

INPUT PROCESSING AND THE TEACHING OF
GERMAN TWO-WAY PREPOSITIONS

By

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Abstract

A number of studies in the last twenty years have focused on the input processing principles related to VanPatten's approach to teaching grammar known as Processing Instruction (VanPatten and Cadierno, 1993; VanPatten, 2004; VanPatten, 2007; Lee and Benati, 2009). One of the principles, known as the Lexical Preference Principle (LPP), states that learners will tend to process lexical items over grammar structures when both convey the same information. This study seeks to contribute to the studies investigating this principle by examining whether the presence or absence of redundant lexical cues contributes to or inhibits the learning of German two-way prepositions.

Sixty-four participants from ten intact second-semester German classes in three separate semesters at a large, public, mid-western University were assigned to two treatment groups: one where redundant lexical cues were not removed from input-processing exercises following explicit instruction and strategy training (+LC; n=32) and one where those lexical cues were removed from the exercises (-LC; n=32). Participant gains were measured using a pre-test/post-test design surrounding a two-day treatment focusing on German two-way prepositions that was provided to all participants. Quantitative analysis of the test scores reveals no significant difference between treatment groups, suggesting that the experimental condition (+/-LC) had no effect on learning.

Think-aloud protocols were collected during the post-test in order to gather data about the extent to which participants were applying the explicit information provided and were making proper form-meaning connections for the target structure. The data collected from these protocols is examined from the perspective of input processing in general and the theoretical framework known as Modular Online Growth and Use of Language (MOGUL) (Truscott and

Sharwood Smith, 2004a, 2004b, 2011; Sharwood Smith and Truscott, 2014). Qualitative analysis of these protocols reveals difficulties learners encountered with the German case system that caused difficulties interpreting two-way prepositions.

This study contributes to instructed SLA in German by demonstrating the effectiveness of the input processing approach to teaching German grammar. It also reveals possible weaknesses in typical teaching practices. Suggestions are made to address these weaknesses and future research directions are offered to address them.

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Chapter 1: Introduction

1.1. Impetus for the research project

During his first semester as a graduate student, the author was given an assignment to create a lesson plan and teaching materials to teach German two-way prepositions to US university students in an elementary German class. The lesson was to be based on the research that would eventually be published in Comer and deBenedette (2010), which compared the effectiveness of a pedagogical approach known as Processing Instruction to more traditional output-based practices in the teaching of a Russian grammar structure that is very similar to German two-way prepositions as it involves inflectional morphology.

While working on this assignment, the author recognized applicability of the approach to his two main areas of interest: classroom language instruction and the use of technology in language teaching. He then began to prepare his own study to see if the approach was indeed more effective than more traditional practices in teaching what is a rather difficult structure for German L2 students to master. As the materials were being refined and piloted in the classroom, the author began to notice that, despite explicit instruction about two-way prepositions and the intent of the approach to push the students to process the target structure for meaning, a number of students still seemed to be focusing on the wrong things, in particular, they appeared to be focusing on the verb, rather than the case of the prepositional object in target sentences.

During this time, Culman, Henry, and VanPatten (2009) was published, the first study to apply VanPatten's Processing Instruction (PI) to the teaching of German to students whose first language (L1) was English. The author noticed that, unlike previous PI studies that were

concerned mainly with teaching Romance languages to similar learner populations, the component of PI known as Explicit Information seemed to play a significant role. This suggested to him that the teaching of German grammar may require a different approach than the teaching of Romance language grammars. This, combined with his classroom observations, led the author to reconceptualize the study into the focus and form that it now has, examining what factors may either allow or inhibit a student in acquiring German two-way prepositions.

1.2. Theoretical background

An important area of research in Second Language Acquisition (SLA) with significant implications for second or foreign language teaching is research into how language learners process input and what strategies they use to comprehend utterances in the target language. Numerous studies have been conducted examining different methods of presenting input to learners in order to discover how they deal with the input and what helps or hinders their acquisition of the language.

1.2.1. Processing Instruction

An approach to teaching grammar that has garnered significant attention and generated a considerable amount of research is VanPatten's Processing Instruction (PI). It is a principled approach that is particularly interesting because it seeks to help learners make the connections between form and meaning that are necessary for them to fully acquire the grammar structure being learned. The goal of PI is to increase the likelihood of learners making these crucial form-meaning connections in two ways: first, by informing them about possible faulty strategies they might rely on that direct their attention away from the target form, thereby inhibiting their ability to connect meaning to that form; and second, by presenting input in a way that makes the target form more salient while pushing them to process the form for meaning.

1.2.2. Acquisition from a cognitive perspective

While this study is guided primarily by the principles of PI and VanPatten's theory of input processing, it is helpful to formulate questions about input processing and L2 acquisition within a wider explanatory framework. A theoretical framework that works well with PI is Modular Online Growth and Use of Language, or MOGUL (Sharwood Smith & Truscott, 2014; Truscott & Sharwood Smith, 2004a, 2011), which is an adaptation of Jackendoff's (1987, 2002) modular conception of memory.

While acquisition can generally be understood simply as learning or "picking up" a language, Sharwood Smith (2010) offers a more precise definition, claiming that acquisition is "the lingering effect of processing" (p. 175) and can be seen as "memory change brought about by the act of on-line processing" (p. 178). The authors of this theory argue that every representation in memory has a resting activation level when that representation is not involved in language processing. When a representation is used in a parse, its activation level is raised along with co-indexed representations in other structures. This results in a slightly higher resting activation level after the parse for all representations that were involved. With continuous usage over time, the resting level becomes high enough that it only requires a small amount of activation, resulting in subconscious processing.

Sharwood Smith and Truscott (2014) discuss the relationship between MOGUL and PI, claiming that "interesting concrete results arising from, say, Processing Instruction (which is very amenable to a MOGUL interpretation) can be rendered yet more interesting because they can be related to more specific aspects of internal processing provided by the overarching framework" (pp. 259-60). While PI gives specific principles that can be used to enhance input and increase a learner's intake, MOGUL provides the overarching theoretical framework that

may shed light on how this process is taking place and why features of PI work or don't work under certain conditions.

A relevant aspect of MOGUL is its conception of what it is that learners are actually aware of or noticing. The only thing that people can actually be aware of are sensations, such as sights and sounds, and their counterparts that are generated internally, such as mental images and what Truscott and Sharwood Smith (2011) refer to as “the voice inside the head” (p. 513). When a learner encounters new information, a new representation is created in memory. If that representation reaches a certain threshold of awareness, it then becomes conscious. While conceptual representations, such as grammar structures, may influence a person's conscious experience, they have no phenomenal qualities and are thus never able to be conscious.

What this implies both for the present study and for SLA in general, is that linguistic knowledge is never conscious. The conceptual representations of grammar are instead associated with and represented through some form of perceptual structure, whether visual, auditory, or affective. In other words, while learners are aware of the sights and sounds of language, they can never be aware of grammar.

What PI and other input-enhancement approaches attempt to do, from a MOGUL perspective, is help learners create or improve conceptual representations that act as internal input. These representations make meaning clearer and input more comprehensible, leading to better form-meaning connections. Explicit knowledge of grammar, then, while not contributing directly to growth of the language module, can be facilitative and help learners construct “the right semantic and pragmatic contexts to be associated with particular syntactic patterns” (Sharwood Smith and Truscott, 2014; p. 271) which then indirectly facilitate syntactic acquisition and linguistic growth.

1.3. The German case system

One of the more difficult aspects of German grammar for English-speaking learners to master is the German case system. Its difficulty lies in its complexity and, particularly, in the fact that the case markers are found primarily in determiners which appear in different forms based on the gender and case of the nouns they modify. Recognition and proper use of these case markers can be critical to accurate communication in German.

When German cases are taught in the classroom, it is typical for them to be demonstrated using definite articles. Despite the fact that the different grammatical forms communicate specific meaning, it is easy for an English L1 learner to simply translate all definite articles as “the”, completely ignoring their forms and subsequently ignoring the information communicated by those forms.

