to make correct form-meaning connections in OVS sentences and figure out who did what to whom, the MDI tasks did not.

Keating and Farley’s results revealed equal gains by the PI and MOI groups in interpretation. Both the PI and MOI groups did better than the MDI group. However, both the output groups outperformed the PI group on production, even though this advantage disappeared by the third post-test. This result is similar to the one obtained in Morgan-Short and Wood Bowden (2006) in that in both studies we see an advantage for the output-based treatments in production on early post-tests, with the advantage disappearing in delayed post-tests. Keating and Farley (2008) attributed the success of MOI to the fact that in addition to output practice, MOI provided learners with information about the processing of the target form and, most importantly, with incidental input containing the target forms, when learners read and listened to the responses during the follow-up phase of each activity (ibid.: 647). Due to the nature of MOI tasks
described above, the MOI incidental input was more carefully structured than was the incidental input in the MDI condition. Importantly, the MOI and MDI groups performed at the same level in production. The authors argue that the two elements present in MOI and absent in MDI—information about processing strategies and incidental structured input—have a differential effect only on interpretation, not on production.

Overall, Keating and Farley’s results are consistent with previous finding that PI and MOI cause comparable gains in interpretation (e.g., Farley, 2004; Morgan-Short and Wood Bowden, 2006). These findings also suggest that MOI may have an advantage as compared to PI in terms of production.

However, the results of Keating and Farley (2008) may not be directly comparable to earlier studies on the effects of PI and MOI. It is clear that the MOI treatment in their study was operationalized differently than in previous studies; in particular, it was deliberately manipulated by the researchers to include a processing element. As VanPatten, Farmer and Clardy (2008) point out, the MOI treatment in Keating and Farley (2008) was actually PI + output, not just output.

In a response to Keating and Farley (2008), VanPatten, Farmer and Clardy (2008) compared the effects of PI with MOI and the control group using the same target form. They used the same materials and assessment tasks as in the original VanPatten and Cadierno (1993) study. MOI tasks from Keating and Farley study were changed to remove the processing element, in order to make it a “true” MOI treatment. In addition, the explicit information provided to MOI learners prior to treatment did not contain any information about the given processing strategy.
The results of VanPatten, Farmer and Clardy’s study revealed that in interpretation, the PI group was superior to both the MOI and the control group, which eventually resulted in no difference between the two groups by the last post-test. In terms of production, the PI and MOI performed at the same level and better than the control group. These results are more in line with the original VanPatten and Cadierno (1993) study and with Benati (2005), which found that PI had an advantage over MOI in interpretation but a relatively equal performance in production.

2.7.1. Summary and Limitations of Research on Meaning-based Output

Overall, the research on the comparative effects of PI and MOI suggests facilitative effects for meaningful output-based instruction on acquisition. In terms of interpretation, some studies reveal equal gains by PI and MOI (e.g., Farley, 2004; Morgan-Short and Wood Bowden, 2006); others show an advantage for PI over MOI (e.g., Benati, 2005; VanPatten et al., 2008; Wong, in press). These results indicate that some MOI treatments tested in previous research may help learners to process the target forms in a way comparable to PI.

In terms of production, while some studies showed equal gains by PI and MOI (e.g., Farley, 2004; Benati, 2005; Morgan-Short and Wood Bowden, 2006; VanPatten et al., 2008), there are some indications that certain types of MOI, as for example, the type of MOI tested in Keating and Farley (2008), may give an advantage in production to the meaningful output-based treatments.
One of the limitations of previous research on the comparative effects of PI and MOI is that previous research designs have used different operationalizations of the experimental treatments. For example, some studies conceptualized MOI as a meaning-based output-based instruction that provides learners with opportunities to produce target forms to express meaning, which is different from TI in that mechanical practice is removed from it (e.g., VanPatten et al., 2008); other MOI treatments have been designed to include a processing component, both as part of the explicit information component provided to the learners before treatment and as part of practice activities (e.g., Keating and Farley, 2008). These differences in operationalizations may explain the differences in the results in the given studies.

However, what is clear from the analysis of previous research is that not all output, even if it is meaningful in nature, is created equal. On the one hand, the results of Keating and Farley (2008) suggest that output is most beneficial when it is meaningful \textit{and} when it involves processing. This claim is also supported by the findings of VanPatten et al. (2008), who found no difference between PI and MOI on production, once the processing component was removed from Keating and Farley’s MOI materials. On the other hand, the fact that both of the output-based groups (with and without a processing component) performed equally well and better than PI on production, seems to indicate that at least on production measures the presence of the processing component was not essential. It seems that both of the output-based treatments were effective because they provided opportunities for production and were meaningful.

The processing component as part of output-based treatments was not directly addressed in other PI/MOI studies discussed in this section. Thus it is not clear whether
or not and to what degree the MOI treatments in previous studies included the processing component and in what way its presence or absence may have been related to the results reported for these studies.

Given the preliminary indications of the importance of the processing component in MOI and inconsistencies in operationalizing MOI in previous research, future research is needed to examine this variable more closely. Is meaningful output-based instruction more beneficial than PI if it contains opportunities for learners to make form-meaning connections during instruction? Will processing-rich MOI be effective only in terms of production, as indicated by previous research (Keating and Farley, 2008), or both in terms of production and interpretation?

2.8. Research on Pushed Output

Another line of research has investigated whether opportunities for oral or written output have positive effects on learners’ acquisition of L2 grammar (e.g., Izumi et al.; 1999; Izumi, 2002; Wong, in press).

For example, Izumi et al. (1999) tested the effects of the opportunities to produce on the acquisition of the English past hypothetical by twenty-two adult ESL learners. The learners in the treatment group (EG) and the control (CG) groups were exposed to the same input containing multiple samples of the target form. The experiment consisted of two phases. In the first phase of the experiment, the EG participants were given an opportunity to underline what they felt was important information in the written text they had received and to reconstruct each passage in writing right after completing the
underlining procedure. In the second phase, the EG participants were asked to write an essay on a topic that naturally prompted the use of the target form in between two input exposures. The CG participants were asked to complete the same tasks (underlining and writing an essay), but only in order to answer comprehension questions unrelated to the target form. In other words, during treatment the EG group was pushed to rely on both the meaning and the target form and was given additional opportunities for output; the CG group was provided with opportunities for output but was not pushed to process the target form during treatment.

Izumi et al. hypothesized that the EG participants would notice more target forms in the second input than in the first, after they had had an opportunity to produce and that they would notice more of the conditional-related forms than the CG participants. However, this hypothesis was not supported by the data. Both groups increased in their noticing of the target forms and did not differ in the proportions of the conditional-related underlines. The results also showed that, though the EG participants were able to incorporate the target forms into their production, the results for accuracy were more complex; the EG group outperformed the CG group in accuracy in using the target form only partially. Thus the claim that opportunities for production of the target form cause deeper processing and promote SLA were only partially supported by the data in Izumi et al.’s study.

In a later study, Izumi (2002) tested the effects of what the author refers to “attention-drawing devices”, internal (pushed output or O) and external (visual input enhancement or IE), on the acquisition of English relative clauses by adult ESL learners. The learners in this study were assigned to one of the five experimental groups: +O+IE,
+O–IE, –O+IE, –O+IE and a control (–O–IE) group. As in Izumi et al. (1999), the participants were exposed to cycles of input and output. Learners in all treatment groups received two input exposures and two postexposure tasks, which were qualitatively different for the different experimental groups. Participants in the +O conditions were asked to take notes during input exposures in order to prepare for and to reconstruct the text that they were reading as accurately as possible both in terms of content and grammar. During the postexposure tasks, participants in the –O conditions answered multiple-choice questions about the content of the text. These questions were purposefully designed to serve as general comprehension questions and “to prevent inadvertently drawing learners’ attention to form” (Izumi, 2000: 553), which the author sees as a design problem in previous studies, including Izumi et al. (1999). The learners in the +IE conditions received a version of the text in which the target forms were visually enhanced with a combination of underlining, highlighting, bolding and different font sizes. The learners in the –IE conditions received the unenhanced version of the texts.

Izumi’s results revealed that both of the +IE groups did better on noticing the target forms in the input than the –IE groups, as evidenced by the note scores. However, both output groups did much better in production and interpretation of the target forms than did the non-output groups, irrespective of whether they received visually enhanced or visually unenhanced texts. Izumi (2002) argues that pushed output as a focus-on-form technique promotes deeper processing and greater learning of the target form than does input enhancement. Although both techniques draw learners’ attention to the target form, pushed output may put the learner in “an ideal position to make a cognitive comparison
between the IL and TL forms”, leading to the incorporation of the new forms and the restructuring of the developing system (ibid.: 567).

Although the results of Izumi (2002) demonstrate that pushed output in promoting SLA, it must be noted that the input conditions in this study did not push learners to process the target forms. The input enhancement technique used in this study was not equivalent to PI and SI treatments reviewed above, which pushed learners to process the target forms. Thus it is difficult to make any clear-cut conclusions about the comparative effects of pushed output and processing-rich input-based treatments.

In order to answer this question and compare the effects of input-based instruction with and without the processing component with the pushed output condition, Wong (in press) compared the effects of three instructional treatments, TR (Text Reconstruction), SI (Structured Input), COMP (Comprehension), and a no instruction group on the acquisition of the French causative. Participants in all treatment groups received the same input – a text with eleven instances of the target form embedded in it, divided into six sections. After each section, the TR group was required to reconstruct that section of the text in writing; in other words, it was pushed to produce meaningful output. The SI group answered four multiple-choice questions about the section of the text in English. One or two of these questions pushed learners to process the target form. COMP participants also answered the multiple-choice questions, however, all of these questions were regular comprehension questions and did not push learners to rely on the target form to get meaning.

The results demonstrated a significant advantage for the SI treatment as compared to the other experimental groups in both interpretation and production. TR and COMP
groups performed similarly to the control group. The results were maintained one week after treatment for interpretation. In terms of production, the results were maintained, except the difference between SI and TR groups was lost. Accordingly, the author argues that SI activities are beneficial in promoting SLA if they provide learners with both input and opportunities to engage in processing of the target form. The provision of input alone (COMP treatment), without opportunities for processing, was not as efficient in promoting SLA. The fact that the TR group performed similarly to the control group indicates that pushed output did not have a beneficial effect on acquisition in this study. Wong suggests that the task of text reconstruction, given to the TR group, was too taxing for the learners’ attentional resources and prevented them from processing the input correctly (ibid.: 28-29):

...perhaps learners should not be made to engage in this type of pushed output too soon. Text reconstruction may be more beneficial after learners have made form-meaning connections from input, perhaps via input-oriented activities such as SI activities.

2.8.1. Summary and Limitations of Research on Pushed Output

Overall, the findings of previous research on pushed output are not consistent. While some studies indicate that opportunities to produce target forms during treatment give learners an advantage (e.g. Izumi et al., 1999; Izumi, 2002), others do not (e.g., Wong, in press).

Once again, a major limitation of previous research on pushed output is that previous research designs have operationalized experimental treatments in different ways.
An interesting observation from this analysis, though, is that when benefits were found for a particular treatment group, it seemed to contain the processing component. This was the case, for example, in Izumi et al. (1999), which required the learners to complete two output-based tasks in between cycles of input (a text reconstruction task and a essay writing task), both of which were structured in a way that required a focus on the meaning of the message and a focus the form. The same tendency can be observed in Izumi (2002), who found that both of the output groups did much better in production and interpretation than did the non-output groups, irrespective of whether they were provided visually enhanced or visually unenhanced texts. However, while the learners in the output groups were asked to reconstruct the text in writing as accurately as they could in terms of content (focus on meaning) and grammar (focus on form), learners in the non-output groups were asked to answer regular comprehension questions about the text they were reading. It is clear that the output group treatments in Izumi (2002) involved an element of processing, while the non-output treatments did not. When interpreted in this light, the results of Izumi (2002) are consistent with other studies that found an advantage for experimental treatments, which include the processing component, including Wong (in press), which also involved a pushed output condition.

Future research needs to test whether opportunities for written or oral production of the target forms during instruction give learners an additional advantage in terms of acquisition, if other aspects of PI and MOI treatments such as their meaningful nature and opportunities to process target forms, are held constant.
2.9. Studies that Address the Issue of Processing

Another strand of research has attempted to isolate the processing component of the input-based instructional techniques and to test its contribution to the effectiveness of these instructional treatments. Marsden (2006) reports on two experiments conducted in two British secondary schools, in which she investigated the comparative effects of two input-based instructional treatments on the acquisition of French inflectional verb morphology: PI and “Enriched Input” (EnI). The two treatments were similar in that they were both input-based, included an explicit information component, were balanced for the number and type of target forms made available to learners, and provided the same feedback on learners’ performance. However, the tasks that learners were asked to perform during treatment were different in nature.

The PI treatment in Marsden’s study consisted of three stages: (1) an explicit information component; (2) referential SI reading and listening activities; and (3) affective SI reading and listening activities. The EnI treatment in Marsden’s study also consisted of three stages: (1) an explicit information component; (2) reading and listening activities similar to the PI activities, but in which learners were not pushed to process the target form in order to complete the task; and (3) affective reading and listening activities. The difference between the PI and EnI treatments was Stage 2 of the experiment. While the PI group engaged in activities that required processing of the target form, the tasks in the equivalent EnI activities did not push learners to rely on the target forms in order to get meaning. For example, in one EnI activity, the learners were asked to judge the “normalness” of a sentence such as “The cat walks the dog”. In this task, learners could rely on their background knowledge and event probabilities rather
than on the target verb forms in order to make their judgment. In another EnI task, the learners were required to number the sentences in the order that they were heard. Again, this task could be completed without paying attention to the target verb forms. The essential question addressed in Marsden’s study is whether providing learners with opportunities to process the target form is essential for learning, as compared to simply providing learners with the input.

The measurements in Marsden’s study consisted of listening and reading interpretation tests and speaking and writing production tests. The results of Experiment 1 demonstrated that the learners in the PI group outperformed those in the EnI group on all measures and that they were able to maintain their learning gains over time, up to fourteen-sixteen weeks after treatment. By contrast, the learners in the EnI group did not make statistically significant gains during the study on either measure, although there was a slight improvement in scores on writing test measures between pre-test and post-tests.

Experiment 2 in Marsden’s study involved learners with a slightly higher level of language proficiency from a different secondary school. About a year prior to treatment these learners had been exposed for a several months to a range of grammar teaching techniques, some of which had focused on the target forms investigated in the study. While the pre-test scores of these learners were not high enough to warrant their elimination from the study, they were higher than those of the learners in Experiment 1. The results showed that the PI group performed better than the EnI group on two interpretation measures, listening and reading. However, the superior performance of the PI group was less obvious on two production measures: speaking and writing. In terms of speaking, the PI, EnI, and control groups all made similar gains, whereas in writing the PI
and EnI made similar gains, which were larger than those of the control group. Marsden argues that these results may be explained by context-specific factors, i.e., the learners’ higher proficiency level and their prior experiences with focus-on-form teaching and testing in Experiment 2.

Considering that the target form, the associated input processing strategies, the structure of the two experimental treatments, and the assessment tasks were all held constant in the two experiments designed for Marsden’s study, it is possible that the higher proficiency level of learners in Experiment 2 may have influenced the results. In particular, it is possible, as the author suggests, that these learners had more prior knowledge of the target forms, which was reactivated by the explicit information and the input activities, especially considering the fact that they did better on the writing task, the type of task that was used in practice as well. Moreover, the learners in Experiment 2 may have had more attentional resources available to them to process the available input.

Overall, the results of this study support the claim made in the literature (e.g., Wong, 2004a, 2010) that not all input-based instructional treatments are equally effective in promoting SLA. Treatments in which attending to and processing of the target forms is essential to task completion (PI) seem more advantageous than those in which they are not (EnI). The results reported in Marsden (2006) indirectly explain some of the inconsistencies in results in previous research, for example, Allen’s (2000) study. It is no surprise that the PI group in Allen’s study demonstrated different results than the PI group in the “original” VanPatten and Cadierno study. As discussed earlier, Allen’s input activities did not always involve processing. It seems that the participants in Allen’s PI group received instructional treatment that was much more similar to Marsden’s EnI than
to true PI. It may even be argued that the results of Allen’s study indirectly support previous findings of the superior effects of PI as compared to other types of focus-on-form instruction that do not provide sufficient opportunities to process target forms and do not attempt to circumvent ineffective processing strategies.

Continuing this line of research, Wong (2010) tested whether SI would have beneficial effects on the acquisition of the same target form, the French causative, when learners were provided with discourse level input, which may have required more attentional resources on their part and may have made target forms more difficult to process. The participants in her study were assigned to three experimental groups: an +SI group, a -SI group and a no instruction group. The participants in both treatment groups received the same text, which had multiple samples of the target form embedded in it and was divided into six sections; they were asked to answer four multiple-choice questions at the end of each of the six questions. Some of the questions in the +SI materials required the learners to process the target form in order to correctly interpret the information in the text and to answer the questions, while others were regular comprehension questions. In the –SI materials, all of the questions were regular comprehension questions; the learners did not need to rely on the target form in order to answer them. The results demonstrated that the +SI group outperformed both the –SI and the no instruction group in both production and interpretation, and that the –SI and no instruction group performed at a similar level. These effects were maintained one week after treatment. The results of Wong’s study emphasize the importance of the processing element of the PI and SI treatments in promoting SLA in addition to provision of meaningful comprehensible input.
Similar results were obtained by Wong (in press), who found that the SI treatment had a significant advantage in both interpretation and production over the COMP treatment, which provided learners with the same input, but did not push them to rely on the target forms to get meaning, but rather required them to answer a series of regular comprehension questions.

2.9.1. Summary of Research that Addresses the Issue of Processing

In sum, the previous research on the comparative effects of input-based treatments that do and do not include a processing component consistently indicate that not all input and not all input-based treatments are created equal. Marsden (2006), Wong (2010, in press) found that what makes input-based instructional treatments effective is not only the fact that they provide learners with the input, but also the fact that they push learners to process target forms. Future research designs need to expand this line of research on the processing component of PI and SI to see whether these results will obtain in different languages, with different target forms and processing problems.

2.10. The Present Study

Review of the existing studies has shown that to date research findings on the comparative effectiveness of PI and SI compared with various output-based treatments are far from consistent. This two-part study is designed to address some of the limitations of previous research.
2.10.1. Experiment 1

The goal of the first part of the experiment designed for this study (Experiment 1) was twofold. First, given the claims made in previous research that input-based instructional treatments may not be effective for less commonly taught non-Romance languages like Russian (e.g., Leaver et al., 2004), Experiment 1 attempts to test whether PI as an instructional technique is effective in promoting SLA of Russian. Second, Experiment 1 attempts to test the claims made in previous research (1) that not all input and not all input-based instructional interventions are equally effective in promoting SLA and (2) that SI activities designed to help learners circumvent the inefficient input processing strategies and to create the correct form-meaning connections are more effective than input-based interventions that do not push learners to make these connections (Marsden, 2006; Wong, 2010, in press). The essential question addressed in Experiment 1 is what makes the SI activities investigated in previous research effective? Is it the fact that they are input-based? Or is it the fact that they are input-based and push learners to process the target forms?

2.10.1.1. Research questions

The research questions for Experiment 1 of this study are as follows:

1. Will both the Input + Processing and the Input – Processing group improve after treatment?
2. If both groups improve, will their gains be equal?
3. If both groups improve, will these gains maintained over time?
2.10.1.2. Hypotheses

1. Participants in both Input + Processing and Input – Processing groups will improve after treatment.

   This hypothesis is based on findings of the positive effects of PI treatments that have included a processing component (e.g., VanPatten and Cadierno, 1993; VanPatten and Wong, 2004; Marsden, 2006) and on findings that indicate that input-based treatments that are not sufficiently processing-rich still promote some learning gains (e.g., Allen, 2000; Marsden, 2006; Wong, in press).

2. Participants receiving Input + Processing treatment will improve more than participants receiving Input – Processing treatment.

   This hypothesis is based on research singling out processing of the target forms as a critical requirement of PI treatments, which promote SLA for both production and interpretation (e.g., VanPatten and Cadierno, 1993; Wong, 2004; Marsden, 2006; Wong, 2010, in press).

3. Learning gains will be maintained over time for both experimental groups.

   This hypothesis is based on research showing that positive effects of PI were maintained for up to sixteen months after treatment (Marsden, 2006).
2.10.2. Experiment 2

As discussed previously, Wong (2004, 2010) postulates that it is processing, not just the provision of input, which makes SI activities effective. There are some indications in previous research that opportunities to process target forms are beneficial for acquisition when they become part of output-based treatments as well (e.g., Keating and Farley, 2008; VanPatten et al., 2008). In addition, researchers such as Izumi (2002) suggest that pushed output can lead to deeper processing. Given these positions, might language practice activities be even more successful if they include not only opportunities to process, but also opportunities for production? Experiment 2 was designed to answer this question.

2.10.2.1. Research questions

The research questions for Experiment 2 of this study are as follows:

1. Will both the Input + Processing and the Output + Processing group improve after treatment?
2. If both groups improve, will their gains equal?
3. If both groups improve, will these gains maintained over time?

2.10.2.2. Hypotheses

1. Participants in both Input + Processing and Output + Processing groups will improve after treatment.
This hypothesis is based on research that has shown positive effects of PI treatments that have included a processing component (e.g., VanPatten and Cadierno, 1993; VanPatten and Wong, 2004; Marsden, 2006) and positive effects of meaning-based output treatments (Farley, 2004; Morgan-Short and Wood Bowden, 2006; VanPatten et al., 2008).

2. Participants receiving Input + Processing treatment and Output + Processing treatment will make equal gains in interpretation, but Output + Processing group will make larger gains in production.

This hypothesis is based on research showing equal gains for PI and MOI treatments on interpretation (e.g., VanPatten and Cadierno, 1993; Farley, 2004, VanPatten et al., 2008), indications that opportunities to produce target forms during treatment may give learners an additional advantage in terms of SLA (e.g., Izumi et al.; 1999, Izumi, 2002), and indications that a combination of processing and output may give output-based treatments an advantage as compared to PI (e.g., Keating and Farley, 2008).

3. Learning gains will be maintained over time for both experimental groups.

This hypothesis is based on research showing that positive effects of PI and MOI treatments are maintained for over time (e.g., VanPatten and Cadierno, 1993; Morgan-Short and Wood Bowden, 2006).

The next chapter presents a description of the two-part experiment designed for the present study, including experimental structure, target forms, participants, materials, data collection procedures, and data analysis and scoring information.
Chapter 3: Research design and methodology

This chapter will describe the two-part experiment designed to investigate the research hypotheses formulated in this study (see section 2.10, above). The experiment structure, target forms, participants, materials, data collection procedure and data scoring and analysis procedures will be discussed.

3.1. Experiment 1

3.1.1. Overview of the experiment

Experiment 1 tested the comparative effectiveness of two input-based treatments—Input + Processing and Input – Processing. Both experimental treatments were input-based. They provided learners with multiple samples of the target forms and required them to listen to or read sentences containing the target forms and respond to their propositional content in some way. As in previous research, the participants in this experiment were not required to produce the target forms at any point during the treatment, either in writing or orally.

The two experimental treatments were completely matched in terms of mode of practice, number and type of activities, number and type of target forms and other vocabulary used. The only differentiating feature of these treatments was the absence or
presence of processing of the target form, which is treated as an independent variable in Experiment 1. The Input + Processing treatment was operationalized as explicit information plus SI activities. It consisted of three listening and three reading structured input activities. Following the guidelines for structured input activities outlined in Wong (2005), the Input + Processing materials included four referential activities (activities which had one correct answer) and two affective activities (activities which did not have one right or wrong answer, but required an affective response from the learner to the information that he or she was processing).

The Input – Processing materials were not based on learners’ processing strategies. In these activities, the learners were not required to rely on the grammatical form to get the meaning of the sentences and complete the task. The Input – Processing treatment designed for this study is similar to the Enriched Input treatment tested in Marsden (2006). In the Input – Processing activities, the task was formulated in a way that did not require learners to process target forms correctly in order to interpret meaning.

The two treatment groups described above were compared to a no-instruction (control) group that did not receive any special instruction concerning the target forms during the experiment; instead it engaged in a distracter grammar activity focusing on the Nominative case forms of all genders (agreement practice) and the Accusative case in the meaning of the direct object of an action. As described in Chapter 4, the no-instruction group was eliminated from the analysis due to the low size of this group. Detailed information concerning the instructional materials used in Experiment 1 is presented below.
All the participants recruited for this study completed the experimental treatments individually, outside of regularly scheduled classes. This was done because data collection in intact classes proved difficult due to curriculum time constraints and issues with student cooperation in the initial testing of the materials in intact classes. The twenty-four participants in this study were randomly assigned to one of the three experimental groups. All the participants were true beginners in Russian; they had studied Russian for approximately three weeks before the start of the experiment.

There were two dependent variables in this Experiment: (1) acquisition of the Accusative/Prepositional case distinction, as measured by interpretation of these forms; and (2) acquisition of the Accusative/Prepositional case distinction as measured by production of these forms. The interpretation task was a picture-recognition task and the production task was a sentence-completion fill-in-the-blank task. The assessment materials used are discussed in detail below.

3.1.2. Target forms

The forms selected for this study were Accusative and Prepositional case forms of basic masculine and feminine nouns in Russian in the directional/locational meaning, the same target form as in Comer and deBenedette (2010). Unlike English, Russian has a rich system of noun inflections. Russian nominal inflections express distinctions of case, number and gender. There are three basic declensional paradigms with several subdeclensions. The system of case endings is mostly regular, although there is some variation connected with declension type, expression of animacy/inanimacy distinctions
and soft and hard noun stems. Table 3 below presents an example of case inflections for the regular first-declension masculine hard stem noun \textit{park} ‘park’, while Table 4 presents an example of the case inflections for the regular second-declension hard stem feminine noun \textit{škola} ‘school’.

<table>
<thead>
<tr>
<th>SINGULAR</th>
<th>PLURAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOMINATIVE</td>
<td>park</td>
</tr>
<tr>
<td>GENITIVE</td>
<td>parka</td>
</tr>
<tr>
<td>DATIVE</td>
<td>parku</td>
</tr>
<tr>
<td>ACCUSATIVE</td>
<td>park</td>
</tr>
<tr>
<td>INSTRUMENTAL</td>
<td>parkom</td>
</tr>
<tr>
<td>PREPOSITIONAL</td>
<td>parke</td>
</tr>
</tbody>
</table>

Table 3. Russian nominal declension for the masculine noun \textit{park} ‘park’

<table>
<thead>
<tr>
<th>SINGULAR</th>
<th>PLURAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOMINATIVE</td>
<td>škola</td>
</tr>
<tr>
<td>GENITIVE</td>
<td>školy</td>
</tr>
<tr>
<td>DATIVE</td>
<td>škole</td>
</tr>
<tr>
<td>ACCUSATIVE</td>
<td>školu</td>
</tr>
<tr>
<td>INSTRUMENTAL</td>
<td>školoj</td>
</tr>
<tr>
<td>PREPOSITIONAL</td>
<td>škole</td>
</tr>
</tbody>
</table>

Table 4. Russian nominal inflection for the feminine noun \textit{škola} ‘school’

\textsuperscript{19} See Timberlake (1993) for a detailed discussion of Russian declensional patterns.
Previous research has documented how challenging this case system is for L2 learners of Russian whose first language is English (see, for example, Rozengrant, 1987; Rubinstein, 1991). Because of the complexity of Russian nominal and verbal inflectional system, it has even been claimed that Russian does not readily conform to the instructional techniques tested and advocated for other, “easier” languages like Spanish or French and that Russian requires a much more focused and rigorous attention to form (see, for example, Leaver et al., 2004). Thus, one of the goals of this study is to test whether the results of earlier studies have any applicability to Russian, and by extension, to the other Slavic languages and, in general, to languages with rich systems of inflection for case.

The linguistic feature investigated in this study is the distinction between Accusative case forms in their meaning of direction of motion (to a specific location) and Prepositional case forms in their meaning of location, exemplified in (11)—(12) and (13)—(14), below. The only difference between the two sets of sentences below is the case marking on the noun park ‘park’ and škola ‘school’; the same preposition v is used, with different English translations depending on the case of the governed noun.

(11)  Boris    idët    v    park.

Boris-NOM walk-PRES.3SG to park-ACC

Boris is going/walking to the park.
The Accusative/Prepositional case distinction seems particularly challenging for L2 learners of Russian. In his analysis of case errors made by American learners of Russian in oral speech, Rubinstein (1991) demonstrates that the confusion of Accusative and Prepositional case is an extremely frequent error pattern. In his study, the incorrect use of Accusative case endings instead of Prepositional endings to express location accounts for 50% of all outside-the-case errors\(^\text{20}\) made in using the Prepositional case. Conversely, the incorrect use of Prepositional case endings instead of Accusative endings

\(^{20}\) In his analysis, Rubinstein (1991) classified all noun case errors made by the subjects in the study into three groups: (1) within-the-case errors—although incorrect, the forms used by subjects had some marking of the target case; (2) outside-the-case errors—the form used was marked for a wrong case; and (3) 'primary form' errors—the form used was not overtly marked for the target case and was instead used in the Nominative (dictionary form) case. The results of his analysis showed that overextension of the Nominative case and outside-the-case errors (i.e., confusion of cases) were the most widespread types of errors among his group of learners.
to express direction accounts for 80% of all outside-the-case errors made in using Accusative case. Rubinstein argues that such “error-prone” points as the use of Accusative and Prepositional cases should be directly addressed by instructional interventions. The author suggests that input-processing techniques requiring learners to process input for meaning while paying attention to the linguistic forms used to encode that meaning might be particularly helpful in such instances (Rubinstein, 1991: 424). This study aims to test Rubinstein’s claim empirically and to find evidence for the kind of instructional procedure that is most beneficial for L2 learners of Russian acquiring this grammatical distinction.

The specific processing strategy associated with this grammatical distinction is described in the Lexical preference principle delineated in VanPatten’s model of Input Processing. L2 learners of Russian generally encounter the Accusative and Prepositional cases in examples like (15) and (16), below.

(15) \textit{Boris \textit{idët} v park.}  
Boris-NOM walk-PRES.3SG to park-ACC  
Boris is walking/going to the park.

(16) \textit{Boris \textit{byl} v parke.}  
Boris-NOM be-PAST.SG.MASC. at park-PREP  
Boris was in the park.
In sentences like (15) and (16), learners tend to focus on content words like ‘is going’ and ‘was’ to determine whether motion or location is expressed and so tend to miss the noun endings that contain that information. Thus, in order to help participants in this study to abandon this ineffective strategy in processing the target forms, the instructional materials in the IP treatment were constructed so that the learners have to rely on the noun endings in order to understand whether direction of motion or location was expressed.

The expression of direction and location in Russian is subject to considerable variation based on the declension of the noun and the choice between the two prepositions в ‘in/to’ and на ‘on/onto’. Unlike in Comer and deBenedette (2010), in this study only a subset of the nouns (regular hard-stem masculines and feminines) were used.

3.1.3. Participants

The participants in the study were twenty-four undergraduate students enrolled in their first quarter of Russian language instruction at a large Midwestern university. The first quarter of study was chosen for two reasons: (1) participants would not have had any prior instruction in the target forms at the time of the study; and (2) the first quarter of instruction (Russian 101) is the most enrolled course in Russian language program at the university and thus was likely to bring in the greatest number of participants for this study. Participants completed experimental treatments outside of class, in individual meetings with the researcher. Participants received extra credit in their Russian 101 courses for participation in the study.
Initially, there were forty-six participants in the study. However, twenty-two participants had to be eliminated from the study for two reasons: (1) because they missed or were not available for Day 2 of the experiment, which needed to be scheduled exactly one week after Day 1 of data collection; or (2) because they may have had previous knowledge of the target forms before treatment. Thus, any participant who scored above 50% on either production or interpretation (or both) sections of the pre-test was removed from the study.

A background questionnaire (provided in Appendix A) was used prior to treatment to obtain information about participants’ age, their L1, and their experience with Russian and any other, including Slavic, languages. In this study, the background questionnaire was used only for the purpose of obtaining background information. Participants who reported that their L1 was a language other than English, or that they had had exposure to Russian or other Slavic languages in the past or use Russian outside of class, were not removed from the study. Because pre-test scores were used to control for the amount of possible prior knowledge of the target forms, there was no reason to believe that the participants’ L1 or the amount and type of exposure to Russian or other languages would influence the results of the study.