1.3.1. Two-way prepositions

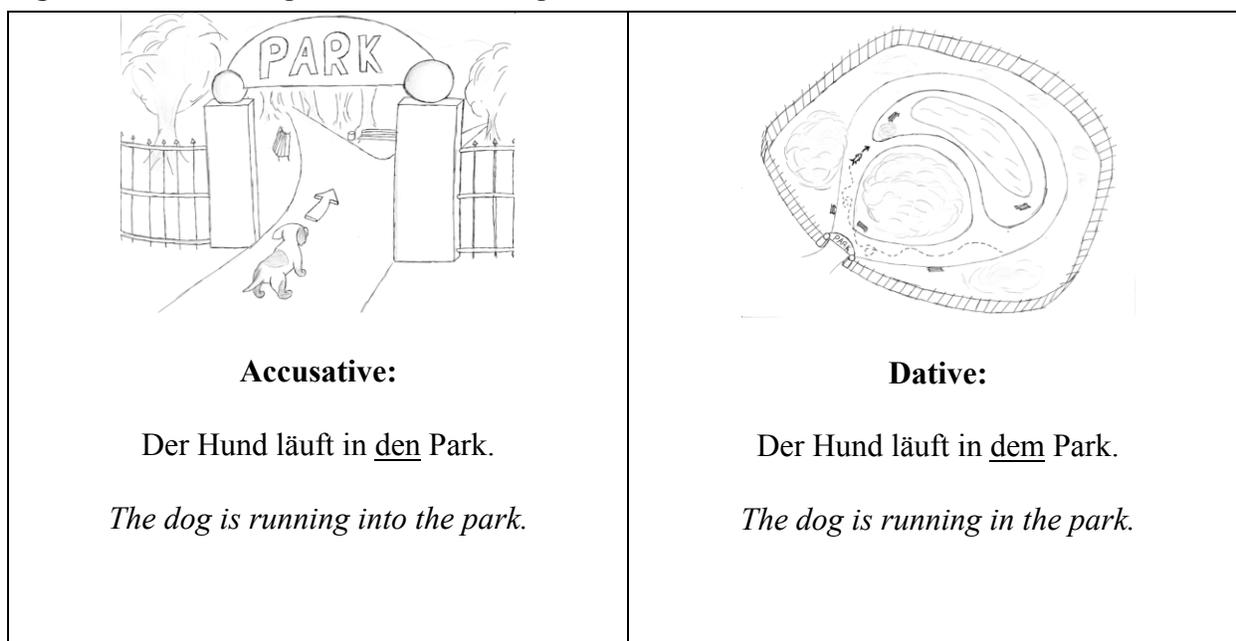
German two-way prepositions are particularly troublesome for English L1 learners because they introduce a concept that does not exist in English and because they differ from other German prepositions. While most German prepositions involve only one case, two-way prepositions involve two, and the choice of case depends on conceptual factors, such as whether the prepositional phrases express a location or a destination. For example, one could compare two sentences using the preposition *in*: *Er geht in den Bahnhof* [He goes in(to) the (acc.) train station] // *Er ist in dem Bahnhof* [He is in the (dat.) train station]. The inflection of the definite article (*den / dem*) immediately following the preposition *in* marks the case.

According to one of VanPatten’s principles of input processing, known as the lexical preference principle (LPP), learners will process content words in a sentence before processing anything else and will attend more to lexical items than to grammatical structures when both

present the same semantic information. The presence of the verbs *gehen* (*geht*) [to go] and *sein* (*ist*) [to be] presents the primary difficulty: these prepositions are often accompanied by lexical cues that render the inflection of the object's article redundant information, which, according to the LPP, may allow the learner to rely more on the lexical cues and fail to notice the inflection of the target form, namely the inflection of the prepositional object's article.

The problem is further compounded by the fact that the same verb may often be used in ambiguous situations, where the sentence could equally indicate either location or destination, and the intended meaning is reflected only in the inflection of the article. For example, the sentences *Der Hund läuft in den Park* [The dog is running in(to) the (acc.) park] and *Der Hund läuft in dem Park* [The dog is running (around) in(side) the (dat.) park] use the same words in the same order, but because the case of the preposition object is different in each, they express different ideas, as can be seen in Figure 1-1:

Figure 1: Visual comparison of the example sentences.



In the first sentence, the case of the prepositional object indicates the destination of the running dog, while in the second, it indicates the location in which the dog is running. The only

difference between the sentences, however, is the inflection of the definite article (*den / dem*) preceding the noun *Park*. According to the LPP, learners may rely more on the verb of motion to determine the meaning and may not notice the inflection of the article, leading to a misinterpretation of the sentence. As this example shows, in order for learners to properly interpret and use German two-way prepositions, it is important for them to attend to the inflections of the articles.

1.4. Research goals and Research questions

The goal of the present study is to contribute to the expanding pool of research into German grammar instruction from within the theoretical framework of input processing and the pedagogical approach known as Processing Instruction (PI). In particular, this study seeks to examine the extent to which the presence or absence of redundant lexical cues affects learner acquisition of the target form, and to discover what other factors may be preventing learners from fully acquiring said form.

The research questions for this study are:

1. Does removing redundant lexical cues from the input lead to greater gains in learner interpretation of German two-way prepositions than if redundant lexical cues are included in the input?
2. Does removing redundant lexical cues lead learners to more effectively map each case to the appropriate meaning for two-way prepositions?

1.5. Organization of the Dissertation

This dissertation is divided into five chapters, with this introduction being the first. The second chapter reviews literature related to the theoretical framework of this study and a number of selected empirical studies that involve either this same theoretical framework, the principles in

focus for this study, or the acquisition of German grammar within the framework of input processing. The third chapter outlines the methods of data collection and analysis as well as the materials and procedures used in the study. In the fourth chapter, the results are presented and analyzed, and the fifth chapter contains a summary of those results as well as a discussion of their meaning and implications.

Chapter 2: Literature Review

2.1. Introduction

This chapter presents a review of literature relative to key aspects of input processing approaches and VanPatten's Processing Instruction intervention. This review will look first at key concepts such as input, intake, and Schmidt's Noticing Hypothesis and will then consider several studies that present these concepts from a cognitive perspective. Next, selected studies from within the framework of VanPatten's Processing Instruction that focus on the Lexical Preference Principle and the processing problem addressed by the present study will be considered, along with several input processing studies involving German that are not specifically within the PI framework but are relevant to the present study. Finally, PI studies focused on German will be reviewed.

2.2. Input Processing

According to Gass and Selinker (2008), "Processing approaches are characterized by a concern with the processing mechanisms and capacities of the human brain and how those mechanisms and capacities operate when dealing within the context of second language learning" (p. 226-7). They further argue that input processing in particular "deals with how learners comprehend utterances and, particularly, how they assign form-meaning relationships" (p. 238).

2.2.1. Definition of input

Since this approach focuses primarily on the role of input and how learners process input, it is necessary to first understand what input is. Corder (1967) defines input at its most basic level as "what is available for going in" (p. 165) while Sharwood Smith (1993) later defines it as "potentially processible language data which are made available, by chance or by design, to the language learner" (p. 167). VanPatten and Cadierno (1993) define input more narrowly as

“*language that encodes meaning*. That is, the input necessary for language acquisition must contain meaning to which the learner attends for its *propositional content*” (p. 46, emphasis original), focusing on the need for language to be meaningful in order for it to be considered input. Lee and Benati (2009) later refine this definition of input, stating that it is “language presented in a communicative context, meaning that learners are attending to the meaning of the message(s) encoded through the language directed to them” (p. 2). In general, input can be defined as meaningful language that is made available to the language learner.

2.2.2. Intake

Not all input is processed by the learner, however, and so a distinction is made between language to which the learner is exposed and the language that is processed. Terms used to refer to each of these concepts are “input” and “intake.” While defining input as “what is available for going in” Corder (1967) defines intake as “what goes in” (p. 165), thereby demonstrating the basic difference between the two concepts.

In his discussion on multi-store models of memory, Kihlstrom (1984) gives insight into why not all of the input makes it into a learner’s developing linguistic system. He argues, “The cognitive system is oblivious to stimulation which falls on the sensory surfaces, but which fails to be transformed by the preattentive process of feature detection and pattern recognition” (p. 163). Moreover, he claims that any input that is not incorporated into short-term memory is “forever consigned to oblivion” (p. 165) since the input in those sensory surfaces decays rapidly. In other words, any input to which the learner does not attend does not become intake and is not available to be incorporated into the learner’s developing linguistic system. Once in short-term memory, another process, which he identifies as maintenance rehearsal, is necessary for the intake, or the attended input, to become integrated into long-term memory.

2.2.3. Schmidt's "Noticing Hypothesis"

A concept that has received a significant amount of attention in SLA research, particularly research within the input processing approach, is Schmidt's "Noticing Hypothesis." Schmidt (1990) claims that "conscious processing is a necessary condition for one step in the language learning process, and it is facilitative for other aspects of learning" (p. 131). According to Schmidt (1990), noticing is one of several possible levels of awareness and is "the basic sense in which we commonly say that we are aware of something" (p. 132). Its importance is highlighted by his claim that "storage without conscious awareness is impossible" (p. 136).

2.2.3.1. Importance of Schmidt's hypothesis to intake

Schmidt (1990) contrasts input and intake when he argues, "it is unlikely that all input used in the comprehension of message meaning also functions as intake for the learning of form" (p. 139). He defines intake as "that part of the input that the learner notices" (p. 139) and further argues that noticing is what is necessary for input to become intake.

Schmidt (1990) agrees with Kihlstrom, saying that "processing in short term memory is necessary for permanent storage" (p. 136) and that any information that is not moved into long-term memory is lost. Based on his interpretation of Kihlstrom, Schmidt seems to be arguing that input is simply what is received in sensory stores while intake is that part of the input that the learner attends to and is incorporated into short-term memory.

2.2.3.2. Operational definition of noticing

Schmidt's (1990) concept of noticing, then, appears to equate to Kihlstrom's (1984) "process of feature detection and pattern recognition" (p. 163) and he operationally defines it as "availability for verbal report" (p. 132). Schmidt (1990) cautions, however, that the lack of verbal report "cannot be taken as evidence of failure to notice" (p. 132). Elaborating on this idea, Robinson

(1995) points out, “one may be aware of, yet unable to verbalize or otherwise articulate the nature of that which one is aware of” (p. 299). Leow (2001) further refines this definition, stating that he “operationalized noticing as making a verbal or written correction of the targeted form...and/or commenting on the targeted linguistic forms” (p. 122).

2.2.4. Noticing and awareness in SLA from a cognitive perspective

Truscott and Sharwood Smith (2011) affirm that the concept of noticing is central to SLA, but point out that it is not simply awareness of the input; rather, it is specifically awareness of *forms* in the input. They argue that it is, however, not full awareness of the form, as conscious understanding is excluded from the concept of noticing.

According to Truscott and Sharwood Smith (2011), there seems to be little clarity among SLA researchers about what noticing actually is. They attribute this confusion to a lack of any clear idea in the field of what consciousness is, claiming that “[t]he objects of awareness have been variously characterized, always loosely, as input” (p. 512) and then ask the question, “[W]hat are these things, such that learners can be aware of them?” (p. 512). They maintain that “there is literally no sense in speaking of awareness of them, except to the extent that they translate into mental representations” (p. 512) and that it is these representations that learners are aware of.

2.2.4.1. A cognitive view of input and intake

Truscott and Sharwood Smith (2011) argue that input “has been treated in a vague, atheoretical way” (p. 515) and offer a further refinement of the concept of input as “perceptual representation of spoken or written language” (p. 515), which they categorize as auditory structure (AS) and visual structure (VS) representations, respectively. The authors summarize the process of input becoming intake by stating that, when input passes into the comprehension stage of processing, it

undergoes analysis. When new information is then matched with existing knowledge and hypotheses are tested using the new information, it may become incorporated into the learner's grammar. This incorporated information can then be used for production and is considered intake.

In order for input to qualify as intake, according to Truscott and Sharwood Smith (2011), the input must contain information that is specifically linguistic. They assert that this information is never present in a perceptual representation—specifically what they refer to as a Perceptual Output Structure (POpS) representation—rather, it needs to be extracted from it. They maintain that noticing occurs when a portion of a POpS representation is selected for additional processing. They refer to this portion that has been picked out as a follow-up auditory structure (AS) and argue that “noticing is awareness of a follow-up AS occurring while—and because—certain existing linguistic representations are active, giving that AS a particular significance” (p. 518).

2.2.4.2. Reformulation of Schmidt's Noticing Hypothesis

Based on these arguments, Truscott and Sharwood Smith (2011) offer a reformulation of the Noticing Hypothesis: “If learners are to acquire an aspect of language form, they must be aware of a POpS representation that was constructed as the result of processing that treats it [the POpS representation] as an instance of that form” (p. 519). According to them, this definition gives a clear lower boundary for noticing, as it states that awareness of input is not enough. They further make the claim that, “when the noticed representation becomes conscious, the form-meaning unit—that is, the coindexed pair of AS and CS [conceptual structure] representations—is automatically stored” (p. 519).

2.2.4.3. Difference from earlier psycholinguistic approaches

An important novelty of Truscott and Sharwood Smith's approach is their conception of memory. While it is conventional to refer to short-term (or working) and long-term memory, their MOGUL theory treats memory as a unified concept: short- and long-term memory are not separate systems. In their most recent study, Sharwood Smith and Truscott (2014) argue that elements are not transferred between different memory stores but are "highly activated within the self-same memory store" (p. 260).

As mentioned earlier, it is the activation level of the item in memory that is critical. An important consequence of this conception is that it sees no need for—and therefore dispenses with—any notion of a separate learning system. Both language learning and production are done within the same memory store. What determines the availability of an item is its resting activation level in memory rather than its presence in or absence from a particular memory store.

2.2.5. Relationship of input and intake to VanPatten's theory of Input Processing

VanPatten and Cadierno (1993) follow an argument similar to both Kihlstrom (1984) and Schmidt (1990) and claim that, in order for input to be converted to intake, the learner must make a connection between meaning and form. Without this connection, the input does not become intake. This argument is central to understanding VanPatten's theory of input processing, which he and Cadierno outlined in their seminal article introducing his intervention known as Processing Instruction.

2.3. VanPatten's theory of Input Processing

VanPatten and Cadierno (1993) proposed a simple model to explain their theory of the stages that input goes through to eventually become output, and demonstrated this theory using the illustration shown in Figure 2-1:

Figure 2: Processing in second language acquisition (p. 226)



2.3.1. Focus of VanPatten's theory

Their primary concern is with the first stage, which represents the processes by which input is converted into intake. According to VanPatten (2007):

Input Processing is concerned with three fundamental questions that involve the assumption that an integral part of language acquisition is making form-meaning connections:

- Under what conditions do learners make initial form-meaning connections?
- Why, at a given moment in time, do they make some and not other form-meaning connections?
- What internal strategies do learners use in comprehending sentences and how might this affect acquisition? (p. 116)

Lee and Benati (2009) expand on these three questions by adding more specific ones:

- What linguistic data do learners attend to during comprehension? Why?
- What linguistic data do learners not attend to? Why?
- How does a formal feature's position in the utterance influence whether it gets processed?
- What grammatical roles do learners assign to nouns based on their position in an utterance? (p. 3)

2.3.2. Principles of VanPatten's theory

There are two main principles that frame VanPatten's theory of input processing. His theory has undergone some development since it was first proposed, but Lee and Benati (2009) present these two principles in their current form as follows:

Principle 1: The Primacy of Meaning Principle. Learners process input for meaning before they process it for form. (VanPatten 2004: 11)

Principle 2: The First Noun Principle. Learners tend to process the first noun or pronoun they encounter in a sentence as the subject. (VanPatten 2007: 122) (p. 4).

Each of these main principles is further divided into sub-principles that “are meant to capture the interplay of various linguistic and cognitive processes that take place during comprehension” (Lee and Benati, 2009, p. 4). For example, one of the sub-principles of the Primacy of Meaning principle, and the one that is applicable to this study, is the Lexical Preference Principle (LPP), which states:

If grammatical forms express a meaning that can also be encoded lexically (i.e., that grammatical marker is redundant), then learners will not initially process those grammatical forms until they have lexical forms to which they can match them. (VanPatten, 2007, p. 118)

2.4. Processing Instruction

These principles and sub-principles form the theoretical framework for VanPatten’s pedagogical intervention known as Processing Instruction (PI). According to VanPatten and Cadierno (1993), traditional language instruction tends to rely on mechanical drills that focus on output immediately after students are initially exposed to a new grammatical form. They argue that students would benefit more from exercises that focus on the initial stage of acquisition, where input becomes intake, and which alter the strategies learners use to process input.

2.4.1. Description

VanPatten and Cadierno (1993) claim that a PI intervention does just this by first providing explicit instruction about a possible faulty learner strategy that may result in the learner not attending to the target form. After this explanation, the instructor provides learners with input that is structured in a way as to push the learner to process the target form in the input. The theory behind this method is based on research that suggests language learners tend to use input processing strategies that direct their attention away from the target grammar forms, which

results in a decreased likelihood that the learner will notice those forms and therefore will not acquire them into his or her developing linguistic system.

PI seeks to make grammar forms with low communicative value¹ more salient and push learners to process those forms for meaning. By pushing them to process the forms while keeping meaning in focus, PI should enhance the process by which form-meaning connections are made, leading to a richer developing system.

2.4.2. Components of PI

Processing Instruction is composed of two distinct elements: Explicit Information (EI) and Structured Input (SI).