After the elimination procedures, the three experimental cells looked as follows:

Input + Processing group: 10 participants
Input – Processing group: 11 participants
No-instruction (control) group: 3 participants

21 207 Russian 101 students were actively recruited for the study via e-mail. The initial response rate was approximately 27%.
22 In all such cases, the excluded participants were not told that their results would not become part of the analysis and were allowed to continue with all the stages of the study like the other participants.
All twenty-four participants completed the background questionnaire. Twenty-one of those participants were native speakers of English; the other three were bilingual speakers of English and of another language. Average age of the Input + Processing participants was 19.3 years; that of the Input – Processing participants 20.7 years; and that of the no-instruction group 25 years. All the participants reported not having studied Russian formally before; however, 50% of them reported having been exposed to Russian or another Slavic language briefly in the past. Approximately 38% of participants reported using Russian outside of class on a regular basis, mostly at the weekly Russian conversation table. As noted above, participants who reported previous or current exposure to Russian or other Slavic languages were not removed from the study, because pre-test scores were used to control for the amount of possible prior knowledge of the target forms; there was no reason to believe that the amount and type of exposure to Russian or other Slavic languages would influence the results of the study.

3.1.4. Materials

The materials used in this study consisted of a consent form, a background questionnaire, a pre-test production task and interpretation task, an explicit information handout, six interpretation activities for the two treatment groups and one fill-in-the-blank exercise for the no-instruction group, an immediate post-test production task and an interpretation task, and a delayed post-test production task and an interpretation task. These materials will be described in the following sections.

23 These participants were native speakers of Chinese, Serbian and Persian. All three participants were from the Input + Processing group.
3.1.4.1. Consent Form

Permission to collect data for this study was obtained from the Institutional Review Board and from individual course instructors. This consent form was used to explain the purpose and the timeline of the study to the participants, to obtain their permission to include their data in the subject pool; and to ensure that their participation was voluntary. The participants were told that efforts would be made to keep their study-related information confidential and that their performance during the study would not affect their standing in the Russian 101 course.

The consent form explained that the purpose of the study was to compare instructional techniques for Russian language instruction and that participants would be asked to complete a series of language exercises in Russian (listening, reading, or fill-in-the-blank). Because understanding the purpose of the study could influence how participants would respond on assessment and instructional tasks, the details of the experiment were only revealed to the participants after the completion of Day 3 of the experiment. This was done either in person or via e-mail. On Day 1, the participants were told that the study was being conducted as part of an effort to improve the quality of language instruction at the university. Participants were asked to sign the consent form if they agreed to participate in the study.

3.1.4.2. Background Questionnaire

This questionnaire elicited information about the participants’ age, L1, and the amount, type of exposure, and, when applicable, proficiency in other languages,
including Russian and other Slavic languages. All participants completed the background questionnaire before the pre-test individually and in writing. A copy of the background questionnaire is provided in Appendix A.

3.1.4.3. Assessment tasks

To examine the short and long term effects of the instructional treatments, a pre-test/post-test procedure was adopted in this study. Three versions of the assessment test (A, B, C) were developed. During each assessment stage of the experiment (pre-test, immediate post-test, and delayed post-test), the participants completed a different version of the test, as described in Table 5, below.

<table>
<thead>
<tr>
<th>Group</th>
<th>Input + Processing group</th>
<th>Input – processing group</th>
<th>No-instruction (control) group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>Version A</td>
<td>Version A</td>
<td>Version A</td>
</tr>
<tr>
<td>Immediate post-test</td>
<td>Version B</td>
<td>Version B</td>
<td>Version B</td>
</tr>
<tr>
<td>Delayed post-test</td>
<td>Version C</td>
<td>Version C</td>
<td>Version C</td>
</tr>
</tbody>
</table>

Table 5. Summary of assessment task versions

Following the original VanPatten and Cadierno (1993) study, each test consisted of a production task and an interpretation task. However, unlike most previous studies on the effects of PI, TI and MOI, the production was presented first, followed by the
interpretation task. In previous studies, the interpretation task was presented first, because it was deemed easier than the production task. In order to avoid priming effects, some studies have used a distracter task between the interpretation and production tasks (e.g., VanPatten and Cadierno, 1993, Cadierno, 1995). Considering issues in previous research dealing with the blurring of processing-rich and non-processing treatments, in this study, the production task was provided to participants first in order to avoid incidental processing during the interpretation task, which could help participants perform better on the subsequent production task.

The participants were instructed not to look back at their answers in the previous section or in the current section as they completed each test.

In the production task, the participants were presented with twenty-five incomplete sentences, each with a target word provided in parentheses and an accompanying picture. The participants were required to complete each sentence by putting the word provided into the appropriate grammatical form based on the picture. This task included ten target forms and fifteen distracter items, which mostly tested participants’ understanding of the Nominative case (essentially agreement practice) and the Accusative case in the meaning of the direct object of an action.  

The interpretation task required the participants to read a series of twenty-five sentences, each accompanied by a set of two pictures and four multiple choice answers.

---

24 In the planning stages of the study, discourse-level production task, in which learners were presented with a series of pictures describing an incident that occurred with a character and were required to write a connected story describing the incident in as much detail as possible, was tested. However, initial testing of the materials showed that because of their low level of proficiency in Russian, participants were not able to handle this task to provide any analyzable data in terms of the target forms. A discourse-level production task is essential for assessing the degree of acquisition of the form, if the students’ general proficiency level allows it.
The participants needed to decide which of the two pictures best matched the sentence — A or B, both A and B, or neither of the two. This task included ten target forms and fifteen distracter items, which mostly tested the participants’ understanding of the Nominative case (essentially agreement practice), the Accusative case in the meaning of the direct object of an action, and some lexical items. See Appendix E for the complete tests.

3.1.4.4. Instructional materials

In Experiment 1, instructional materials included three packets which corresponded to the three experimental conditions tested in the study: Input + Processing instructional packet, Input – processing instructional packet and no-instruction packet. The instructional packets for the two treatment groups consisted of two parts: (1) an identical explicit information handout; and (2) six interpretation activities.

3.1.4.4.1. Explicit information

To control for the amount and type of explicit information the participants would receive during the treatment, the instructional packets for both treatments contained the same explicit information handout. This handout first informed the participants that Russian uses regular word endings (also called cases) to express various meanings; then it introduced the distinction between the Accusative case in the meaning of direction of motion and the Prepositional case in the meaning of location by using four example sentences, two with the regular-stem masculine noun bank ‘bank’ and two with the
regular-stem feminine noun škola ‘school.’ The example sentences were translated into English, and the case/meaning distinctions were discussed explicitly. The participants were then given an opportunity to review basic Nominative, Accusative and Prepositional case endings for regular masculine and feminine nouns in Russian.

Variations in case endings, including spelling variations and noun stem variations, were not discussed in the explicit information handout, as they were beyond participants’ current level of proficiency. Also not addressed specifically was the variation between the two prepositions that are used in Russian in the meaning of direction and location (in, inside an enclosed space) and na (on, in an open space, or an event). The participants were not required to choose between the two prepositions at any point in the instructional treatments, as this was not the major focus of language practice.

Lastly, the explicit information handout contained information about the processing strategy involved in processing the target forms. The participants were told that, when reading or listening to sentences containing the target forms, learners of Russian tend to focus on vocabulary items (‘going,’ ‘bank’) and tend to miss the endings used in the nouns, which often leads them to misinterpret and/or make grammatical mistakes in such sentences. The participants were instructed to pay particular attention to the endings and the meanings that they express as they went through the language activities.

3.1.4.4.2. Practice activities

Part II of all the instructional packets consisted of language practice activities that involved the target forms, but in qualitatively different ways for the two treatment
groups. The number of activities, the number of sentences within each activity and their grammatical complexity, and the number of target forms and other vocabulary were held constant in the two instructional packets. The format of each activity, the task, and the associated skill (listening or reading) were also matched. The input provided to the participants was simplified so that no lexical items other than the target forms carried the meaning of direction or location.

The participants in the no-instruction group were asked to complete one fill-in-the-blank activity with forty-six blanks and associated pictures. This task was similar to the production section of the tests used in this study, with the target forms removed. The participants in the no-instruction group were not given the explicit information handout or any information or instruction concerning the target case/meaning distinction.

Activities in both the instructional treatments required participants to read or listen to sentences in Russian containing the target forms and to respond to their propositional content in three ways:

(a) Choose a picture that best represents the utterance that the learners read;
(b) Choose an English rendering that best represents the utterance that they heard;
(c) Express a personal opinion or give a personalized response to the utterance that they read or heard.

For example, in Activity 1 of the Input + Processing materials, the participants were asked to read a sentence containing a target form and to choose one of the two pictures that best represented the sentence. One of these pictures depicted a character
walking to the park, while the other showed the same character walking in a park. In order to complete this task and interpret the sentence correctly, the Input + Processing participants needed to rely on the noun ending of the place name. In the parallel Input – processing activity, participants were asked to read the same sentence, but were offered a different set of pictures—one depicting a character walking to a park and another showing the same character walking to a forest. In order to complete the task, Input – processing participants were required to interpret the sentence correctly and choose the corresponding picture; however, in order to do that, they did not need to rely on the noun ending. The instructional packets for the two experimental treatments are available in Appendices B, C and D.

3.1.5. Procedure

Data collection spanned three weeks and took place approximately during the third to sixth weeks of instruction during the academic quarter when data collection was administered. Scheduling was done on an individual basis with each participant. All the data collection was done outside of regularly scheduled classes, in one-on-one meetings with the researcher. Data-collection meetings with each participant were scheduled at different times during the day, as long as there was exactly one week between the pre-test, treatment/immediate post-test, and delayed post-test, and as long as all three stages were completed before the target forms were introduced in class as part of the regular Russian 101 curriculum. The researcher administered all parts of the treatment in all treatment groups to attempt to control for instructor bias.
On Day 1 of the data collection, the participants met one-on-one with the researcher to discuss the purpose and the timeline of the study, to complete the informed consent for participation in research and background questionnaire, and to take the pre-test. These activities took anywhere between twenty to thirty-five minutes to complete depending on individual participant. The participants were instructed not to look up material or discuss the pre-test with anyone and to try and forget about it until the next scheduled meeting with the researcher (Day 2 of the data collection).

The participants were assigned to the treatment groups randomly in the order in which they communicated with the researcher. The order in which treatments were administered was determined randomly and was as follows: Input + Processing, Input – Processing, no-instruction.

On Day 2 of the data collection, the participants received instructional packets for their respective treatments. The participants in both treatment groups except the no-instruction group were first given five minutes to read over the explicit information handout (Part I) of the instructional packets. In order to control for the amount and type of explicit information the two experimental groups received prior to the treatment, participants were not given an opportunity to ask any questions about the target forms. The participants were asked not to refer to the explicit information handout while completing the activities. The participants in the no-instruction group proceeded directly to the distractor language activity.

After reading over the explicit information handout, the Input + Processing and Input – Processing participants were instructed to proceed to Part II of the experimental treatment—the language activities for their respective treatments. They completed each
activity in its entirety before moving on to the next one, and all activities were completed in the preset sequence. The participants were asked not to look back at the completed activities in order to control for the amount and type of practice.

The participants were given as much time as they needed to complete all six activities in both experimental treatments, in order to control for the number of target forms that they were exposed to during treatment. As mentioned above, the participants in both treatment groups were provided with the same forty-six target forms. It was expected that there may be some individual variation in completing the listening and reading tasks in the two treatments. Thus the time was not cut off, though it was recorded using a simple stopwatch.

Instruction in all the groups was conducted in Russian to the greatest degree possible. However, as the participants were true beginners in Russian, some English was used during the treatment, as expected.

The researcher read the directions to each exercise aloud and also allowed the participants to read the instructions for themselves. The participants were also allowed to ask questions about the format and the tasks in the activities. Then they were asked pick the correct answer (number 1 or number 2, A or B), without pronouncing the forms in order to control for the amount of input that they were receiving. During the treatment, the participants in both treatment groups were provided with immediate feedback on their answers. The researcher simply confirmed that the answers were correct (“That’s correct!”, “Good!” in Russian), without giving any additional explanations, in order to control for the amount of explicit information that participants received. It was decided at the onset of the study that, if the learners requested such information during treatment,
the researcher would tell them that there was no time; however, this turned out to be unnecessary, as none of the participants requested this kind of explanation from the researcher. If a participant answered incorrectly, the researcher told the participant that the answer was incorrect (“No” or “Think about it” in Russian), without giving them the correct answer or giving any explanations. Because all the answers involved a choice between a limited range of forms, participants were able to self-correct easily.

After the completion of the experimental treatment, which took between eleven and twenty minutes in the Input + Processing group and between nine and twenty-two minutes in the Input – Processing group, depending on experimental treatment and individual participant, all the participants were asked to take an immediate production and interpretation post-tests. As with the pre-test tasks, the participants were given as much time as they needed to complete the immediate post-tests. This took between fifteen to twenty-five minutes, depending on participant. At the completion of Day 2, participants were instructed not to look up, study, or discuss the target forms before the next scheduled meeting for the delayed post-test.

All the participants took the delayed production and interpretation post-tests exactly one week after the instructional treatment was administered, on Day 3 of data collection. On this day, as soon as the participants arrived, they were given a copy of the delayed post-test tasks, reminded of the structure of the tests and allowed as much time as they needed to complete it. As with pre-test and immediate post-test, this took between fifteen to twenty-five minutes depending on participant. After the completion of the delayed post-tests, the participants were informed of the true goals of the study and were allowed to ask questions and make comments about it. Any participants who did not have
time to stay and discuss the study, were contacted by the researcher via e-mail. Table 6 below displays a summary of the experimental groups and the procedures used in Experiment 1, discussed above.

<table>
<thead>
<tr>
<th>Group</th>
<th>Input + Processing group</th>
<th>Input – processing group</th>
<th>No-instruction (control) group</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Day 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directions Consent Form</td>
<td>Directions Consent Form</td>
<td>Directions Consent Form</td>
<td></td>
</tr>
<tr>
<td>(5-10 min.)</td>
<td>(5-10 min.)</td>
<td>(5-10 min.)</td>
<td></td>
</tr>
<tr>
<td>Pre-test:</td>
<td>Pre-test:</td>
<td>Pre-test:</td>
<td></td>
</tr>
<tr>
<td>(1) production task</td>
<td>(1) production task</td>
<td>(1) production task</td>
<td></td>
</tr>
<tr>
<td>(2) interpretation task</td>
<td>(2) interpretation task</td>
<td>(2) interpretation task</td>
<td></td>
</tr>
<tr>
<td>(15-25 min.)</td>
<td>(15-25 min.)</td>
<td>(15-25 min.)</td>
<td></td>
</tr>
<tr>
<td><strong>Day 2</strong></td>
<td>Explicit information</td>
<td>Explicit information</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>(3-5 min.)</td>
<td>(3-5 min.)</td>
<td></td>
</tr>
<tr>
<td>6 input activities:</td>
<td>6 input activities:</td>
<td>1 output (writing)</td>
<td></td>
</tr>
<tr>
<td>3-listening</td>
<td>3-listening</td>
<td>activity</td>
<td></td>
</tr>
<tr>
<td>3-reading</td>
<td>3-reading</td>
<td></td>
<td></td>
</tr>
<tr>
<td>46 target forms</td>
<td>46 target forms</td>
<td>46 distracter forms</td>
<td></td>
</tr>
<tr>
<td>(11-20 min.)</td>
<td>(9-22 min.)</td>
<td>(25-30 min.)</td>
<td></td>
</tr>
<tr>
<td>Post-test 1:</td>
<td>Post-test 1:</td>
<td>Post-test 1:</td>
<td></td>
</tr>
<tr>
<td>(1) production task</td>
<td>(1) production task</td>
<td>(1) production task</td>
<td></td>
</tr>
<tr>
<td>(2) interpretation task</td>
<td>(2) interpretation task</td>
<td>(2) interpretation task</td>
<td></td>
</tr>
<tr>
<td>(15-25 min.)</td>
<td>(15-25 min.)</td>
<td>(15-25 min.)</td>
<td></td>
</tr>
<tr>
<td><strong>Day 3</strong></td>
<td>Post-test 2:</td>
<td>Post-test 2:</td>
<td></td>
</tr>
<tr>
<td>(1) production task</td>
<td>(1) production task</td>
<td>(1) production task</td>
<td></td>
</tr>
<tr>
<td>(2) interpretation task</td>
<td>(2) interpretation task</td>
<td>(2) interpretation task</td>
<td></td>
</tr>
<tr>
<td>(15-25 min.)</td>
<td>(15-25 min.)</td>
<td>(15-25 min.)</td>
<td></td>
</tr>
</tbody>
</table>

Table 6. Summary of treatment procedures in Experiment 1.
During the treatment, participants in both the experimental groups were exposed to the same forty-six target forms, which included sixteen Accusative masculine, sixteen Prepositional masculine, seven Accusative feminine, and seven Prepositional feminine target forms. The number of the feminine target forms was noticeably smaller than the number of masculine target forms because the incidence of masculine nouns in the materials available at the participants’ level of proficiency is much higher than that of feminine nouns.\(^{25}\)

3.1.5. Scoring

Only ten target items were scored in both the production and the interpretation task on all versions of the test. Thus, the maximum score for each task of the test was ten. One point was awarded if a participant wrote a correct and legible ending in the production task or check-marked the correct multiple-choice variant in the interpretation task. No points were awarded for partially correct answers.