2.4.2.1. Explicit Information

Explicit Information (EI) is instruction given to learners about a possible faulty processing strategy that may lead them away from attending to the target form. VanPatten (2011) explains,

What makes PI different is the explicit information on the processing problem. That is, learners are explicitly informed of the mistake they most likely make when trying to comprehend a particular kind of sentence and then are given examples to show why their “default” processing strategies may not work. (p. 45)

For example, in an utterance such as “He walked the dog yesterday,” the instructor might inform the learners that their tendency will be to rely on the word “yesterday” to determine whether the action of walking the dog occurred in the past, but that they need to focus on the form of the verb. The intent is to direct them away from the faulty strategy of relying on a lexical cue and toward attending to the target verb form in order to learn it.

¹ VanPatten (1996) defines communicative value as: “the relative contribution a form makes to the referential meaning of an utterance and it is based on the presence or absence of two features: inherent semantic value and redundancy within the sentence utterance” (p. 24).

2.4.2.1. Structured Input

Structured Input (SI) can be described as exercises practicing the target form that are manipulated in a way that pushes the learner to rely solely on the target grammar form to derive meaning from an utterance. Using the same example given above, since the word “yesterday” implies an action that occurred in the past, the *-ed* inflection indicating the past-tense of the verb “to walk” is redundant. According to the LPP a learner will most likely not attend to this grammar form but will instead rely on the lexical item “yesterday” to process the past-time meaning of the sentence. In a Structured Input exercise, an option for the instructor would be to remove the word “yesterday” and then ask the learner to state when the action occurred. Because the lexical item is missing, the learner is pushed to process the form of the verb to determine the meaning.

If an instructor is focusing on the past tense and uses SI, the instructor would present the input in a way that removes all redundant lexical information and focuses on the meaning of the utterance. This in turn would require the learner to pay attention to the target grammar form to process the utterance for meaning. For example, the instructor might develop an exercise asking if the action described in the sentences occurred in the past or is it something that occurs regularly, and present several sentences involving both past and present tense, such as the example exercise in Figure 2.2:

Figure 3: Example Structured Input exercise.

| Exercise A: Select whether Mary did this yesterday or does this regularly. | | |
|---|--------------------------|-------------------|
| Mary... | | |
| Yesterday | Regularly | |
| <input type="checkbox"/> | <input type="checkbox"/> | walked her dog. |
| <input type="checkbox"/> | <input type="checkbox"/> | washes her car. |
| <input type="checkbox"/> | <input type="checkbox"/> | spilled her milk. |

In these sentences, all redundant lexical items such as *yesterday* or *often* have been avoided. The only way learners will be able to process these sentences for meaning is by attending to the inflection on the verbs.

2.5. The Lexical Preference Principle

As mentioned above, the Lexical Preference Principle is applicable to the present study since the two-way preposition usage in German usually co-occurs with a verb whose basic semantic meaning suggests either motion or static location. The intervention created for this study specifically removes the learners' ability to use lexical cues to decide on prepositions and their case governance. As shown in Figure 1.1, two-way prepositions can be interpreted in one of two ways: either showing destination (e.g. "into") or location (e.g. "in"). The difference between these interpretations is reflected only in the case of the prepositional object.

2.5.1. Relation to this study

The assumption for this study is that learners may rely on the verb to try to determine the meaning rather than the case of the prepositional object. If the verb is a verb of motion, the learner may assume that it indicates a destination.

Another possible lexical item that a learner may rely on is the preposition itself. The German preposition *in*, for example, is cognate with the English preposition *in*, but can also carry the same meaning as the English preposition *into*. Because of its similarity to *in*, however, it could be misinterpreted as *in* rather than *into* if the learner does not attend to the case of the preposition's object.

2.5.2. Summaries of selected empirical studies focusing on the LPP

A number of studies have focused on the Lexical Preference Principle such as Cadierno (1995), Benati (2001, 2004a, 2005), Farley (2001a, 2001b, 2004), Lee et al. (2007), Lee and Benati (2007b), Rossomondo (2007), and Comer and deBenedette (2010, 2011). Most of these studies involve a Romance language, Spanish, French, and Italian in particular, the exceptions being Lee and Benati (2007b), which deals with Japanese, and Comer and deBenedette (2010, 2011), which both deal with Russian. All the above studies also involve L1 English learners with the exception of Lee and Benati (2007b), which involves L1 Italian learners. Some studies, primarily the earlier ones, compared Processing Instruction to other forms of instruction, while later studies examined the role that components of PI play during instruction, focusing mainly on whether or not EI is a necessary part of PI.

2.5.2.1 Extension of the original PI research

Cadierno (1995) extended the research of VanPatten and Cadierno (1993) and compared the effects of instruction using PI, traditional instruction (TI), and no instruction to teach the Spanish preterit. For this study, temporal adjectives were removed from the input, pushing the participants to process the verbal morphology for meaning. Learners were divided between three conditions: traditional instruction that relied mainly on output-based exercises immediately following introduction to the grammar form, processing instruction that used the principles and methods described above, and no instruction.

Participant performance was measured using a pre-test, one immediate post-test, and two delayed post-tests that were composed of one interpretation task and one production task. The first post-test was administered immediately after the intervention, the second one week later, and the third one month after the second post-test. The PI group performed just as well as the TI

group on the production task, despite the fact that no production was done during the PI intervention. The PI group also performed significantly better than the TI group on the interpretation task. Both groups maintained their improvement over all three post-tests.

2.5.2.2 Addressing methodological concerns with early PI research

Benati (2001) addresses a methodological concern that was raised about Cadierno (1995), namely, that the communicative activities that each group completed were different and may have accounted for some of the differences between the groups. Benati (2001) compared PI with an output-based focus-on-form intervention (OBI) teaching the Italian future tense and attempted to ensure that the communicative activities between the groups were similar. As with Cadierno (1995), temporal adverbs were removed from the input, pushing the participants to process the verb form for meaning. Participants were divided into three groups: PI, output-based instruction, and no instruction (control group).

Performance was measured using a pre-test and two post-tests. The first post-test was administered immediately after the intervention and the second was administered three weeks later. The tests consisted of three tasks: an aural interpretation task, a written completion task, and an oral limited response task. Participants in the PI group scored significantly higher than the OBI group on the interpretation task, who, in turn, scored significantly higher than the control group. Both instructional groups performed similarly on both the written completion task and the oral limited response task. Both instruction groups also scored significantly higher than the control group. Benati (2001) noted that participants in the output-based group showed clear signs of learning, and suggested that the meaningful output produced by one participant may have also served as input for the other participants. He pointed out that, although the production scores were similar, the PI intervention did not contain any production tasks. He concluded, based on

this fact combined with the significantly higher interpretation task score, that PI was more beneficial overall than the output-based instruction.

2.5.2.3 Extending PI research beyond Romance languages

Lee and Benati (2007b) examined the effect of structured input on the acquisition of two different forms in Japanese: the past tense and negative vs. affirmative present statements. This study focused on both the Lexical Preference Principle and the Sentence Location Principle, which states that learners will process sentence initial items first followed by sentence final and, lastly, sentence medial items. The participants were divided between a PI group, where instructional materials pushed learners to process input, and a traditional instruction group in which the participants were required to produce output. The groups also differed from most previous studies in that the SI group did not receive explicit information about the target forms while the TI group did.

Participant performance was measured by comparing a pre-test and one post-test. The tests consisted of one interpretation task and one production task so that the tests favored neither of the instructional conditions. The results of the study showed that, while both groups made gains, the PI group made greater gains in the interpretation task, while there was no statistically significant difference between the groups in the production task, demonstrating the same two-for-one effect noticed in previous SI studies. This study also showed that PI is effective for teaching more than just Romance languages.

2.5.2.4 Two PI studies foundational to the present study

Rossomondo (2007) also focused on the LPP by examining the role that Lexical Temporal Indicators (LTIs) play in the acquisition of the Spanish future tense and specifically

addressed whether or not their presence affected the acquisition of the form by learners who were not familiar with it. As an example, she provided the sentence:

Mañana el hombre hablará con su jefe.

“Tomorrow the man will speak with his boss.” (p. 41)

The synthetic future tense in Spanish is constructed by adding the accented *-á* to the infinitive of the verb, which, for this sentence, is *hablar*. In this example, the LTI “*mañana // tomorrow*” indicates the future, making the future tense ending *-á* redundant information. According to the LPP, a learner encountering this sentence will attend more to the lexical cue *mañana* than to the verbal form *hablará*, reducing the possibility of noticing and subsequently acquiring the form.

In her study, Rossomondo (2007) provided two groups of beginning Spanish learners each with a different version of the same text: one group received a version that contained LTIs and the other received a version without LTIs. Learners in the +LTI condition scored higher in a multiple-choice comprehension task than learners in the –LTI condition, which Rossomondo claimed lends some support to the LPP.