\(^{25}\) The vocabulary used in instructional and assessment materials in this study consisted of highly frequent items familiar to first-quarter Russian students. Approximately 73% of all target forms were cognates with English forms (either actual locations, or names of cities and states). A vast majority of these nouns were regular-stem nouns, which was precisely the target form in the present study. This was by design, to accommodate the low level of proficiency of the participants.

\(^{26}\) Legibility became an issue due to the low proficiency level of the participants. Because first-quarter learners of Russian have to master a new alphabet and new conventions of writing it is to be expected that they will not have fully mastered the system and that they will make spelling mistakes. Thus, mistakes in the middle of the word were not considered. However, only correct and legible endings in the target forms were given full credit.
3.1.6. Analysis

In order to determine the effects of the three instructional treatments, the data were submitted to a series of analyses of variance (ANOVAs). The participants’ raw scores constituted the dependant variables, while + or − processing constituted the independent variables. The results of these analyses are reported in Chapter 4.

3.2. Experiment 2

3.2.1. Overview of the experiment

Thus Experiment 2 tested the comparative effectiveness of an input-based processing-rich treatment (Input + Processing) and a meaningful processing-rich output-based treatment (Output + Processing). The number of activities, the number of sentences within each activity and their grammatical complexity, and the number of target forms and other vocabulary were held constant in the two instructional packets. The only differentiating feature of the two experimental treatments was the mode of practice (input vs. output), which was treated as an independent variable in Experiment 2. Every time the learners in the Input + Processing group were required to interpret or respond to a sentence, learners in the Output + Processing group were required to produce the same target form in writing. The learners in both groups were required to process the target forms correctly and were given immediate feedback on their performance.

All the activities in the Output + Processing instructional packet were production-based (writing). They required the participants to fill in the blanks in the sentences by putting the words given in parentheses in the correct grammatical form, using the pictures
provided. For example, as described above, in Activity 1 of the Input + Processing materials, participants were asked to read a sentence containing a target form and to choose one of the two pictures (a character walking to a park and a character walking in a park) to match the sentence. In the parallel Output + processing activity, the participants were required to complete a sentence in writing using the appropriate form (either the Accusative or the Prepositional case) of the place provided in parentheses based on a picture. In every sentence, the participants needed to make a choice between the two possible forms in order to convey the meaning depicted in the picture correctly. Pictures describing both direction and location were used throughout the activity in no particular order; this made it difficult for the learners simply to predict which forms were required and instead focused their attention on expressing the meaning at hand. In other words, for each sentence in this activity, the two target forms “competed,” and learners needed to make a choice between them in order to express the appropriate meaning.

The independent variable in Experiment 2 was the mode of instruction. As in Experiment 1, there were two dependent variables: (1) acquisition of the Accusative/Prepositional case distinction, as measured by interpretation of these forms; and (2) acquisition of the Accusative/Prepositional case distinction, as measured by production of these forms. The assessment materials used in Experiment 1 were used in Experiment 2. Table 7 below displays a summary of the experimental groups and procedures used in Experiment 2.

As in Experiment 1, participants were given as much time as they needed to complete the six language activities in the experimental treatments in order to control for the number of target forms to which they were being exposed to. It was expected that
listening and reading activities involving the target forms (in Input + Processing) may take less time than physically writing out the correct forms of the target forms (in Output + Processing materials), especially considering that the participants had to write their answers using cursive Cyrillic script which they had been introduced only four weeks prior to treatment and thus did not have a complete mastery of all the writing conventions and required slightly more time in order to write out the words.

Balancing the two experimental treatments for time, i.e., giving the participants the same amount of time to complete them, may have required more target forms to be included in the Input + Processing treatment to “fill in the time.” While this would have given participants the same time on task, the amount of input would have been different; this would have made it difficult to draw conclusions about the effects of experimental treatments themselves (the quality of input) as opposed to the quantity of input.

As in Experiment 1, there was exactly one week between each of the three treatment days. The target forms, all materials (except the instructional materials), and the procedure were kept constant with Experiment 1, described above.
### Table 7. Summary of treatment procedures in Experiment 2

<table>
<thead>
<tr>
<th>Group</th>
<th>Input + Processing group</th>
<th>Output + Processing group</th>
</tr>
</thead>
</table>
| Day 1 | **Directions** Consent Form  
(5-10 min.) | **Directions** Consent Form  
(5-10 min.) |
|       | **Pre-test:**  
(1) production task  
(2) interpretation task  
(15-25 min.) | **Pre-test:**  
(1) production task  
(2) interpretation task  
(15-25 min.) |
| Day 2 | **Explicit information**  
(5 min.) | **Explicit information**  
(5 min.) |
|       | **6 input activities:**  
3-listening  
3-reading  
46 target forms  
(11-22 min.) | **6 output (writing) activities**  
46 target forms  
(17-27 min.) |
|       | **Post-test 1:**  
(1) production task  
(2) interpretation task  
(15-25 min.) | **Post-test 1:**  
(1) production task  
(2) interpretation task  
(15-25 min.) |
| Day 3 | **Post-test 2:**  
(1) production task  
(2) interpretation task  
(20 min.) | **Post-test 2:**  
(1) production task  
(2) interpretation task  
(20 min.) |

### 3.2.2. Participants

Ten more participants from the same participant pool from the same university were assigned to the Output + Processing group. One of them was removed from the study during elimination procedures, because he scored 70% on the interpretation pre-
test. Thus the final experimental cell for the Output + Processing condition contained nine participants. All nine completed the background questionnaire. All of them were native speakers of English; their age was 19.4 years. All the participants reported not having studied Russian formally before; however 22% of them reported having been exposed to Russian or another Slavic language briefly in the past. Approximately 33% of participants reported using Russian outside of class on a regular basis, mostly at the weekly Russian conversation table. As in Experiment 1, participants who reported previous or current exposure to Russian or other Slavic languages were not removed from the study, because pre-test scores were used to control for the amount of possible prior knowledge of the target forms; thus there was no reason to believe that the amount and type of exposure to Russian or other Slavic languages would influence the results of the study.

3.2.3. Materials

The materials used in Experiment 2 were the same as those used in Experiment 1, except for the instructional materials discussed above; they included a consent form, a background questionnaire, a pre-test production task and interpretation task, an explicit information handout, six production activities, an immediate post-test production task and an interpretation task, and a delayed post-test production task and an interpretation task.
3.2.4. Scoring and analysis

The participants’ answers on the pre- and post-tests in Experiment 2 were scored and analyzed using the procedures described for Experiment 1. The results of these analyses are reported in Chapter 4.
Chapter 4: Results

This chapter presents the results of the data analyses of the pre-test and post-test production and interpretation scores, which were conducted after the completion of the two experiments designed for this study. First, the repeated measures ANOVA on the available data, commonly used in previous research, will be presented.\(^{27}\) Then, an alternative model for the statistical analysis of the type of data available in this study, i.e., dichotomous data with low group size and several missing values, will be discussed—Generalized Linear Model, more specifically the Logistic Linear Model (LLM). It will be argued that, although both models, the repeated measures ANOVA and the LLM, produce similar results, the LLM is more appropriate for the data available in this study and is able to capture the effects observed in this study more accurately.

4.1. Experiment 1

4.1.1. Repeated measures ANOVA

4.1.1.1. Results for production (ANOVA)

This section presents the results of the data on the acquisition of the directional/locational case distinction by Input + Processing and Input – Processing groups as measured by a sentence-level production task at the pre-test and the immediate

\(^{27}\) For both the ANOVA and the LLM, the effects were considered significant at the 0.05 level.
post-test. The number of participants, means, standard deviations, observed range, possible range and kurtosis values for the variable processing at pre-test and immediate post-test are presented in Tables 8 and 9 below.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Range</th>
<th>Min.</th>
<th>Max.</th>
<th>Mean</th>
<th>SD</th>
<th>Variance</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input + Processing</td>
<td>10</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>1.80</td>
<td>.632</td>
<td>.400</td>
<td>10.000</td>
</tr>
<tr>
<td>Input – Processing</td>
<td>11</td>
<td>4</td>
<td>2</td>
<td>6</td>
<td>2.55</td>
<td>1.293</td>
<td>1.673</td>
<td>5.510</td>
</tr>
</tbody>
</table>

Table 8. Descriptive statistics for production pre-test for Input + Processing and Input – Processing treatments

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Range</th>
<th>Min.</th>
<th>Max.</th>
<th>Mean</th>
<th>SD</th>
<th>Variance</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input + Processing</td>
<td>10</td>
<td>3</td>
<td>7</td>
<td>10</td>
<td>8</td>
<td>1.054</td>
<td>1.111</td>
<td>-.450</td>
</tr>
<tr>
<td>Input – Processing</td>
<td>11</td>
<td>9</td>
<td>0</td>
<td>9</td>
<td>5.27</td>
<td>3.003</td>
<td>9.018</td>
<td>-.973</td>
</tr>
</tbody>
</table>

Table 9. Descriptive statistics for production post-test for Input + Processing and Input – Processing treatments

The means from these tables reveal that the mean scores were higher from the time of the pre-test to the time of the post-test regardless of the treatment participants received. The next question to be examined is whether any conclusions can be inferred from this increase.
Two ANOVAs were conducted on the pre-test scores for the two treatment groups (Input + Processing and Input – Processing)—one on the production task and one on the interpretation task. These analyses revealed no statistically significant differences between the two treatment groups on either production or interpretation measures prior to treatment. Thus any differences on post-test scores may be attributed to the effects of the instructional treatments.

Next, repeated measures ANOVA was conducted on the two response variables (pre-test and immediate post-test scores) for production and interpretation. However, the results of the delayed post-test were left out of this analysis, because delayed post-test scores were only available for approximately 50% of the participants, because ANOVA was not able to handle these missing values, and also because delayed post-test data was unevenly distributed among the two treatment groups.

Repeated measures ANOVA conducted on the production scores revealed a main effect for time $F(1, 20) = 82.810, p = .000, p < .05$, and an interaction between time and treatment $F(1, 20) = 12.531, p = .002, p < .05$. These results are presented in Table 10 below.

---

28 During the exploratory data analysis, the no-instruction (control) group, which contained three participants by the end of the data collection, was eliminated from consideration due to the low size of this group. It was decided that this sample size was not large enough to capture any possible difference with the treatment groups on pre- and post-test measures, even if there were such a difference.

29 ANOVA analysis of the pre-test production scores presented here excludes participant 106, who was identified as a clear outlier on production measures and was eliminated from the final analysis of the production scores. This participants’ performance on production tests as well as the specifics of the decision to eliminate her from the production data analysis is discussed in detail in section 4.3.1.1. Participant 106’s data on interpretation measures were tested as well, but were not deemed problematic. Thus the interpretation data presented here includes Participant 106.

30 Delayed post-test results were available for eight participants in the Input + Processing group and four participants in the Input – Processing group.
The results of the analysis revealed that the Input + Processing group did better than the Input – Processing group on the production post-test and that this difference was statistically significant ($p=.014$, $p<.05$). Estimated marginal means for the two treatment groups are presented in Figure 2 below.
4.1.1.2. Results for interpretation (ANOVA)

This section presents the results of the data on the acquisition of the directional/locational case distinction by the Input + Processing and Input – Processing groups as measured by an interpretation task at the pre-test and the immediate post-test. The number of participants, means, standard deviations, observed range, possible range and kurtosis values for the variable processing at pre-test and immediate post-test are presented in Tables 11 and 12, below.
Table 11. Descriptive statistics for interpretation pre-test for Input + Processing and Input – Processing treatments

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Range</th>
<th>Min.</th>
<th>Max.</th>
<th>Mean</th>
<th>SD</th>
<th>Variance</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input + Processing</td>
<td>10</td>
<td>6</td>
<td>0</td>
<td>6</td>
<td>3.30</td>
<td>1.636</td>
<td>2.678</td>
<td>1.245</td>
</tr>
<tr>
<td>Input – Processing</td>
<td>11</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>3.55</td>
<td>1.293</td>
<td>2.273</td>
<td>-0.539</td>
</tr>
</tbody>
</table>

Table 12. Descriptive statistics for interpretation post-test for Input + Processing and Input – Processing treatments

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Range</th>
<th>Min.</th>
<th>Max.</th>
<th>Mean</th>
<th>SD</th>
<th>Variance</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input + Processing</td>
<td>10</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>9</td>
<td>1.247</td>
<td>1.556</td>
<td>3.418</td>
</tr>
<tr>
<td>Input – Processing</td>
<td>11</td>
<td>10</td>
<td>0</td>
<td>10</td>
<td>6</td>
<td>2.646</td>
<td>7.000</td>
<td>2.022</td>
</tr>
</tbody>
</table>

As these tables reveal, the mean scores were higher from the time of the pre-test to the time of the post-test, regardless of the treatment participants received. Whether any conclusions can be inferred from this increase is examined next.

Repeated measures ANOVA performed on the interpretation scores revealed a main effect for time $F(1, 21) = 43.878$, $p = .000$, $p < .05$, and an interaction between time and treatment $F(1, 21) = 6.950$, $p = .016$, $p < .05$. These results are presented in Table 13.
Table 13. Effect for time and interaction between time and treatment for Input + Processing and Input – Processing groups in repeated measures ANOVA for interpretation

The results of the analysis demonstrated that the Input + Processing group did much better than the Input – processing group on interpretation measures and that this difference was statistically significant ($p = .004, p < .05$). Estimated marginal means for the two treatment groups are presented in Figure 3 below.
In sum, the results of the repeated measures ANOVA indicate that the Input + Processing group did better than the Input – Processing group on both production and interpretation measures. However, several characteristics of the data available in the present study warranted a more critical look at the data and the results of the analysis discussed above. First, the data in this study were dichotomous, not continuous. Second, as mentioned earlier, the sample size in this study was considerably smaller than in most
PI research. Third, even after the no-instruction group was removed from consideration, data analysis revealed unequal variances in the three treatment groups. Based on these factors, exploratory model testing was conducted, to find a statistical model that would fit the available data and would account for the missing values, such as the no-instruction group scores. A Generalized Linear Model, more specifically the Logistic Linear Model (LLM), was identified as a more appropriate fit for the available data and was deemed to be more accurate and sensitive in capturing the differences between the treatment groups in this study. While ANOVA is a good approximation for the large sample sizes, common in previous PI research, more stringent estimations were deemed necessary for the current data. In the LLM model used in this study, repeated measures were taken into account by using the log odds of the pre-test as a controlled variable. The effects were considered significant at the 0.05 level.

While both models, ANOVA and LLM, produced similar results, as can be seen from the following sections, the discussion and conclusions presented in chapters 5 and 6 below are based on the results of the LLM model.

4.1.2. Logistic Linear Model

4.1.2.1. Results for production (LLM)

The LLM performed on immediate post-test production scores revealed a main effect for treatment, $F(1, 20) = 6.367, p = .012, p < .05$.

---

31 For comparison, VanPatten and Cadierno (1993) used forty-nine participants; Allen (2000) one hundred seventy-nine participants; and Marsden (2006) eighty-six participants. It must be noted that sample size in Comer and deBenedette was also limited and included thirty participants, which stresses the significance of the issue with access to large participant pools in less-commonly-taught languages like Russian.
Analysis of post-test production scores for the two treatment groups revealed that the Input + Processing group performed better than the Input – Processing group on production measures (mean difference =.29, \( p=.009, p<.05 \)). Pairwise comparisons of the estimated marginal means for the two treatment groups on production measures are presented in Table 14, below.

<table>
<thead>
<tr>
<th>(I) Treatment</th>
<th>(J) Treatment</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>df</th>
<th>Bonferroni</th>
<th>90% Wald Confidence Interval for Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input + Processing</td>
<td>Input – Processing</td>
<td>.29^a</td>
<td>.110</td>
<td>1</td>
<td>.009</td>
<td>Lower  .11</td>
</tr>
<tr>
<td>Input – Processing</td>
<td>Input + Processing</td>
<td>-.29^a</td>
<td>.110</td>
<td>1</td>
<td>.009</td>
<td>Lower -.47</td>
</tr>
</tbody>
</table>

Table 14. Estimated marginal means for Input + Processing and Input – Processing groups on production measures in LLM

As can be seen from Table 14, application of the LLM model to the available data, maintained the difference in production between the Input + Processing and the Input – Processing groups at a statistically significant level.
4.1.2.2. Results for interpretation (LLM)

The LLM conducted on the post-test interpretation scores revealed a main effect for treatment, $F(1, 21) = 8.707, p = .003, p < .05$.