On the other hand, she noted that “the presence or absence of lexical cues to meaning did not affect the learner’s noticing of the novel forms in the input... These results indicate that learner recognition of novel forms encountered in a reading passage is not inhibited by redundant lexical markers” (p. 58). According to the author, her findings support similar findings by Lee (2002a) that suggest the presence of LTIs does not distract learners from noticing novel forms in the input.

These findings seem to draw into question the extent to which the LPP is applicable. While learners do seem to benefit from the presence of lexical cues, their presence does not seem to affect noticing of the grammatical form, contrary to what the LPP states. This may, however,

depend on the saliency of the target form. Rossomondo (2007) notes: “the Spanish synthetic future tense is a notably simple construct with a salient tense marker” (p. 61). It may be, then, that the LPP is more applicable to less salient morphology, such as that encountered in the definite article in German two-way prepositions.

Comer and deBenedette (2011) was written in response to objections raised by Leaver, Rifkin, and Shekhtman (2004) against the claim made in Wong and VanPatten (2003) that mechanical drills were not necessary and that better results would be achieved if they were replaced with focus-on-form exercises, particularly with a PI intervention. Wong and VanPatten (2004) responded to these objections by challenging instructors of Russian to provide evidence that either mechanical drills were necessary or that PI would not work for Russian.

Comer and deBenedette (2011) took up this challenge by conducting a comparison of PI to traditional instruction, focusing on the teaching of two prepositions, *в* and *на*. These prepositions are very similar to German two-way prepositions in that they can both express the ideas of either destination (into/to) or location (within/at). The processing problem in Comer and deBenedette (2011) is the same as in the present study: learners tend to rely on the main verb rather than on the case of the prepositional object to derive meaning from utterances involving these prepositions.

In line with most PI studies, participant performance was measured by comparing a pre-test given before the treatment to a post-test given afterward. The tests were comprised of an aural sentence interpretation task and a written sentence completion task. In order to focus on the claims made by Leaver, Rifkin, and Shekhtman (2004) that mechanical drills were necessary, the instructional materials for the TI group consisted of explicit information and solely mechanical drills that required the participants to produce output, while the materials for the PI group

consisted of explicit information plus structured input activities that were designed in accordance with the principles and guidelines outlined in Lee and VanPatten (2003) and contained no production activities.

The results showed that the PI group made greater gains on the interpretation task from pre-test to post-test than did the TI group. Similar to the results of VanPatten and Cadierno (1993), both groups performed equally well on the production task, again showing the two-for-one effect of PI in both interpretation and production. These results suggest that PI is in fact effective both for a language with complex grammatical structures like Russian and for the specific structure and processing problem under investigation.

2.5.3. Research syntheses of PI-focused studies

Two recent studies have reported on research syntheses of studies that focus on Processing Instruction, either comparing PI to other forms of instruction, or examining the role of the different components of PI.

2.5.3.1. Meta-analysis comparing PI and production-based (PB) instruction

Shintani (2015) examined 42 experiments published in 33 studies that compared the effectiveness of PI to production-based (PB) instruction. The meta-analysis showed that both PI and PB were effective for developing both receptive and productive knowledge. PI was more effective for receptive tasks, but PB was just as effective as PI for productive tasks. The study also found that there was no significant difference between the receptive scores for PI and the productive scores for PB. This suggests that each intervention did equally well for the skill that was practiced: receptive skills for the PI group and productive skills for the PB group. The productive scores for PI, however, were significantly greater than the receptive scores for PB.

An interesting finding of the study was that strategy instruction seemed to also make a difference between the groups. For PB groups that received strategy training as part of their explicit information, the effect size for the receptive tasks was 1.28 while the effect size for those groups that did not receive strategy training was only 0.51. For the PI groups, the presence or absence of strategy training did not make a difference in the effect sizes for receptive tasks. Since PB groups in general did not receive strategy training, this suggests that it is a moderating factor in the comparisons made between PI and PB interventions.

Shintani (2015) also found that PI interventions were more effective in the case of productive knowledge when the principle in focus was the Primacy of Meaning principle rather than the First Noun principle. The authors explain this result saying that studies focusing on the First Noun Principle involve both syntactic features as well as morphological features of the L2. Since the Primacy of Meaning principle tends to only focus on morphology, it is less complex and explicit information and strategy training is more easily applied to a single morphological feature than to multiple structures at the same time.

One research gap mentioned by Shintani (2015) that the present study seeks to address is that there is a need for studies showing the learning process that PI leads to and how learners process input. The think-aloud protocols employed in this study will provide some insights into how the learners processed the input provided after the interventions.

2.5.3.2. Narrative review assessing the effectiveness of PI

DeKeyser and Prieto Botana (2015) conducted a narrative review of the same 33 studies as Shintani (2015) to determine whether there was any difference between interventions with or without EI, whether there is any difference between PI and PB on L2 grammar acquisition, and to determine moderating factors in these two comparisons.

The review found that, while EI did not make a significant difference in a number of studies, the moderating factor may have been the task-essentialness of the Structured Input exercises. The authors point out that those studies in which no effect for EI was found employed SI exercises in which the target form was essential to proper completion of the task. They further highlighted two studies (Marsden, 2006; Marsden and Chen, 2011) that compared task-essential to non-task-essential exercises and found that non-task-essential exercises yielded no or less significant gains.

The authors also found that EI seems to be more effective for more complex forms. For easier structures, SI seemed to be sufficient for rule induction and EI did not make significant contributions. For complex structures, the provision of EI appears to be beneficial, leading to quicker understanding and more robust gains than interventions that rely on rule induction.

The study also considers the comparison of PI to PB and finds that PI only had an advantage in about half of the studies. They determined that PB can be more effective for production than PI, but this depends on how the PB is implemented. The authors argue that the moderating factor in this comparison may be the non-communicative nature of the practice provided by those studies that found PB to be less effective than PI.

Important points raised by the authors concerning PI research in general include the observation that the studies reviewed do not assess how well participants attended to or learned the EI provided. They also note that all of the studies were of short duration and employed measures that document proceduralized declarative knowledge rather than implicit or automatized knowledge. They call for studies of longer duration that employ communicative tasks to measure knowledge.

The present study addresses the first gap by implementing think-aloud protocols. Because the protocols capture the students' verbalization of their reasoning while they are completing the tasks on the post-test, their responses should provide evidence as to whether or not they have attended to the EI provided during the intervention. By measuring the frequency of their references to the EI and the accuracy of their verbalization compared to the EI, it should be possible to see the extent to which they have learned the information.

2.6. Studies of acquisition of German from an input processing perspective

A number of studies examining the acquisition of German case markings from the perspective of input processing have been conducted in recent years (Jackson 2007, 2008a, 2008b; and Jackson and Dussias, 2009). In particular, they have focused on subject/object ambiguities with regard to how learners process accusative case markings and word order. While these studies do not specifically address Processing Instruction, they do reference and validate VanPatten's principles and are relevant to the present study in their focus on the acquisition of German grammar and their clear theoretical framing within input processing.

2.6.1. German case markings and L1 English learners

Jackson (2007) focused on how intermediate L2 German learners (L1 English) use case markings, word order, and semantic information to interpret individual German sentences. She conducted a longitudinal study, testing learners in their fifth and sixth semesters of German study over the course of an academic year. The sentences were a combination of SVO and OVS and varied between having an animate noun for both the subject and the direct object and having an inanimate noun for the direct object.

Her findings show that SVO sentences that only contained one animate noun were the easiest to interpret as the learners were primarily using semantic information and word order to

interpret them. Over the course of the year, however, their processing of case markings improved and they were better able to interpret OVS sentences with two animate nouns. Her findings also suggest that participants tended to use a subject-first strategy, supporting VanPatten's principle known as the First Noun Principle that says learners will tend to interpret the first noun they encounter as the subject of the sentence.

2.6.2. Processing strategies of L2 German learners compared to L1 German speakers

Jackson (2008a) looked at the processing strategies that learners might use while learning German grammar. Specifically, she looked at whether or not learners use grammatical information that differs from the learner's L1 (English, for this study) case markings and whether or not the animacy of the nouns interacted with their interpretation of case markings. She compared the performance of intermediate, advance, and native German speakers on timed comprehension tasks. Participants were asked to read a German sentence presented to them on a computer screen. After reading the sentence, they were presented two statements and were asked to choose the one that best represented the meaning of the sentence provided.