Analysis of post-test interpretation scores revealed that the Input + Processing group performed much better than the Input – Processing group (mean difference = .30, $p = .002, p < .05$). Pairwise comparisons of estimated marginal means on interpretation scores for the two treatment groups are presented in Table 15, below.

<table>
<thead>
<tr>
<th>(I) Treatment</th>
<th>(J) Treatment</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>df</th>
<th>Bonferroni</th>
<th>90% Wald Confidence Interval for Difference Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input + Processing</td>
<td>Input – Processing</td>
<td>.30a</td>
<td>.097</td>
<td>1</td>
<td>.002</td>
<td>.14</td>
<td>.46</td>
</tr>
<tr>
<td>Input – Processing</td>
<td>Input + Processing</td>
<td>-.30a</td>
<td>.097</td>
<td>1</td>
<td>.002</td>
<td>-.46</td>
<td>-.14</td>
</tr>
</tbody>
</table>

Table 15. Estimated marginal means for Input + Processing and Input – Processing groups on interpretation measures in LLM

As can be seen from Table 15, application of the LLM model to the interpretation data, maintained the difference between Input + Processing and Input – Processing groups on the interpretation measures at a statistically significant level.
4.2. Summary of Results (Experiment 1)

In regards to the first research question of whether both Input + Processing and Input – Processing group would improve after treatment, the answer is yes. Both groups made significant gains from pre-test to post-test and these gains were statistically significant. The second research question was whether the Input + Processing group would make larger gains on both production and interpretation measures than the Input – Processing group. The answer to this question is yes. Input + Processing groups did much better than the Input – processing group on both measures. No answer was obtained for the third research question about whether the learning gains covered by the first two questions will be maintained over time. This was due to a lack of sufficient data for the delayed post-test. The results of Experiment 2 are presented in the sections below.

4.3. Experiment 2

4.3.1. Repeated measures ANOVA

4.3.1.1. Results for production (ANOVA)

This section presents the results of the data analysis on the acquisition of the directional/locational case distinction by Input + Processing and Output + Processing groups as measured by a sentence-level production task at the pre-test and the immediate post-test. The number of participants, means, standard deviations, observed range, possible range and kurtosis values for the variable processing at pre-test and immediate post-test are presented in Tables 16 and 17 below. As these tables reveal, the mean scores were both groups were higher from the time of the pre-test to the time of the post-test.
The next question to be examined is whether any conclusions can be inferred from this increase.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Range</th>
<th>Min.</th>
<th>Max.</th>
<th>Mean</th>
<th>SD</th>
<th>Variance</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input + Processing</td>
<td>10</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>1.80</td>
<td>.632</td>
<td>.400</td>
<td>10.000</td>
</tr>
<tr>
<td>Output + Processing</td>
<td>8</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>1.25</td>
<td>.886</td>
<td>.786</td>
<td>1.481</td>
</tr>
</tbody>
</table>

Table 16. Descriptive statistics for production pre-test for Input + Processing and Output + Processing treatments

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Range</th>
<th>Min.</th>
<th>Max.</th>
<th>Mean</th>
<th>SD</th>
<th>Variance</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input + Processing</td>
<td>10</td>
<td>3</td>
<td>7</td>
<td>10</td>
<td>8</td>
<td>1.054</td>
<td>1.111</td>
<td>-.450</td>
</tr>
<tr>
<td>Output + Processing</td>
<td>8</td>
<td>1</td>
<td>9</td>
<td>10</td>
<td>9.75</td>
<td>.463</td>
<td>.214</td>
<td>.000</td>
</tr>
</tbody>
</table>

Table 17. Descriptive statistics for production post-test for Input + Processing and Output + Processing treatments

During exploratory data analysis, Cook’s Distance test was used to identify influential data points and potential outliers in the available production data. Based on the results, participant 106 from the Output + Processing group was identified as a clear
outlier. The data was run through repeated measures ANOVA and LLM with and without this participant to identify the degree of influence of this data point on the overall results. Based on the results of the test, participant 106 was eliminated from the analysis of the production data.

A closer inspection of pre- and post-test production scores for participant 106 revealed that she scored two out of ten points on the production pre-test and one out of ten points on the production post-test. In other words, participant 106 performed worse on the production task after treatment. Significantly, one of the two target forms that participant 106 produced correctly on the pre-test was the Accusative masculine form, which in Russian does not have an explicit case marker and looks exactly like the Nominative masculine form. The other correct form was the Prepositional masculine form, which required a specific case marker –e; this should have been unfamiliar to participants at the time of the pre-test. It is not clear whether this second correct answer on the part of participant 106 demonstrates partial knowledge of the target forms taught in this study, or whether it could be attributed to chance, especially because the participant used five other different endings throughout the test, both with the target and distractor items. The ending –e mentioned above was also applied to three distractor items on the test, all incorrectly.

On the production post-test, participant 106 clearly operated with the three target cases: Nominative, Accusative, and Prepositional; however, she reversed nine out of ten target forms. In other words, 90% of the time, when an Accusative form of a noun was required by context, participant 106 produced a form that would have been grammatically accurate for the Prepositional case. Conversely, when a Prepositional case form was
required by context, the given participant produced a form that would have been grammatically correct for the Accusative case. Interestingly, the only answer that this participant got correct on the production post-test was the Prepositional feminine form, which uses the same Prepositional case marker –e discussed above. Once again, it is difficult to say whether this correct ending on the part of the participant demonstrates partial knowledge of the Prepositional case forms and whether this knowledge could be gained prior to treatment or could be attributed to treatment. Nonetheless, due to the consistency of the reversal of the two target forms observed in this participant’s production post-test, it may be argued that, even though her scores got worse form pre- to post-test, she was able to demonstrate some learning gains which were not captured by the experiment design.\textsuperscript{32}

Next, two ANOVAs were conducted on the pre-test scores for the two treatment groups (Input + Processing and Output + processing)—one on production task and one on interpretation task. These analyses revealed no significant differences between the two treatment groups on both pre-test measures. Therefore, any differences between the two experimental groups on the post-tests could be attributed to the effects of the instructional treatments.

Next, repeated measures ANOVA were conducted on the two response variables (pre-test and immediate post-test scores) for production and interpretation for the two treatment groups (Input + Processing and Output + processing). As in Experiment 1, the

\textsuperscript{32} The same phenomenon was observed on delayed post-test results for participant 115 from the Input+ group, who consistently reversed all the Accusative and Prepositional case forms in both the production and the interpretation tasks. This caused a tremendous drop-off in test scores from the immediate post-test (nine out of ten on production and ten out of ten on comprehension) and to the delayed post-test (zero out of ten on both tasks).
results of the delayed post-test were left out of this analysis due to the low number of participants who were able to take this test.

Repeated measures ANOVA conducted on the production scores revealed a main effect for time $F(1, 20) = 784.000, p = .000, p < .05$ and an interaction between time and treatment $F(1, 20) = 19.193, p = .000, p < .05$. These results are presented in Table 18 below.

<table>
<thead>
<tr>
<th>Source</th>
<th>Time</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Linear</td>
<td>480.200</td>
<td>1</td>
<td>480.200</td>
<td>784.000</td>
<td>.000</td>
</tr>
<tr>
<td>Time * Treatment</td>
<td>Linear</td>
<td>11.756</td>
<td>1</td>
<td>11.756</td>
<td>19.193</td>
<td>.000</td>
</tr>
<tr>
<td>Error (Time)</td>
<td>Linear</td>
<td>9.800</td>
<td>16</td>
<td>.612</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 18. Effect for time and interaction of time and treatment for Input + Processing and Output + Processing groups in production in repeated measures ANOVA

The results revealed that the Output + Processing group performed better than the Input + Processing group in production and that this difference was statistically significant ($p = .000, p < .05$). Estimated marginal means for the two treatment groups are presented in Figure 4 below.
4.3.1.2. Results for interpretation (ANOVA)

This section presents the results of the data analysis on the acquisition of the directional/locational case distinction by Input + Processing and Output + Processing groups as measured by an interpretation task at the pre-test and the immediate post-test. The number of participants, means, standard deviations, observed range, possible range and kurtosis values for the variable processing at pre-test and immediate post-test are presented in Tables 19 and 20 below.
<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Range</th>
<th>Min.</th>
<th>Max.</th>
<th>Mean</th>
<th>SD</th>
<th>Variance</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input + Processing</td>
<td>10</td>
<td>6</td>
<td>0</td>
<td>6</td>
<td>3.30</td>
<td>1.636</td>
<td>2.678</td>
<td>1.245</td>
</tr>
<tr>
<td>Output + Processing</td>
<td>9</td>
<td>4</td>
<td>2</td>
<td>6</td>
<td>3.89</td>
<td>1.269</td>
<td>1.611</td>
<td>.263</td>
</tr>
</tbody>
</table>

Table 19. Descriptive statistics for interpretation pre-test for Input + Processing and Output + Processing treatments

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Range</th>
<th>Min.</th>
<th>Max.</th>
<th>Mean</th>
<th>SD</th>
<th>Variance</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input + Processing</td>
<td>10</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>9</td>
<td>1.247</td>
<td>1.556</td>
<td>3.418</td>
</tr>
<tr>
<td>Output + Processing</td>
<td>9</td>
<td>5</td>
<td>5</td>
<td>10</td>
<td>8.56</td>
<td>1.878</td>
<td>3.528</td>
<td>.165</td>
</tr>
</tbody>
</table>

Table 20. Descriptive statistics for interpretation for Input + Processing and Output + Processing treatments

The means from these tables reveal that the mean scores were higher from the time of the pre-test to the time of the post-test for both experimental groups. Whether any conclusions can be inferred from this increase is examined in the following sections.

Repeated measures ANOVA performed on the interpretation scores revealed a main effect for time $F(1, 21) = 120.028, p = .000, p < .05$, but no significant interaction.
between time and treatment $F(1, 21) = 1.193, p = .290, p > .05$. These results are presented in Table 21 below.

<table>
<thead>
<tr>
<th>Source</th>
<th>Time</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Linear</td>
<td>254.529</td>
<td>1</td>
<td>254.529</td>
<td>120.028</td>
<td>.000</td>
</tr>
<tr>
<td>Time * Treatment</td>
<td>Linear</td>
<td>2.529</td>
<td>1</td>
<td>2.529</td>
<td>1.193</td>
<td>.290</td>
</tr>
<tr>
<td>Error (Time)</td>
<td>Linear</td>
<td>36.050</td>
<td>17</td>
<td>2.121</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 21. Effect for time and interaction between time and treatment for Input + Processing and Output + Processing groups on interpretation measures in repeated measures ANOVA

The analyses revealed that the Input + Processing and the Output + processing groups performed at the same level on interpretation measures. Estimated marginal means for the two treatment groups are presented in Figure 5 below.
Figure 5. Estimated marginal means for Input + Processing and Output + Processing groups on interpretation measures in repeated measures ANOVA

The results of repeated measures ANOVA conducted on the available data indicate that the Output + Processing did as well as the Input + Processing group in interpretation, but performed better than the Input + Processing group in production.

As in the case with Experiment 1 data, the data in Experiment 2 were run through a Logistic Linear Model (LLM), which was deemed more appropriate for the available data, as described below.
4.3.2. Logistic Linear Model

4.3.2.1. Results for production (LLM)

The LLM performed on immediate post-test production scores revealed a main effect for treatment, $F(1, 20) = 15.844, p = .001, p < .05$. Analysis of post-test production scores for the two treatment groups revealed that the Output + Processing group performed better than the Input + Processing group in production. Pairwise comparisons of estimated marginal means on production measured for the two treatment groups are presented in Table 22 below.

<table>
<thead>
<tr>
<th>(I) Treatment</th>
<th>(J) Treatment</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>df</th>
<th>Bonferroni</th>
<th>90% Wald Confidence Interval for Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output + Processing</td>
<td>Input + Processing</td>
<td>.18a</td>
<td>.043</td>
<td>1</td>
<td>.000</td>
<td>.11 .25</td>
</tr>
<tr>
<td>Input + Processing</td>
<td>Output + Processing</td>
<td>-.18a</td>
<td>.043</td>
<td>1</td>
<td>.000</td>
<td>-.25 -.11</td>
</tr>
</tbody>
</table>

Table 22. Estimated marginal means for Input + Processing and Output + Processing groups on production measures in LLM

As can be seen from Table 22, application of the LLM model to the available data still puts the Output + Processing group in the first place in terms of production.
performance. In addition, it maintains the difference between the two treatment groups at a statistically significant level.

4.3.2.1. Results for production (LLM)

The LLM conducted on the post-test interpretation scores revealed no main effect for treatment, $F(1, 21) = .572, p = .5245, p < .1$. Analysis of post-test interpretation scores revealed no statistically significant differences between the Output + Processing and Input Processing groups ($p = .449, p > .05$).

Pairwise comparisons of estimated marginal means for the two treatment groups on the interpretation measures are presented in Table 23 below.

<table>
<thead>
<tr>
<th>(I) Treatment</th>
<th>(J) Treatment</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>df</th>
<th>Bonferroni</th>
<th>90% Wald Confidence Interval for Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output + Processing</td>
<td>Input + Processing</td>
<td>-.06</td>
<td>.078</td>
<td>1</td>
<td>.454</td>
<td>-.19, .07</td>
</tr>
<tr>
<td>Input + Processing</td>
<td>Output + Processing</td>
<td>.06</td>
<td>.078</td>
<td>1</td>
<td>.454</td>
<td>-.07, .19</td>
</tr>
</tbody>
</table>

Table 23. Estimated marginal means for Input + Processing and Output + Processing groups on interpretation in LLM

As can be seen from Table 23, application of the LLM model to the interpretation data, did not change the results of the analysis; there was no statistically significant difference between the two treatment groups on the interpretation measures. Overall, the
results of the LLM data analyses revealed that in production the Output + Processing group performed better than the Input + Processing group in production and that the Output + Processing and Input + Processing groups performed at the same level in interpretation.

4.4. Summary of results (Experiment 2)

Research question 1 of this dissertation was whether both the Input + Processing and the Output + Processing groups would make learning gains. The answer to this question is yes. Both treatment groups made significant gains from pre-test to post-test and these gains were statistically significant.

The second research question was whether the gains would be similar in the two treatment groups. This question is answered affirmatively, but only in part. The two treatment groups performed at the same level on interpretation, but the Output + Processing group outperformed the Input + Processing group on production.

The answer to research question 3 could not be obtained due to the paucity of the data form the delayed post-test.

The next chapter presents the discussion of the results of the test data as they relate to the independent variable identified in this study and the effectiveness of the proposed instructional treatments.
Chapter 5: Discussion and Conclusions

This chapter presents a discussion of the results of the data analysis conducted in the two-part experiment designed for this study. First, it will examine the results of Experiment 1 as they concern processing of the target form will be presented. Next, it will discuss the results of Experiment 2 in regards to opportunities for pushed output. Finally, it will note the limitations of the present study pointing some directions for future research.

5.1. Experiment 1

The first part of the experiment designed for this study investigated the effects of two input-based focus-on-form instructional treatments: Input + Processing and Input – Processing. The first research question of Experiment 1 was: Will both the Input + Processing and the Input – Processing group improve after treatment? The results indicate that for both experimental groups, the immediate post-test scores were higher than the pre-test scores for production and interpretation. Thus, the response to the first research question is yes.

This result is in line with a large body of research on different processing problems, target forms and languages, that has shown that PI is a successful instructional intervention because it helps learners make correct form-meaning connections. The result
that the Input + Processing group made statistically significant gains in production is consistent with earlier findings that PI causes acquisition gains in both interpretation and production, although participants in PI treatments, by design, never engage in production practice (e.g., VanPatten and Cadierno, 1993; Farley, 2004; Benati, 2005; Morgan-Short and Wood Bowden, 2006; VanPatten et al., 2008). As discussed in Chapter 2, it has been claimed that the reason PI is effective in promoting production gains is that it affects the learners’ developing system making linguistic data available for production, as predicted by the SLA model (e.g., VanPatten and Cadierno, 1993).

Interestingly, in this study, the Input – Processing group also made gains during treatment on both production and interpretation measures. This result demonstrates that providing learners with meaningful comprehensible input had some positive effects on learning, even without the processing component. On the one hand, this result differs from previous findings that input-based instructional interventions which do not push learners to process target forms cause little to no learning gains. For example, Wong (in press) found that there was no difference between the COMP treatment, in which the learners received input, but were asked to answer regular comprehension questions, and the control group on both interpretation and production measures. Similar results were obtained in Wong (2010), who found that there was no difference between the –SI treatment and the control treatment on both measures. Likewise, Marsden (2006) found that the EnI treatment in her Experiment 1 with less proficient learners did not cause any learning gains and was not different from the control group (see section 2.9, above).