The results of this study showed that both L2 groups had lower comprehension rates on OVS sentences, which suggested that they had adopted a subject-first strategy, similar to the findings of Jackson (2007). Advanced learners performed better on OVS sentences containing two animate nouns, suggesting that more advanced speakers are better able to make use of case markings than were intermediate learners. In comparison, while the German L1 participants also scored lowest on OVS sentences with animate subjects, the score was high enough to suggest they were relying primarily on the case markings to interpret the target sentences. Reading times of L1 participants for OVS sentences with animate subjects were also slower than for the other conditions, but were faster than the reading times for all conditions for both L2 groups, showing

that native speakers had some initial difficulty with them, but were able to overcome this difficulty quickly, suggesting again that they relied mainly on the case markings to interpret them. The overall results suggested learners at both levels were relying more on semantic information and real-world event probabilities than case markings, but that increased proficiency corresponded with better ability to use case markings.

2.6.3. Comparing how L2 German learners at different proficiency levels process input

Jackson (2008b) examined how L2 German speakers at different proficiency levels processed case markings in a self-paced reading task while processing subject-object ambiguities. Learners read a series of *wh*-question sentences where the grammatical gender of the *wh*-phrase was either feminine or neuter, making it ambiguous as to whether it was the subject or the object of the sentence. The disambiguation occurred with the second noun phrase which was always masculine, and was marked as either nominative or accusative case, indicating it as either the subject or the direct object, respectively.

After reading each sentence, the participants were given a comprehension statement and were asked to determine if the statement was true or false, based on the sentence they read. She concluded that, while intermediate proficiency learners had difficulty processing case markings, the performance of advanced proficiency learners suggested that, as proficiency increases, learners are able to more rapidly process case markings, but may still rely on lexical-semantic features more often than native speakers would.

Jackson and Dussias (2009) compared reading times for highly proficient L2 speakers to native German speakers in a self-paced reading task. The results of the study showed that the L2 speakers were sensitive to case markings during processing, suggesting that highly proficient L2 learners are able to quickly integrate information that is specific to the L2 during online

processing. The in-sentence location of time differences for object extraction between the two groups also suggests that L2 speakers may not rely on morpho-syntactic information in the same way as native speakers.

Native German speakers and advanced L2 speakers exhibited longer reading times at the second noun phrase when the case markings of the noun disambiguated the role of both the first and second noun phrases, while intermediate L2 speakers did not show longer reading times at this same noun phrase. Advanced L2 speakers also demonstrated longer reading times for simple past sentences as opposed to present perfect sentences, while native speakers showed no difference between the two. This suggests that intermediate L2 speakers may be withholding assignment of grammatical roles until a later point than both advanced L2 and native speakers, or are not able to process the case markings as rapidly as the other two groups.

All three groups also demonstrated different reading times at the final segment of the sentences. Intermediate L2 speakers exhibited longer reading times for OVS sentences than for SVO sentences while advanced L2 speakers showed longer reading times for present perfect sentences, when the thematic verb is present in final position as a past participle, than for simple past sentences, in which the thematic verb is encountered earlier. Native German speakers, in contrast to both L2 groups, demonstrated no reading time differences in the final segment for any condition. These differences suggest that native speakers might be incrementally assigning grammatical roles while reading each sentence, a strategy that neither L2 group seems to adopt.

2.7. PI studies in German

To date there have been only two studies published that examine the teaching of German grammar within the framework of Processing Instruction. Culman, Henry, and VanPatten (2009) and VanPatten and Borst (2012) both examined the acquisition of accusative case morphology

and focused on the First Noun Principle, which states that the first noun encountered by the learner in an utterance tends to be processed as the subject.

Culman, Henry, and VanPatten (2009) examined the role of EI in an intervention that was used to teach the German accusative case and focused on learner interpretation of OVS sentences with masculine nouns as their direct objects. The authors observed that “[p]revious research has suggested that explicit information is not necessary for processing instruction” (p. 19) and sought to test this hypothesis explicitly by dividing the experimental groups by the presence or absence of EI in the intervention while maintaining the same SI activities for both conditions. The groups were also divided between first semester and third semester learners to see if prior exposure to the language might affect their performance. The experiment was conducted using specialized computer software—*ePrime*—so that participant progress could be monitored over time throughout the experiment.

The results of the study showed that the groups that received EI maintained a higher mean score throughout the experiment and seemed to correctly process OVS sentences sooner than the SI-only group. This suggested that EI played a significant role in that it seemed to accelerate the correct processing of the input. They also found that there was no difference between the first year and second year participants, suggesting that “prior instructions did not give the second year learners any ‘leg up’ on how to correctly interpret simple noun-verb-noun sequences in German” (Culman et al., 2009, p. 28).

Another significant point to this study is that the participants completed a follow-up questionnaire in which they were asked to recall any “tricks” they may have used to interpret the sentences. The authors reported that 20 out of 30 participants in the PI group mentioned using the case marking of the definite article as the cue to interpretation, but only three out of 29 from

the SI-only group reported using this same “trick”. The authors believe, however, that the actual number from the PI group that utilized this strategy may be higher, citing the possibility that participants may not have understood what was meant by a “trick” on the questionnaire.

VanPatten and Borst (2012) is a follow-up to Culman et al. (2009) and as such also focused on the First Noun Principle that sought to examine the effect of EI over time in an intervention focusing on the German accusative case in OVS sentences. Because the results of Culman et al. (2009) differed significantly from previous studies in Romance languages—in particular Fernández (2008), which focused on the FNP and Spanish clitic object pronouns—that suggested EI played no significant role, the authors commented, “[I]f we obtain results similar to Culman, Henry, and VanPatten (2009) then indeed it would look like EI might interact differentially with different target features when the processing problems (in this case, the FNP) is held constant” (p. 95).

The participants were again divided between two experimental conditions: instruction with and without EI. All participants were third-semester paid volunteers from two different universities and were randomly assigned to the experimental groups. Both the pre- and post-tests were delivered via computer using SuperLab 4.0 in order to record the participants’ progress throughout the study. One addition to the study is that the participants also took the grammatical sensitivity portion of the Modern Languages Aptitude Test to see if grammatical sensitivity would be a good predictor of the results of a PI intervention.

The results of VanPatten and Borst (2012) did, in fact, replicate the findings of Culman, Henry, and VanPatten (2009) regarding the role of EI: those participants who received EI began to correctly process OVS sentences sooner. The authors compared their German study to Fernández (2008), focusing on the role of EI with the same processing problem, in which EI did

not seem to play a significant role, and they commented that “perhaps the processing of case markings in German L2 might be different from the processing of clitic object pronouns in Spanish L2” (p. 97). They concluded that “EI about case markings is more readily available during real-time processing than EI about clitic object pronouns for the specific targets in our research” (p. 103).

2.7.1. Comparison to the current study

The focus of the present study differs significantly from the previous two in that the present study applies the Lexical Preference Principle and looks at case markings for a set of prepositional objects rather than for objects of verbs. The one area where this study overlaps with them is in the fact that the grammar form is case markings, which are represented primarily in the morphology of articles.

Another way in which the present study differs significantly from the previous German PI studies is that the previous studies involved learning a new structure with a new form. The studies were limited to the Accusative case. The only change that occurs in the German Accusative is the change in the masculine article from *der* to *den* and all target sentences in both studies include masculine nouns in either the Nominative or the Accusative. This allowed for a one-to-one mapping of a new form with a specific meaning. Two-way prepositions, on the other hand, involve mapping a new meaning onto previously learned forms, ensuring competition with the previously mapped meanings.

2.7.2. Caveats related to the current study

Russel (2012) comments that one drawback of PI is the fact that the grammatical form in focus “may need to have a high communicative value for PI to be effective” meaning that a form has “a high communicative value if it has inherent semantic value (it conveys some type of

meaning) and lacks redundancy within the sentence or utterance” (p. 44). The difficulty with German case markings is that they are almost purely conceptual, conveying only the meaning of definiteness or indefiniteness.

Baten (2011), while discussing the acquisition of German case within the framework of Processability Theory, confirms the conceptual nature of case markers, saying, “Regarding the *Wechselpräpositionen* [two-way prepositions], it is difficult within PT to make statements about the processing of case because the use of the accusative or dative forms depends on the conceptual, not on the lexical specifications of the verb” (p. 481). Baten (2013), in fact, refers to the type of marking involved in two-way prepositions as Conceptual Marking and states, “The use of case with these prepositions is determined by semantic motivations that go beyond lexical case assignment (either by the verb or the preposition)” (p. 15).

2.8. Summary

As can be seen, the input processing approach to language acquisition has generated quite a bit of research, only a small portion of which has been discussed here. The few studies outlined in this chapter help not only to establish the theoretical framework behind the present study, but they also support and lend credibility to that framework.