On the other hand, a similar outcome has been documented in previous research. Marsden (2006) found that the EnI treatment in her Experiment 2 with more proficient
learners did lead to learning gains, particularly on writing and speaking measures. Marsden hypothesized that given the more advanced preparation these learners had with focus-on-form techniques, writing as a skill and with the target forms, these learners may have had more attentional resources available to them to process the available input during treatment. In other words, the learners were able to attend to the target forms to a larger degree than was expected in the experimental design. This finding is consistent with the Availability of the Resources principle (P1e) of VanPatten’s Input Processing model, which posits that learners can process redundant meaningful grammatical forms or non-meaningful grammatical forms if the processing of the overall sentential meaning does not drain their available processing resources.

It is possible that the way input was structured in the Input – Processing treatment in this study allowed the learners in this group a higher degree of focus on the target forms, than had been the case for input-based treatments without the processing component in the previous studies. The Input – Processing treatment materials contained very simple sentences, which relied heavily on using cognate words. In addition, many sentences were accompanied by visuals. The fact that the meaning of the input was made clear, this may have “freed” up some attentional resources for the processing of the target form. Thus, the results of this study reaffirm the Availability of Resources principle of the Input Processing model and indicate that one of the ways to make target forms more salient in the input is to increase the comprehensibility of the message by using cognate and high frequency vocabulary, to “free up” learners’ attentional resources to allow them to notice how meaning is encoded linguistically in the input. This is particularly important for Russian, which does not have many cognates with English. This is one of
ways of ensuring that the input provided to learners of Russian in various practice activities may become usable for acquisition.

Future research needs to test whether the same results would obtain with input where conditions for processing may not be as optimal, for example, with input at the discourse-level, which, as Wong (2010) points out, inherently contains more words to process and is more taxing for learners’ attentional resources.

The finding that both the Input + Processing and Input – Processing groups made gains from pre- to post-tests also indicates that SI activities can work for Russian, at least for the target forms investigated in this study. In his analysis of case errors made by leaners of Russian, Rubinstein (1995) suggests that PI could be one way to appropriately focus learners’ attention on the more problematic case distinctions in Russian, such as the directional/locational constructions. According to Rubinstein, “It seems that input processing activities proposed by VanPatten and Cadierno can help learners prevent errors in the use of cases” (ibid.: 424). This study provides support to this claim.

This result is also compliments the findings of Comer and deBenedette (2010), who investigated the same target form and found that PI made significant gains during treatment on both measures. The gains of PI treatments observed in both studies are indicative of the effectiveness of this instructional technique. Although both studies have limitations and their findings need to be validated by future research, they both provide preliminary indications that at least at the initial stages of the acquisition process PI gives learners an important jump start in making appropriate form-meaning connections. This result is particularly noteworthy considering that the meaning distinctions tested in these studies are not grammaticalized in English and use a range of morphemes, which could
be particularly challenging for learners of Russian whose L1 is English, as cautioned by Leaver et al. (2004). The results of this study indicate that when input and the accompanying tasks are carefully structured with learners’ processing strategies in mind, they can help even with such challenging forms.

The second research question of Experiment 1 was: If both groups improve, will their gains be equal? The results indicate that on both production and interpretation measures, the Input + Processing group outperformed the Input – processing group. Thus, the response to the second research question is no. The Input + Processing group made larger gains than did the Input – processing group.

This finding is consistent with the results of previous research showing that input-based instructional treatments that require learners to attend to and process target forms are more beneficial for SLA than input-based instructional treatments that do not (Marsden, 2006; Wong, 2010, in press). This result indicates that processing of the target form is essential to the effectiveness of input-based instructional treatments. What makes input-based interventions effective is not just the fact that they provide learners with meaningful comprehensible input, but also the fact that they push learners to process the target forms. The results of this study provide additional support to the claims made in previous literature (e.g., Wong, 2004) that not all input-based treatments are created equal and that processing-rich input-based treatments are more effective in promoting acquisition.

This result may also indirectly explain the inferior performance of PI treatments in previous studies as compared to TI treatments (e.g., Salaberry, 1998; Allen, 2000). The
performance of PI treatments in these studies is not surprising, considering that they did not consistently push learners to process target forms as claimed.

In this study PI helped learners correctly process the target forms, as evidenced by the post-test scores. However, because the delayed post-test data was not available for analysis in this study, it is difficult to make claims about the long-term effects of these treatments. Future research should include delayed post-tests, preferably at several points after treatment. In addition, in this study treatment time was as short as nine minutes for some participants. Nonetheless, even with such short exposure times, the learning gains were significant for both experimental groups. Some aspect of the instructional treatments clearly served to focus learners’ attention in a way that helped them correct form-meaning connections, even if these represented the initial stages of acquisition.

The finding that the Input + Processing group outperformed the Input – Processing group on both measures also indirectly addresses the concerns raised in Leaver et al. (2004: 127) that acquiring Russian cannot be “just a matter of simply more and more input, that is, more time on task.” Leaver et al. call for instructional techniques that directly draw the learners’ attention to the formal properties of the language, instead of simply exposing them to large amounts of input as is the case with most naturalistic environments. They suggest that this is a way to build a strong foundation for the ultimate attainment of upper-level proficiency.33

The results of this study indicate that it is indeed not enough just to provide learners with input. Rather, the input and the accompanying tasks must be appropriately

---

33 Leaver et al. (2004) also discuss the importance of what they refer to as “grammar drills” in language acquisition, as a technique in grammar instruction. The definition of “drills” or their place in language acquisition is not discussed in this dissertation.
structured in a way that keeps learners’ processing strategies in mind, and requires them to attend to and process the target forms. If all of the critical stipulations of PI are respected, SI activities are in fact a very explicit focus-on-form technique. They directly and deliberately draw learners’ attention to the target forms, push learners to process these forms and provide learners with immediate feedback about their performance.

The third research question in Experiment 1 was: If both groups improve, will these gains maintained over time? No answer could be obtained for this question, due to paucity of delayed post-test data. Future research designs must necessarily include delayed post-tests.

5.2. Experiment 2

The second part of the experiment designed for this study investigated the effects of an input-based instructional treatment that included a processing component (Input + Processing) and an output-based treatment that included a processing component (Output + Processing).

The first research question of Experiment 2 was: Will both the Input + Processing and the Output + Processing group improve after treatment? The results indicate that for both experimental groups, the immediate post-test scores were higher than the pre-test scores for both production and interpretation. Thus, the response to the first research question is yes.

This result is different from previous research findings that give PI an advantage in interpretation as opposed to MOI (Farley, 2004; Benati, 2005; Morgan-Short and
Wood Bowden, 2006; VanPatten et al., 2008). However, this result is consistent with findings in those studies, which found comparable gains for PI and MOI on interpretation measures (e.g., Farley, 2004; Keating and Farley, 2008). Importantly, the Output + Processing treatment tested in this study by design included a processing component, similar to Keating and Farley (2008); this may have helped the learners in the Output + Processing group do as well as learners in the Input + Processing group in interpretation. In other words, the results indicate that processing either as part of input-based or output-based treatments helps learners process target forms.

The finding that the Output + Processing group did better than the Input + processing group in production is interesting, because it is inconsistent with most previous research on the effects of PI and MOI, which generally finds equal gains on production for these two treatments (e.g., Farley, 2004; Morgan-Short and Wood Bowden, 2006; VanPatten et al., 2008). However, this result is consistent with the findings in Keating and Farley (2008), who found an advantage for MOI group in production. The authors explained this result by the fact that the learners in their MOI group were receiving incidentally structured input during follow-up activities when they heard their classmates’ answers. In other words, the MOI learners in Keating and Farley (2008) received output + incidental input processing. It is also important that the MDI treatment in Keating and Farley (2008) performed at the same level as the MOI treatment in production. The authors suggested that the processing element brings a differential affect in interpretation and not in production.

In this study, all of the activities were conducted in writing and individually, so the superior performance of the Output + Processing group could not be explained by
incidental input, because learners did not receive it. The results of this study in conjunction with Keating and Farley’s findings suggest that, just like input, not all output is created equal. Output treatments that include a processing component seem to have more beneficial effects than the output treatments that do not. Research findings on pushed output also confirm this claim. As discussed in Chapter 2, every time an advantage is found in these studies, treatments involve a processing component. Then a crucial question is, if processing is such an important component of both input-based and output-based language practice, why is Output + Processing more beneficial for production than Input + Processing? A possible explanation suggested by Wong (person communication) is that the processing component in both treatments helps learners process the target forms, i.e. helps create intake and affects acquisition. Once intake has been created, output practice can help with developing sufficient accuracy in accessing and producing this form; this is reflected on the production measure. In other words, at this point there is seems to be no evidence that opportunities for production in themselves may have had an effect on the learners’ developing system. Instead, given the essential role of processing established in this and earlier studies and VanPatten’s SLA model, it is more likely that the output practice had an impact on accuracy, a skill which requires practice to develop and is different from developing a mental representation of L2. These claims need to be tested in further research, especially in the light of Keating and Farley (2008), who found no difference in production between the two output groups, irrespective of whether they included a processing component.

At the same time, as discussed in Chapter 3, the experimental treatments in this study were not matched for time, as they were, for example, in Comer and deBenedette’s
(2010) study; the participants were allowed to take as long as they needed to complete the treatment activities. This was done in order to match the experimental treatments for the number of target forms used and the amount of practice that the learners received. The fact that the participants completed their treatments individually allowed for this element of flexibility in collecting the data. The amount of time spent during treatment depended on the treatment itself and on each individual participant. The average treatment time for the Input + Processing group was fifteen minutes and ranged from eleven minutes for participant 118 to twenty minutes for participant 108. The average treatment time for the Output + Processing group was 23.25 minutes and ranged from seventeen minutes for participant 15 to twenty-seven minutes for participant 9. These numbers indicate that, on average, the Input + Processing treatment took about 35% less time than did the Output + Processing treatment. The different time on task may have influenced the performance of the two groups on production measures. Future research needs to test whether the same results will obtain if the time on task for the two treatments is matched. For example, Morgan-Short and Wood Bowden (2006) also allowed their participants to take as much time as needed to complete the tasks; however, they did not notice any differences in how long the different treatments took, possibly because they were delivered via computer. Delivering instruction electronically may allow to more closely match the experimental treatments for time on task.

Researcher’s observations during the experiment revealed that several Output + Processing participants spent time in a qualitatively different way than did the

---

34 This also explains the difference between the number of target forms used in the two instructional treatments in Comer and deBenedette (2010). There were approximately forty-six instances of the target form in the PI treatment and twenty-five instances of the form in the TI treatment.
participants in other treatment groups. Several Output + processing participants consistently verbalized their thoughts as they considered which form to use to express a particular meaning. Several of them commented on how the endings are changed from Nominative to the target case form or how the endings are written out in Cyrillic. It seems that these participants considered the choice of the target forms more carefully, because they were required to write them out; this influenced the amount of time they spent on the treatment. Taking into account these observations and the considerable difference in time on task between the output-based and the input-based treatments in this study, future research designs may document and consider learner behavior during different instructional treatments.

Another important difference between the experimental design in this study and those in previous studies, which may have influenced the results, is that during the assessment stage of the experiment, the participants were first given the production task followed by the interpretation task in order to avoid priming effects. It is possible that the order of tasks could be accountable for the differences in results. Future research may consider testing this hypothesis and comparing the same instructional treatments tested with two different orders of the assessment tasks.

No answer to research question 3 in Experiment 2 could be obtained due to the paucity of the necessary data. Future research designs must necessarily include delayed post-tests, preferably at several points after treatment.
5.3. Observations on Participants’ Performance

The qualitative analysis of participants’ responses revealed several interesting tendencies and test-taking strategies, which participants applied in producing the target forms following treatment. These observations may be important to researchers and practitioners creating and testing PI treatments in the future, especially for Russian.\(^35\)

One such interesting tendency, which was observed for three participants (106, 115, and 123), was the consistent—complete or almost complete—reversal of the two target forms on the assessment tasks. These participants incorrectly but consistently used what would be grammatically accurate Prepositional forms of masculine and feminine nouns to express the meaning of direction of motion associated with the Accusative. Conversely, they used what would be accurate Accusative forms to express the meaning of location associated with the Prepositional.

Given their consistency, it is clear that these participants actually learned the meaning distinction between the two forms and the appropriate markers for feminine and masculine nouns, but reversed the cases. On the one hand, in all probability their performance on the test demonstrates a very early stage in the acquisition of the target forms. Thus, it is quite natural that these learners would not have fully acquired the target forms, especially considering the short treatment time provided to participants in this study. Interestingly, all three of the participants came from the three different treatment groups, each of which received a different amount (strictly in terms of the amount of time

\(^35\) Comer and deBenedette (2010: 133) concede that creating PI and SI activities for Russian may be challenging. They state, “Admittedly, it can be a struggle to create good SI and PI materials for specific aspects of Russian grammar. Since so much of Russian’s core vocabulary is not cognate with English, there is a higher risk that global comprehension will require so much of the learners’ attention that there are not resources left over to process even meaningful grammatical forms, let alone redundant or otherwise non-meaningful morphology.”
taken by the treatment) and a different type of practice during treatment. However, it is the type of mistake that these participants made that is of interest here. On the other hand, it is possible that the practice itself was not successful in drawing learners’ attention to the formal properties of the language that they were working with and thus failed to help these learners process the target forms appropriately. Lastly, it is possible that the sheer number of forms that learners were working with contributed to this reversal of forms on the post-test. This is a complication that Comer and deBenedette (2010) observed in their study as well, although the number of the ending distinctions chosen for this study was smaller than the number of forms that they used.

Some of the other common mistakes that occurred on the post-test included overextension of the target form markers to distractor items, including items that are not marked for case in Russian, like adverbs. Several participants overextended the Accusative feminine ending –u to masculine nouns. For these learners, -u became the Accusative case marker for all nouns, irrespective of their grammatical gender. This may be explained by the fact that among the two Accusative case forms that participants in this study were working with, the Accusative singular feminine ending is explicitly more salient to the learners, when compared to the Accusative singular masculine ending, which (for inanimate nouns is zero), the same as the Nominative case. While no partial credit was given for these forms, it is clear that participants who provided such answers demonstrated partial learning of the target forms—the meaning of the Accusative case, if not the different markers used for the Accusative case for different gender nouns. Future research designs may need to consider finding better ways to capture such partial learning
gains and to tease apart the different knowledge components and their relationship to instructional interventions.

Several participants demonstrated a tendency to change the endings on the test items incorrectly when the same lexical item was elicited twice in a row. For example, participant 15 routinely added an adjective ending on the second instance of a lexical item when the same item was tested twice in a row if he did not know one of the case endings. Instead of filling in the blanks with the target word in the same form twice, leaving it unchanged, based on what the participant knows, he changed the second instance into an adjective. Evidently this participant believed that two instances of the same form were unlikely to be tested on the same test, especially together, one following the other, thus making the judgment that one of these forms should have a different ending. The participant then applied the only other form s/he knew at that time in Russian, the Nominative adjective ending.

All of the strategies described above may be helpful to both researchers and teachers in creating language activities that would appropriately push learners to process target forms, both in input- and output-based instructional treatments.

5.4. Study Limitations and Directions for Future Research

Several limitations of the current research design made it difficult to make clear-cut conclusions about the effects of the instructional treatments designed and tested in this study.
The first limitation of the research design was the small group size. The shortage of the participants did not allow for testing and comparison of the three treatment groups with a control group. Although the small sample size has been partially accounted for by the statistical model chosen for the data analysis in this study, future research should include larger group sizes, whenever possible.

Another limitation of the study is the fact that delayed post-test data were not available for all participants in the study and thus were not available for analysis. Future research designs need to find some ways of making participants cooperate with this aspect of the experimental design, especially when data collection occurs outside of class and is not required by the curriculum. In addition, the placement of the target forms chosen for this study within the Russian 101 curriculum at this university made it impossible to include delayed post-tests with a delay longer than one week after treatment into the experimental design. Future research designs should ideally include delayed post-tests at several points after treatment, as they present an important measure of acquisition gains and their maintenance over time.

Due to the low numbers of participants, this study did not allow for testing of an Output – Processing group, even though that was part of the original design of the experiment. Inclusion of an Output – Processing group would allow processing to be isolated as an independent variable in output-based practice and to investigate the specific contributions of processing and output-based practice on acquisition.