Of particular relevance, of course, are those studies that examine the Lexical Preference Principle, establishing it as a valid principle that has been tested and is supported by research. Studies examining interventions that take this principle into account help establish this validity while also showing that this particular obstacle to L2 acquisition can be overcome when it is taken into account. Finally, studies focusing on the same or similar structures as the one in focus in the present study help to validate the applicability of these principles to the teaching of German two-way prepositions.

The present study contributes to the pool of studies that examine the teaching of German grammar from within the input processing framework. It looks at the difficulties that arise when learners are required to process structures that have a very low communicative value, namely the morphology of German definite articles, in order to properly interpret input. It also contributes to the growing pool of studies that examine VanPatten's Processing Instruction intervention by focusing on the application of the Lexical Preference Principle to the problems that arise when German grammar in general and two-way prepositions in particular are taught in the classroom.

While many studies that have previously examined the components and principles of Processing Instruction have focused on the role of explicit information by altering the EI for each experimental condition, this study holds EI constant for both conditions and alters the input exercises, making structured input the independent variable. The present study also adds online analysis of learner strategies through think-aloud protocols. Rather than relying on offline questions about "tricks" after the post-test is complete, this study attempts to record the thought processes of the participants during the post-test by having them think aloud about their choices while completing each task on the test. These think-aloud protocols should also help address the research gaps mentioned earlier by Shintani (2015) and DeKeyser and Prieto Botana (2015) by providing some insights into the way learners process the target input after an intervention and by showing to what extent they attended to and are using the explicit information provided.

Chapter 3: Research Methods

3.1 Introduction

In this chapter, the research methods employed for the current study will be described. It will start with a brief overview of pilot tests that were conducted prior to the main studies and were used to test and refine the design of the materials and procedures employed in the main studies. Following this, the details of the design and structure of the two main experiments will be discussed, including the materials used and the procedures followed during the interventions. This study uses a mixed methods approach, employing both quantitative analysis and think-aloud protocols as a qualitative measure, in order to provide a broader range of analysis than one method alone would provide. The use of think-aloud protocols in SLA and in this study, along with caveats concerning their use is discussed toward the end of the chapter.

3.2. Pilot Studies

Two pilot studies were conducted prior to the first main study in order to test various aspects of the experimental design, particularly the instructional materials and the data collection instruments, within the operational environment that they would eventually be used for the main studies, namely the classroom. Difficulties encountered during the pilot studies helped shape the overall experimental design and the goals of the studies. Think-aloud protocols were also added to the second pilot and tested prior to use in the first study.

3.2.1. Pilot Study 1

The goal of the first pilot was to test the effectiveness of a processing instruction intervention in comparison to a more traditional intervention. Four intact sections of a second-semester German course (n=31) were randomly assigned to either a PI group or a non-PI group. All participants

were administered a pre-test prior to treatment, an immediate post-test and two delayed post-tests. The overall results of the pilot were inconclusive, as neither treatment group showed any statistical advantage over the other.

Several key issues were noted about the design of the study, which led to significant changes. First, although efforts were made to rely mainly on mechanical drills and to avoid any instruction that might resemble PI methods in the non-PI group, the teaching method was not clearly defined, so it would not have been possible to attribute any clear results to the type of instruction. Also, dissimilarity between the pre- and post-tests reduced the reliability of the measures. The pre-test consisted of only one production task whereas the immediate post-test consisted of two recognition tasks and two production tasks. The delayed post-tests consisted of only one of each type of task, but they were structured differently from the previous tests. Although no clear results were obtained, the study did at least show that PI was not any less effective than the methods that were currently being used in the classroom.

3.2.2. Pilot Study 2

Following the first pilot, a number of substantial changes were made to the overall design and focus of the study and a second pilot study was conducted.

3.2.2.1. Change in focus of the study

The first change to be made for the second pilot was to clearly define all teaching conditions. In the process, the focus of the study shifted from a comparison with traditional instruction to isolating one principle of PI, namely the Lexical Preference Principle. For this pilot, both groups received the same instruction, the only difference being that input exercises for one group included lexical cues while they were not included in the input exercises for the second group.

3.2.2.2. Changes to the testing instruments

To address the testing issue from the first pilot where the pre- and post-tests differed, a pool of questions for each task (listening and reading) was written and the questions distributed evenly between the pre- and post-tests to ensure that the pre- and post-test were comparable. One group received one set of questions (version A) as the pre-test and the second set (version B) as the post-test. According to Mackey and Gass (2005), this practice helps to increase the internal validity of the tests by ensuring that both are comparable and by reducing possible practice effects and the effects of learner inattention, since they are not being given the exact same set of questions in both tests. While this practice is typically employed with individual participants, for ease of administration, especially given that audio prompts were used in the listening task, all learners in each experimental group were given the same set of questions. Different groups received different versions of the test to alleviate possible test compromise across groups and to reduce the possibility that one of the two tests was more difficult than the other, since all questions were used in both the pre- and post-tests.

3.2.2.3. Addition of think-aloud protocols

An addition that was tested during this pilot was the use of think-aloud protocols during the post-test. During the listening task, the stimuli were presented over a computer recording system and the participants were permitted 30 seconds to provide their responses. As they provided their answers to the task items, they were asked to think out loud about what led them to make their choices and their oral responses were recorded using the same recording equipment. For the reading task, they were permitted ten minutes to complete the entire task and were asked to think aloud during the entire process.

3.2.2.4. Participants

Two intact sections of a second-semester German course were randomly assigned to either the group with lexical cues (+LC; n=7) or the group without them (-LC; n=4). Technology-related problems during the post-test for the +LC group prevented a full collection of data. The only useable data collected were the participants' responses for the first five items on the listening task.

3.2.2.5. Analysis

Because of the low number of participants and data items, no statistical analysis was made and the focus of the pilot shifted to administration and analysis of the think-aloud protocols. A coding scheme was developed based on a coding scheme developed by Rosa and Leow (2004) and Rosa and O'Neill (1999). Analysis of the protocols suggested that both groups were attending equally to the target form.

3.2.2.6. Modifications resulting from the second pilot study

Results of the second pilot study revealed ambiguities in the sentences used for the reading task. Some of the items could have been interpreted equally as either location or destination since there was no context to make it clear which was the appropriate answer. For example, the item *Ich (gehe/sitze) in dem Park [I (go/sit) in the (dative) park]* could be answered with either verb because the act of going (*gehe*) could be done within the confines of the park. This would require the dative case, just like the verb *sitze* (*sitze*), since the noun *der Park* would then be the location of the activity rather than its destination. Although the resulting utterance would not be considered a standard sentence in German, learners at this level likely would not be able to make this distinction and could easily have selected the wrong answer using valid reasoning based on their knowledge of the language. In order to avoid such ambiguities, the reading task for the first study

consisted of a series of pictures with each one showing an activity demonstrating either a destination or a location. Under each picture was a sentence with three possible conclusions and the participants were asked to select the conclusion that corresponds to the picture.

Another significant change that occurred as a result of the second pilot was in the instructions given for the think-aloud protocols. The example that participants heard used a grammar structure that was similar to the target structure and made explicit mention of the relationship between the case and its meaning. A high degree of regularity was noted in participant usage of metalinguistic information about the noun case that suggested their responses might have been primed by the example. To minimize any influence, the sample think-aloud protocol was demonstrated using a grammar structure that was different from the target structure—specifically, an example using the preterit was given—and no mention was made of cases, prepositions, or articles.

The final change to the procedures that occurred as a result of the second pilot was the amount of time participants were allowed to respond during the listening task of the post-test. In the original design, they were allowed 30 seconds, but during the analysis of the protocols, it was noted that all participants finished within 12 seconds. The time was then adjusted to only 15 seconds, allowing sufficient time to answer while limiting the possibility of a participant rethinking and changing his or her answers.

The coding scheme developed for the second pilot was also abandoned and a simpler scheme was developed that would allow for different trends in the data to be noticed. Analysis of the protocols suggested that some participants had a faulty understanding of the German case system, which resulted in difficulty interpreting the meaning of two-way prepositions.

3.3. The two main studies

After the procedures and materials had been tested in the pilot studies, two separate main studies were conducted. Problems encountered with the testing instruments used in the first study resulted in changes and a second study was conducted incorporating those changes. Both studies used the same intervention materials and the same procedures. While the first main study could have been designated as a third pilot, insights gained from the data collected, along with similar trends seen in both main studies warranted treating it as a separate main study. The materials and procedures used for both as well as the differences between the two will be discussed in the following section.