Another important limitation of this study is the different time on task allotted to the different treatment groups. Although learners in all three groups were exposed to the same exact target forms (forty-six), some groups took more time to complete the
treatment than others, which may have influenced the results. Therefore, future research
designs should attempt to control as much as possible for time on task.

Another major limitation of this study is the brief exposure time. As discussed
above, the treatment time was as short as nine minutes for some participants. It could be
argued that this time on task could not have been sufficient to promote any kind of
changes in the developing system and cause acquisition. On the other hand, the fact the
all groups, including the Input – Processing group improved from pre- to post-test
indicates that the instructional interventions provided to learners in this study actually did
give them a boost in terms of acquisition. The differences in results for the three
treatment groups investigated in this study also point to the fact that, even given such a
short exposure time, some instructional techniques may focus learners’ attention on the
target forms more effectively than others. Hence, these results provide some information
about what kind of instructional interventions would be more beneficial in promoting
acquisition and should inform both future research and teaching practices. It is important
that future research designs include longer exposure times.

Another limitation of the present research design is the nature of the assessment
tasks used on pre-and post-tests. These tests included discrete-point writing and reading
exercises. This was done to accommodate the low proficiency level of the participants in
this study. However, these tasks did not allow the claims about acquisition gains made by
learners in this study to be tested in more open-ended, free-production tasks, both writing
and speaking. Future studies will need to consider diversifying assessment tasks used to
measure acquisition gains and include more open-ended assessment measures, whenever
appropriate.
Finally, the results of the present study pertain to a specific group of learners in a specific learning context and to a specific target form distinction. Because differences in the target structure and the processing problems make direct comparisons of the efficacy of different instructional treatments difficult, future research could first focus on the same target forms, the Accusative and Prepositional case forms, and the associated Primacy of Meaning Principle. It would be interesting to conduct a replication study with a larger sample size; this would allow for less variation within experimental cells and would allow for the inclusion of the no-instruction group.

The research agenda laid out in this study may further be extended to include other target forms. Previous research on PI has focused on target forms like the subjunctive, the relative causes, past and present tense. Research on the effects of Input + Processing and Input – Processing and Output + Processing and Output – Processing treatments on all these forms in Russian would further promote this research agenda.

At the same time, future research should also focus on the types of target forms, that have been identified as specifically challenging for L2 learners of Russian. For example, it has been claimed that the system of Russian aspect poses considerable challenges to L2 learners of Russian, whose first language is English. Aspect distinctions in Russian are indeed complex and include both morphological and lexical distinctions. Claims have been made that input-based instructional interventions would not be sufficient to promote acquisition of the aspectual system of Russian. Future research could test if the positive effects of PI would actually obtain for this form as well. Considering the complex nature of the aspectual distinctions in Russian, future research
design would need to take special care to isolate a specific processing strategy associated with processing of this form to be addressed during instruction.

5.5. Conclusions

The present study tested the effects of the processing of the target form as a crucial component of language practice and opportunities for pushed output as part of three focus-on-form instructional treatments in promoting the acquisition of the Accusative/Prepositional case distinction in Russian by first-quarter L2 students of Russian.

The results of the study presented in this dissertation have made a number of contributions to the ongoing debate in the field of SLA about the effects of various focus-on-form instructional treatments on the acquisition of the formal properties of L2.

First, the results of the study confirmed the positive affects of PI in altering learners’ processing strategies documented in previous research. This study also provides new evidence on the effects of PI in Russian and suggests that PI is a focus-on-form technique that can work for Russian. It also suggests that PI is not just any input-based instructional technique and that in fact it is a very explicit type of instruction that clearly helps learners notice and process the target forms; this has positive effects on both interpretation and production. This study also compliments PI research that exists on Russian, by offering additional evidence on the Accusative and Prepositional case distinction and the Primacy of Meaning principle of VanPatten’s Input Processing model. The results of this study should be interpreted with caution considering the limitations
discussed above; nonetheless, this study suggests that PI is a valuable pedagogical intervention that consistently brings positive results, across different target forms and associated processing problems, and different languages. Additionally, a series of language activities that have been created for the experiment in this study could be a valuable contribution to the bank of SI and PI materials for Russian that Comer and deBenedette (2010) call for. While a wealth of PI and SI language activities have been created and tested for other, more commonly-taught languages, these materials are virtually non-existent for Russian. Close scrutiny, testing and discussion of these materials is essential to the ongoing discussion of PI and focus-on-form instructional techniques in general in our field.

Secondly, the present study supports the previous findings that not all input and output based instructional treatments are created equal. Processing of the target form, i.e. providing learners with processing-rich input- and output-based practice seems to be the key to success, even for less-commonly-taught languages like Russian, which often offer special problems to L2 learners.

Lastly, the results of this study provide additional evidence that opportunities for output are beneficial for language acquisition, especially in combination with processing.
References


Leaver, B. L., B. Rifkin, and B. Shekhtman. (2004). Apples and Oranges are Both Fruit, but They Don't Taste the Same: A Response to Wynne Wong and Bill VanPatten. *Foreign Language Annals* 37(1): 125–32.


Appendix A: Background Questionnaire

1. Participant #: __________________________  2. Age: ____________________________

3. What is your native language(s)? ____________________________

4. What other language(s) do you speak? Please explain.

5. Have you ever studied Russian or another Slavic language before? When?

6. Please rate your current proficiency in this language (these languages) on the scale from 1-low, limited proficiency to 5-fluent, high proficiency.

   | Listening | 1 | 2 | 3 | 4 | 5 |
---|-----------|---|---|---|---|---|
Reading | 1 | 2 | 3 | 4 | 5 |
Speaking | 1 | 2 | 3 | 4 | 5 |
Writing  | 1 | 2 | 3 | 4 | 5 |
Grammar | 1 | 2 | 3 | 4 | 5 |

7. Were you ever exposed to Russian even if you didn’t study it formally (through parents or grandparents, friends, etc.)? Please explain.

8. Do you use Russian outside of classroom? Circle one.    YES    NO

   How often? ____________________________________________

   With whom? ____________________________________________

9. Please provide any additional information that you think may be relevant for this study.
Appendix B: Input Processing Instructional Packet

I. Introduction

Russian uses regular word endings (also called cases) to express various meanings. The ending of a word shows what function this word plays in a sentence and what meaning it expresses.

One of the important meaning distinctions in Russian is that between direction of motion (expressed by Accusative case) and location (expressed by Prepositional case).

For example, sentence (1) below uses the Accusative case form of the word банк ‘bank’ which expresses direction of motion: Anna is walking (going) to the bank.

Sentence (2), however, uses the Prepositional case form of the same noun банк ‘bank’, банке, and, thus, expresses location. In this sentence Anna is already at the bank, and she is walking inside it.

(1) Анна идёт в банк. Anna is walking to the bank.

(2) Анна идёт в банке. Anna is walking in (inside) the bank.

As you can see, the only difference between sentences (1) and (2) above is the ending of the noun банк ‘bank’. This ending gives you important information about which of the two meanings (direction or location) is expressed in the sentence.

Take a few moments to review the basic Accusative and Prepositional case endings of regular masculine and feminine nouns in Russian.

<table>
<thead>
<tr>
<th>Case</th>
<th>Masculine</th>
<th>Feminine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominative</td>
<td>банк</td>
<td>школа</td>
</tr>
<tr>
<td>Accusative</td>
<td>банк</td>
<td>школу</td>
</tr>
<tr>
<td>Prepositional</td>
<td>банке</td>
<td>школе</td>
</tr>
</tbody>
</table>

Here is another example of the same direction/location distinction with a feminine noun школа ‘school’. Once again, in sentences (3) and (4), it is the ending of the noun школа ‘school’ that tells you whether someone is going to the school (sentence 3) or is walking inside the school (sentence 4).

(3) Он идёт в школу. He is going to the school.
(4) Он идёт в школе. He is going (walking) inside the school.

When reading or listening to sentences like (1)-(4) above, learners of Russian tend to focus on the vocabulary items (идёт ‘going’, банк ‘bank’) and tend to miss the endings used in these nouns. This leads students to misinterpret and/or make grammatical mistakes in such sentences.

You will now complete a series of activities that involve this distinction between direction and location. Pay particular attention to the endings and the meaning they express, as you go through these activities.

Part II.

Activity 1.

Boris is a Russian exchange student taking classes at the university. The sentences below describe what Boris is doing right now. For each of the sentences below, decide whether Boris is walking towards a location or is walking inside/at this location by circling the appropriate picture.

(a) Борис идёт в парк.
(Boris is walking to a park-Acc.masc.)

(b) Борис идёт в магазине.
(Boris is walking at a store-Prep.masc.)
(в) Борис идёт в университет.
(Boris is walking to the university-Acc.masc.)

(г) Борис идёт на концерте.
(Boris is walking at a concert-Prep.masc.)

(д) Борис идёт в банке.
(Boris is walking in the bank-Prep.masc.)

(е) Борис идёт в спортзал.
(Boris is walking to the gym-Acc.masc.)
(ж) Борис идёт на балет.
(Boris is walking to the ballet-\textit{Acc.masc.})

(з) Борис идёт в клубе.
(Boris is walking in the club-\textit{Prep.masc.})

\textbf{Activity 2.}

Now your friend Natasha tells you what she is going to or where she is walking at right now. Listen to the sentences and for each sentence decide whether Natasha tells you that she is \textit{walking toward that location} or \textit{is walking inside that location}.

(a) toward inside
(b) toward inside
(c) toward inside
(d) toward inside
(e) toward inside
Instructor script:

(a) Я в библиотеку. (I am (going to) the library-Acc.fem.)

(b) Я на стадионе. (I am at the stadium-Prep.masc.)

(v) Я в парк. (I am (going to) the park-Acc.masc.)

(г) Я в больнице. (I am at the hospital-Prep.fem.)

(д) Я в магазин. (I am (going to) the store-Acc.masc.)

(e) Я в спортзале. (I am at the gym-Prep.masc.)

Activity 3.

Now think about the places you like to go to. Look at the list of locations below and check mark those you like to visit and cross out those you don’t like to visit, as shown in the example.

Я люблю ходить... (I like go to…)

✓ в кино (to movies)

_____ в спортзал (to the gym)

_____ в библиотеку (to the library)

_____ в кинотеатр (to the movie theater)

_____ в аптеку CVS (to the CVS pharmacy)

_____ в ресторан Chipotle (to restaurant Chipotle)

_____ в зоопарк (to the zoo)

_____ на почту (to the post office)

_____ в университет (to the university)

Based on your answers above, do you have time to go to interesting/fun places?

☐ да (yes) ☐ нет (no)

142
Activity 4.

Your friend Boris likes to travel across US. The sentences below describe where or where to Boris is driving right now. For each of the sentences below, decide whether Boris is driving to this state or is driving in this state by circling the appropriate picture.

(a) Boris едет в Алабаме.
   (Boris is driving in Alabama - Prep.fem.)

(b) Boris едет в Вашингтон.
   (Boris is driving to Washington - Acc.masc.)

(v) Boris едет в Аризону.
   (Boris is driving to Arizona - Acc.fem.)
(г) Борис едет в Висконсине.
(Boris is driving to Wisconsin-Prep.masc.)

(д) Борис едет в Индиане.
(Boris is driving in Indiana-Prep.fem.)

(е) Борис едет в Мичиган.
(Boris is driving to Michigan-Acc.masc.)
Activity 5.

Boris and Natasha often tell you about the different states in the US that they have been to and states that they would like to go to in the future. Listen to their descriptions and for each location they mention, decide whether Boris and Natasha are in that state right now or are on their way to that state.

(a) in this state now going to this state
(b) in this state now going to this state
(c) in this state now going to this state
(d) in this state now going to this state
(e) in this state now going to this state
(ж) in this state now going to this state
(з) in this state now going to this state

Instructor script:

(а) Мы в Массачусетс. (We are (going to) Massachussets- Acc.masc.)
(б) Мы в Неваде. (We are in Nevada- Prep.fem.)
(в) Мы в Илинойсе. (We are in Illinois- Prep.masc.)
(г) Мы в Орегоне. (We are (going to) Oregon- Acc.masc.)
(д) Мы в Луизiana. (We are (going to) Luisiana- Prep.fem.)
(е) Мы в Вермонте. (We are in Vermont- Prep.masc.)
(ж) Мы в Техасе. (We are (going to) Texas- Acc.masc.)
(з) Мы в Небраске. (We are in Nebraska- Prep.fem.)

Activity 6.

Your friend Natasha tells you which US states she lived in at some point in her life. Listen to the states Natasha lists and for each sentence mark whether the same is true about you.

(1) true for me not true for me
(2) true for me not true for me
(3) true for me not true for me
(4) true for me not true for me
(5) true for me not true for me
(6) true for me not true for me
(7) true for me not true for me
(8) true for me not true for me

Based on your answers above, would you say you have travelled a lot?

☐ да (yes)  ☐ нет (no)

Instructor script:

(1) Я жила в Арканзасе. (I lived in Arkansas-Prep.masc.)

(2) Я жила в Айове. (I lived in Iowa-Prep.fem.)

(3) Я жила в Висконсине. (I lived in Wisconsin-Prep.masc.)

(4) Я жила в Дэлавере. (I lived in Delaware-Prep.masc.)

(5) Я жила в Коннектикуте. (I lived in Connecticut-Prep.masc.)

(6) Я жила в Миннесоте. (I lived in Minnesota-Prep.fem.)

(7) Я жила в Юте. (I lived in Utah-Prep.fem.)

(8) Я жила в Мичигане. (I lived in Michigan-Prep.masc.)
Appendix C: Input – Processing Instructional Packet

1. Introduction

Russian uses regular word endings (also called cases) to express various meanings. The ending of a word shows what function this word plays in a sentence and what meaning it expresses.

One of the important meaning distinctions in Russian is that between direction of motion (expressed by Accusative case) and location (expressed by Prepositional case).

For example, sentence (1) below uses the Accusative case form of the word банк ‘bank’ which expresses direction of motion: Anna is walking (going) to the bank.

Sentence (2), however, uses the Prepositional case form of the same noun банк ‘bank’, банке, and, thus, expresses location. In this sentence Anna is already at the bank, and she is walking inside it.

(5) Анна идёт в банк. Anna is walking to the bank.

(6) Анна идёт в банке. Anna is walking in (inside) the bank.

As you can see, the only difference between sentences (1) and (2) above is the ending of the noun банк ‘bank’. This ending gives you important information about which of the two meanings (direction or location) is expressed in the sentence.

Take a few moments to review the basic Accusative and Prepositional case endings of regular masculine and feminine nouns in Russian.

<table>
<thead>
<tr>
<th>Case</th>
<th>Masculine</th>
<th>Feminine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominative</td>
<td>банк</td>
<td>школа</td>
</tr>
<tr>
<td>Accusative</td>
<td>банк</td>
<td>школу</td>
</tr>
<tr>
<td>Prepositional</td>
<td>банке</td>
<td>школе</td>
</tr>
</tbody>
</table>

Here is another example of the same direction/location distinction with a feminine noun школа ‘school’. Once again, in sentences (3) and (4), it is the ending of the noun школа ‘school’ that tells you whether someone is going to the school (sentence 3) or is walking inside the school (sentence 4).

(7) Он идёт в школу. He is going to the school.

(8) Он идёт в школе. He is going (walking) inside the school.
When reading or listening to sentences like (1)-(4) above, learners of Russian tend to focus on the vocabulary items (идёт ‘going’, банк ‘bank’) and tend to miss the endings used in these nouns. This leads students to misinterpret and/or make grammatical mistakes in such sentences.

You will now complete a series of activities that involve this distinction between direction and location. Pay particular attention to the endings and the meaning they express, as you go through these activities.

Part II.

Activity 1.

Boris is a Russian exchange student taking classes at the university. The sentences below describe where Boris is walking right now. For each of the sentences below, circle the picture that best describes each sentence.

(a) Борис идёт в парк.
(Boris is walking to the park - Acc.masc.)

(b) Борис идёт в магазине.
(Boris is walking at the store - Prep.masc.)
(в) Борис идёт в университет.
(Boris is going to the university - Acc.masc.)

(г) Борис идёт на концерте.
(Boris is walking at a concert - Prep.masc.)

(д) Борис идёт в банке.
(Boris is walking in a bank - Prep.masc.)

(е) Борис идёт в спортзал.
(Boris is walking to the gym - Acc.masc.)
Activity 2.

Now Boris tells you what he did yesterday. Listen to the sentences and for each sentence decide whether each activity Boris mentions he did for fun or as part of school work.

(a) fun school work
(b) fun school work
(c) fun school work
(d) fun school work
(e) fun school work
Instructor script:

(a) Я в библиотеку. (I am (going to) the library- Acc.fem.)
(b) Я на стадионе. (I am at the stadium- Prep.masc.)
(c) Я в парк. (I am (going to) the park- Acc.masc.)
(d) Я в больнице. (I am at the hospital- Prep.fem.)
(e) Я в магазин. (I am (going to) the store- Acc.masc.)

Activity 3.

Now think about the places you like to go to. Look at the list of locations below and check mark those you like to visit and cross out those you don’t like to visit, as shown in the example.

Я люблю ходить... (I like go to…)

✓ в кино (to movies)
_____ в спортзал (to the gym)
_____ в библиотеку (to the library)
_____ в кинотеатр (to the movie theater)
_____ в аптеку CVS (to the CVS pharmacy)
_____ в ресторан Chipotle (to restaurant Chipotle)
_____ в зоопарк (to the zoo)
_____ на почту (to the post office)
_____ в университет (to the university)

Based on your answers above, do you have time to go to interesting/fun places?

☐ да (yes)    ☐ нет (no)
Activity 4.

Your friend Boris likes to travel across US. The sentences below describe what Boris is doing on his travels. Select the picture that best goes with each description.

(a) Борис едет в Алабаме.
   (Boris is driving in Alabama-Prep.fem.)

(b) Борис едет в Вашингтон.
   (Boris is driving to Washington-Acc.masc.)

(v) Борис едет в Аризону.
    (Boris is driving to Arizona-Acc.fem.)
(г) Борис едет в Висконсин.
(Boris is driving in Wisconsin-Prep.masc.)

(д) Борис едет в Индиане.
(Boris is driving in Indiana-Prep.fem.)

(е) Борис едет в Мичиган.
(Boris is driving to Michigan-Acc.masc.)
(ж) Борис едет в Канзас.
(Boris is driving in Kansas-Prep.masc.)

(з) Борис едет в Монтану.
(Boris is driving to Montana-Acc.fem.)

Activity 5.

Boris and Natasha often tell you about the different states in the US that they have been to and states that they will go to in the future. Listen to their descriptions and for each location they mention, indicate whether you or not you have been to that state.

(a) I have been to this state    I have not been to this state

(b) I have been to this state    I have not been to this state

(в) I have been to this state    I have not been to this state

(г) I have been to this state    I have not been to this state

(д) I have been to this state    I have not been to this state

(е) I have been to this state    I have not been to this state
(ж) I have been to this state I have not been to this state
(з) I have been to this state I have not been to this state

**Instructor script:**

(a) Мы в Массачусетс. (We are (going to) Massachussets-\textit{Acc.masc.})

(b) Мы в Неваде. (We are in Nevada-\textit{Prep.fem.})

(в) Мы в Илинойсе. (We are in Illinois-\textit{Prep.masc.})

(г) Мы в Орегон. (We are (going to) Oregon-\textit{Acc.masc.})

(д) Мы в Луизиану. (We are (going to) Luisiana-\textit{Prep.fem.})

(е) Мы в Вермонте. (We are in Vermont-\textit{Prep.masc.})

(ж) Мы в Техас. (We are (going to) Texas-\textit{Acc.masc.})

(з) Мы в Небраске. (We are in Nebraska-\textit{Prep.fem.})

**Activity 6.**

Your friend Natasha tells you which US states she lived in at some point in her life. Listen to the states Natasha lists and for each sentence mark whether the same is true about you.

(1) true for me not true for me
(2) true for me not true for me
(3) true for me not true for me
(4) true for me not true for me
(5) true for me not true for me
(6) true for me not true for me
Based on your answers above, would you say you have travelled a lot?

☐ да (yes)  ☐ нет (no)

Instructor script:

(1) Я жила в Арканзасе. (I lived in Arkansas-Prep.masc.)

(2) Я жила в Айове. (I lived in Iowa-Prep.fem.)

(3) Я жила в Висконсине. (I lived in Wisconsin-Prep.masc.)

(4) Я жила в Дэлавере. (I lived in Delaware-Prep.masc.)

(5) Я жила в Коннектикуте. (I lived in Connecticut-Prep.masc.)

(6) Я жила в Миннесоте. (I lived in Minnesota-Prep.fem.)

(7) Я жила в Юте. (I lived in Utah-Prep.fem.)

(8) Я жила в Мичигане. (I lived in Michigan-Prep.masc.)
Appendix D: Output + Processing Instructional Packet

I. Introduction

Russian uses regular word endings (also called cases) to express various meanings. The ending of a word shows what function this word plays in a sentence and what meaning it expresses.

One of the important meaning distinctions in Russian is that between direction of motion (expressed by Accusative case) and location (expressed by Prepositional case).

For example, sentence (1) below uses the Accusative case form of the word банк ‘bank’ which expresses direction of motion: Anna is walking (going) to the bank.

Sentence (2), however, uses the Prepositional case form of the same noun банк ‘bank’, банке, and, thus, expresses location. In this sentence Anna is already at the bank, and she is walking inside it.

(9) Анна идёт в банк. *Anna is walking to the bank.*

(10) Анна идёт в банке. *Anna is walking in (inside) the bank.*

As you can see, the only difference between sentences (1) and (2) above is the ending of the noun банк ‘bank’. This ending gives you important information about which of the two meanings (direction or location) is expressed in the sentence.

Take a few moments to review the basic Accusative and Prepositional case endings of regular masculine and feminine nouns in Russian.

<table>
<thead>
<tr>
<th>Case</th>
<th>Masculine</th>
<th>Feminine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominative</td>
<td>банк</td>
<td>школа</td>
</tr>
<tr>
<td>Accusative</td>
<td>банк</td>
<td>школу</td>
</tr>
<tr>
<td>Prepositional</td>
<td>банке</td>
<td>школе</td>
</tr>
</tbody>
</table>

Here is another example of the same direction/location distinction with a feminine noun школа ‘school’. Once again, in sentences (3) and (4), it is the ending of the noun школа ‘school’ that tells you whether someone is going to the school (sentence 3) or is walking inside the school (sentence 4).

(11) Он идёт в школу. *He is going to the school.*

(12) Он идёт в школе. *He is going (walking) inside the school.*
When reading or listening to sentences like (1)-(4) above, learners of Russian tend to focus on the vocabulary items (идёт ‘going’, банк ‘bank’) and tend to miss the endings used in these nouns. This leads students to misinterpret and/or make grammatical mistakes in such sentences.

You will now complete a series of activities that involve this distinction between direction and location. Pay particular attention to the endings and the meaning they express, as you go through these activities.

Задание 1.

Boris is a Russian exchange student taking classes at the university. Sentences below describe where Boris is walking (идёт) right now. Complete the sentences below with the appropriate forms of the locations provided.

(a) Борис идёт в __________________________.
   (Boris is walking to __________________________.)

(b) Борис идёт в __________________________.
   (Boris is walking to __________________________.)
(в) Борис идёт в __________________________.
(Boris is walking to __________________________.)

(г) Борис идёт на __________________________.
(Boris is walking to __________________________.)

(д) Борис идёт в __________________________.
(Boris is walking to __________________________.)
(e) Борис идёт в _______________________.
(Boris is walking to _______________________.)

(gym-Nom.masc.)

(ж) Борис идёт на _______________________.
(Boris is walking to _______________________.)

(ballet-Nom.masc.)

(3) Борис идёт в _______________________.
(Boris is walking to _______________________.)

(club-Nom.masc.)
Задание 2.

Prospective students are visiting OSU campus. They have limited time at their disposal. They have some time to walk to a few places on campus, but they can walk inside only 3 places. Where do you think they should go?

First, look at the list of OSU locations below and decide:

(1) which 3 places these students should **go to** (without walking inside) and

(2) which 3 places these students should **walk inside**.

Now, complete sentences below using appropriate forms of these locations.

Пусть студенты пойдут в/на (students should go to) __________________.
__________________.
__________________.

Пусть студенты походят в/на (students should walk at/ inside)
__________________.
__________________.
__________________.
Задание 3.

Now think about the places you often go to. Look at the list of locations below and circle those you go to often and cross out those where you rarely or never go.

спортзал RPAC  библиотека  кинотеатр  антека CVS  ресторан  зоопарк  почта  университет

Now, complete the sentences below, using appropriate forms of the locations.

Я часто хожу (I often go) в/на ______________________________.
______________________________.
______________________________.
______________________________.
______________________________.

Я редко/никогда не хожу (I rarely/never go) в/на
______________________________.
______________________________.
______________________________.
______________________________.
______________________________.
Activity 4.

Your friend Boris likes to travel across US. The sentences below describe where or where to Boris is driving right now. Fill in the blanks in the sentences below, using appropriate forms of the locations provided.

(a) Борис едет в __________________________ (Алабама).
(Boris is driving __________________________ (Alabama-Nom.fem.)

(b) Борис едет в __________________________ (Вашингтон).
(Boris is driving __________________________ (Washington-Nom.masc.)

(v) Борис едет в __________________________ (Аризона).
(Boris is driving __________________________ (Arizona-Nom.fem.)
(г) Борис едет в ___________________(Висконсин).
(Boris is driving ___________________ (Wisconsin-Nom.masc.))

(д) Борис едет в ___________________(Индиана).
(Boris is driving ___________________ (Indiana-Nom.fem.))

(е) Борис едет в ___________________(Мичиган).
(Boris is driving ___________________ (Michigan-Nom.masc.))
Activity 5.

Your friends Boris and Natasha often tell you about the different states in the US that they have been to and states that they would like to go to.

In the list of states below, those where Boris and Natasha have been to are check-marked. The states where Boris and Natasha will go to in the future, are not.

- Massachusetts (Nom.masc.)
- Nevada (Nom.fem.)
- Illinois (Illinois-Nom.masc.)
- Oregon (Nom.masc.)
- Louisiana (Nom.fem.)
- Vermont (Nom.masc.)
- Texas (Nom.masc.)
- Nevada (Nom.fem.)
Based on the list, complete the sentences below, using appropriate forms of the states provided.

Наташа и Борис были (Natasha and Boris were in) ____________________________

______________________________________________________________________.

Наташа и Борис поедут (Natahsa and Boris will go to) ____________________________

______________________________________________________________________.

Activity 6.

Now look at the list of the states below. Which of these states did you live in or stay in?
Circle these states.

• Арканzas (Arkansas-Nom.masc.)
• Айова (Iowa-Nom.fem.)
• Висконсин (Wisconsin-Nom.masc.)
• Дэлавер (Delaware-Nom.masc.)
• Коннектикут (Connecticut-Nom.masc.)
• Миннесота (Minnesota-Nom.fem.)
• Юта (Utah-Nom.fem.)
• Мичиган (Michigan-Nom.masc.)

Now complete the sentences below, using appropriate forms of the states provided.
Я жил(а) (I lived)  

Я никогда не жил(а) (I never lived in)
Appendix E: Pre-test (all treatment groups)

Task 1. Your Russian friend Boris (Борис) has many interests. Fill in the blanks in the sentences below, describing the pictures below each sentence, using the words provided in parentheses.

(1) Это __________________________ (книги) Бориса.
These are __________________________ (the books-Nom.pl.) of Boris.

(2) Борис читает __________________________ (книга).
Boris is reading __________________________ (a book-Nom.fem.).

(3) Борис идёт в __________________________ (библиотека).
Boris is walking to __________________________ (the library-Nom.fem.).
(4) Это хорошая _____________________ (библиотека).
This is a good _____________________ (library-Nom.fem.).

(5) Борис — ________________________ (студент).
Boris is a ________________________ (student-Nom.masc.).

(6) У Бориса плохой _____________________ (компьютер).
Boris has a bad _____________________ (computer-Nom.masc.).
(7) Борис идёт в __________________________ (магазин).
Boris is walking to __________________________ (a store-Nom.masc.).

(8) Это большой __________________________ (магазин).
It is a big __________________________ (store-Nom.masc.).

(9) Борис идёт в __________________________ (магазин).
Boris is walking in a __________________________ (store-Nom.masc.).
(10) Boris sees an excellent _________________________ (computer-Nom.masc.).

(11) Boris is driving a _________________________ (car-Nom.fem.).

(12) Boris is driving to _________________________ (Texas-Nom.masc.).
(13) Техас – очень красивый ________________________ (штат).
Texas is a beautiful ________________________ (state-Nom.masc.).

(14) Сейчас Борис едет в ________________________ (Хьюстон).
Now Boris is driving in ________________________ (Houston-Nom.masc.).

(15) Борис слушает ________________________ (музыка).
Boris is listening to ________________________ (music-Nom.fem.).
(16) Boris really likes _________________________ (pop music-Nom.fem.).

(17) Boris is walking at a _________________________ (dance-Nom.fem.).

(18) This is a good _________________________ (dance-Nom.fem.).
(19) Ещё Борис любит _________________________ (опера).
Boris also likes _________________________ (opera-Nom.fem.).

(20) Борис едет на _________________________ (опера).
Boris is driving to the _________________________ (opera-Nom.fem.).

(21) Сейчас Борис едет на _________________________ (парковка).
Now Boris is driving in a _________________________ (parking lot-
Nom.fem.).
(22) Сейча́с Бори́с идёт на __________________________ (рабо́та).
Now Boris is walking to __________________________ (work-Nom.fem.).

(23) Это его __________________________ (офис).
This is his __________________________ (office-Nom.masc.).

(24) Сейча́с Бори́с уже идёт в __________________________ (офис).
Now Boris is already walking in the __________________________ (office-
Nom.masc.).
(25)  Борис любит свой __________________________ (офис).
Boris likes his __________________________ (office-Nom.masc.).

Task 2. Sentences below describe what Boris is doing right now. For each of the sentences below, check mark ☑ one of the 4 choices listed under the two pictures that best describes each sentence.

(1)  Борис слушает музыку.
Boris is listening to music.

A.  
B.  

☐ A  
☐ B  
☐ A & B  
☐ neither A or B

(2)  Борис читает.
Boris is reading.

A.  
B.  

177
(3) Boris is walking at the zoo.

(4) Boris sees a zebra.
(5) Boris is drinking Pepsi.

A. ![Boris drinking Pepsi](image1)

B. ![Boris](image2)

☐ A
☐ B
☐ A & B
☐ neither A or B

(6) Now Boris is walking to a lecture.

A. ![Boris walking to lecture](image3)

B. ![Boris walking](image4)

☐ A
☐ B
☐ A & B
☐ neither A or B
(7) Это хорошая лекция.
It is a good lecture.

A.  
B.  

☐ A  
☐ B  
☐ A & B  
☐ neither A or B

(8) Сейчас Борис идёт в кафе.
Now Boris is walking to the cafe.

A.  
B.  

☐ A  
☐ B  
☐ A & B  
☐ neither A or B

(9) Борис идёт в музей.
Boris is walking to a museum.

A.  
B.  

180
(10) Это старый музей.
It is an old museum.

A. 2007  

B. 1946

(11) Борис идёт на вечеринке.
Boris is walking at a party.

A.  

B.
(12) Это плохая вечеринка.
It is a bad party.

A.  
B.  

☐ A  
☐ B  
☐ A & B  
☐ neither A or B

(13) Борис играет в бейсбол.
Boris is playing baseball.

A.  
B.  

☐ A  
☐ B  
☐ A & B  
☐ neither A or B

(14) Борис идёт на стадион.
Boris is walking at a stadium.

A.  
B.  

182
(15) Борис читает.
Boris is reading.

A. □ A
□ B
□ A & B
□ neither A or B

(16) Борис идёт на свадьбу.
Boris is walking to a wedding.

A. □ A
□ B
□ A & B
□ neither A or B
(17) Boris is not feeling good.

A. [Image of a sick person]

B. [Image of a healthy person]

☐ A
☐ B
☐ A & B
☐ neither A or B

(18) Boris is walking at a pharmacy.

A. [Image of a person walking to a pharmacy]

B. [Image of a person at a pharmacy]

☐ A
☐ B
☐ A & B
☐ neither A or B

(19) The pharmacy is far away.

A. [Image with a distance marker of 40 minutes]

B. [Image with a distance marker of 5 minutes]

184
(20) Boris is talking on the phone.

(21) Boris is walking at the theater.
(22) Сейчас Борис идёт в столовую.
Now Boris is walking to the cafeteria.

A.  
B.  

☐ A  
☐ B  
☐ A & B  
☐ neither A or B

(23) Борис любит есть.
Boris loves to eat.

A.  
B.  

☐ A  
☐ B  
☐ A & B  
☐ neither A or B

(24) Борис идёт на рынок.
Boris is walking to the market.

A.  
B.  

186
(25) Boris loves bananas.

A. □ A
□ B
□ A & B
□ neither A or B

B. □ A
□ B
□ A & B
□ neither A or B