3.3.1. Human Subjects Committee Approval

Approval was obtained for both pilots and the two studies. Consent forms were administered for the first and second pilot. For the two main studies, a consent form waiver was granted because the study was conducted in the course of regular classroom instruction, all testing materials were presented as in-class exercises, and the study presented no risk to the participants. The consent waiver permitted data collection from a larger number of participants.

3.3.2. Participants

Participants for the first study were drawn from two intact sections of a second-semester German course during the Fall semester of 2012 and four sections of the same course from the Spring semester of 2013. The participants for the second study were drawn from four intact sections of a second-semester German course during the Spring semester of 2014 at the University of Kansas. The participants reflect the demographic distribution of the university's undergraduate population. The instructors for each section were graduate teaching assistants and all sections

used the same textbook—the 6th edition of *Deutsch: Na klar!* (Di Donato, Clyde & Vansant, 2012)—and followed the same syllabus.

3.3.3. Screening of Participants

A questionnaire was administered to determine the language learning experience of the participants (see Appendix F). Results from the questionnaire were used to limit participants to those whose L1 is English and who have had no more than the equivalent of one semester of university-level German. This is intended to mitigate possible effects from prior language learning experience. Prior to treatment, all sections were administered a pre-test that was used both to screen potential participants and to provide an initial measure for statistical comparison to the post-test. Potential participants scoring 60% or higher on the pre-test were assumed to have prior knowledge of the target form and were excluded from the study.

3.3.4. Assignment of Participants

Each section was assigned to one of two groups: one, designated -LC (n=11), was provided exercises where the redundant lexical cue (i.e. the verb) was removed from each item (see Appendix G), whereas the second group, designated +LC (n=10), was provided exercises where the redundant lexical cue (i.e. the verb) was provided (see Appendix H). Participants who took both the pre- and post-test, but were not present for the intervention, were assigned to a control group (n=3).

3.3.5. Materials

The materials used in this study included written pre- and post-tests, presentation materials used during the interventions, and exercises used in class during the interventions. All materials were

tested during the pilot studies and appropriate changes were made based on observations made from the pilot studies.

3.3.5.1. Pre- and Post-tests

A pre-test + treatment + post-test design was employed for this study. The testing scheme developed for the second pilot was used in the study and the test design and rationale for the design is described above in section 3.2.2. Vocabulary items for the test were drawn from the current and previous chapters in the course textbook (Di Donato, Clyde & Vansant, 2012) and were limited to the items practiced in the exercises during the treatment.

The test contained two sections: a listening interpretation task and a reading interpretation task. For the listening task, participants listened to a sentence being read and chose whether the sentence indicates a destination, a location, or neither. Target nouns were limited to either neuter (*das*, accusative; *dem*, dative) or feminine (*die*, accusative; *der*, dative) in order to avoid the possibility of confusing the masculine articles (*den*, accusative; *dem*, dative), which are often difficult for learners to distinguish because of their similar sounds.

The listening task consisted of 15 items, 3 of which were distractors. The reading task consisted of 12 items, two of which were distractors. The distractors for both tasks used other types of prepositions that indicate neither location nor destination and only require one case.

3.3.5.2. Differences between the two studies

During the analysis of the protocols from the first study, it was discovered that there was an imbalance of gender and case markings in the listening task. For example, one post-test contained two feminine dative and two feminine accusative target items while the other post-test contained three feminine dative and one feminine accusative target items. Both tests also contained a single masculine plural target item that appears to have caused some confusion. The

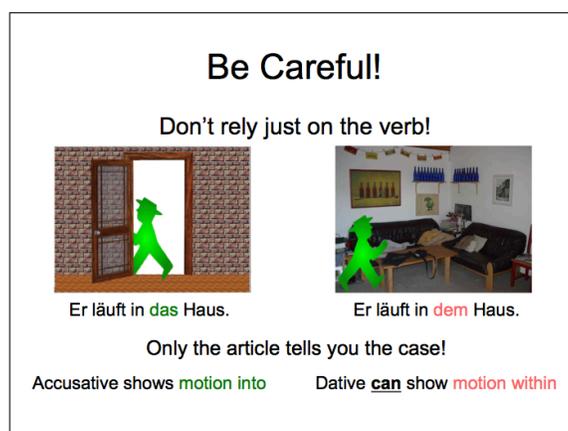
listening task was completely rewritten to include the same number of singular feminine and neuter items in both accusative and dative cases.

A significant problem was also discovered with the reading task developed for the first study. By asking the participants to select one of three choices, the task became a production task rather than an interpretation task, meaning that it did not answer the first research question about whether removing redundant lexical cues increased learner interpretation of the target form. Because the participants were required to select a given article, it was also difficult to determine if they were actually attending to the article, or simply reading them while trying to make a choice. The reading task was redesigned to make it an interpretation task and to make it more similar to the listening task, including reusing a significant portion of the vocabulary used in the listening task. Participants were given one sentence and a set of two pictures and asked to determine which of the two pictures corresponds to the sentence. This design ensures that participants are interpreting the input rather than trying to produce a sentence. It also limits their attention to a single prepositional object, which should allow for a greater possibility of determining whether or not they are attending to the case of the article rather than the verb for their interpretation.

3.3.5.3. Explicit Information

Both groups received the same explicit information about the target grammar form and the same explicit information about a possible faulty strategy they might rely on that could lead them away from processing the target form. To provide this information, all participants were shown the following slide during the intervention:

Figure 4: Explicit Information Slide



Ampelmann and door images are Public Domain
 Wohnzimmer by capl@washjeff.edu CC BY-NC-SA

The applicable principle is the Lexical Preference Principle (LPP), which states that learners will process lexical items before they process redundant grammatical forms that encode the same information as the lexical items. The lexical cue that participants may rely on in relation to this target form is the verb, especially verbs of motion. Participants in both groups were informed that they might try to rely on the verb to interpret the input, but that they need to pay attention to the case of the prepositional objects in order to properly interpret the input. The slide used animation to demonstrate the fact that the verb can show both motion into (the figure on the left moves through the open door) or motion within (the figure on the right moves across the picture of / inside the living room.) The instructors were asked to stress the fact that participants would need to rely on the case of the article in the prepositional phrase to correctly interpret the sentences, rather than relying on the verb.

3.3.5.4. Exercises

A second principle that may also affect learner attention to the target form is the sentence position principle, which states that learners tend to process items in initial position first, then

items in final position, while items in medial process are processed last. Participants were not informed about this principle, but it was a factor in how the exercises for the -LC group (see Appendix G) are structured: tasks were formatted in a way that allows the target items to be in initial position, increasing their salience by making them the first item participants will process.

In order to avoid possibly overloading the participants, the initial presentation and immediate follow-up exercises were restricted to only one of the nine two-way prepositions (*in*). All nine of the prepositions were introduced in a later exercise, but the studies focused primarily on *in*. Another change made between the first and second studies involved the gender of the target items. In the second study, the objects of the preposition were restricted to neuter nouns. This differs from the first study, where masculine nouns were chosen because they show inflection in both accusative and dative cases. Analysis of the protocols from the first study suggested participants had difficulties with the case system, so a simplification of the input seemed to be in order. Neuter nouns were chosen since they only show inflection in the dative case, which simplifies the input, ensuring participants are exposed to only one change rather than multiple changes. Exposure to the remaining prepositions and genders occurred later in the treatment, after participants had time to practice the basic concepts.

Both groups received the same number and type of exercise tasks. As with the test, vocabulary items were drawn from the participants' active vocabulary from the current chapter in the course textbook (Di Donato, Clyde & Vansant, 2012) as well as items from previous chapters. To ensure equivalent exposure, exercises for both groups used the same vocabulary set and differed only in formatting. Exercises for the -LC group (Appendix G) were formatted in such a way as to remove verbs and to make the target form more salient, whereas the exercises for the +LC group (Appendix H) contained verbs and did not have any special formatting.

Exercises consisted of two basic types: referential and affective. Referential exercises (see Appendices D and E, Aktivität 1a – 3) have only one correct answer and are intended to focus on learning the meaning of the target form. Affective exercises (Appendices D and E, Aktivität 4a – 5) are open-ended in that they require some form of judgment, opinion, or observation on the part of the participant. Successful completion of affective exercises requires the participant to already have an understanding of the meaning of the target form. Because the focus of the study is on the structuring and presentation of *input*, the exercises consisted solely of interpretation tasks and did not include any production tasks.

3.3.6. Procedures

The treatment was conducted in the course of regular classroom instruction, during each section's regularly scheduled class time, at a time in the semester when the approved syllabus and textbook called for instruction in the target form. In order to minimize distraction in the classroom during the treatment, each section's regular instructor provided the treatment. Instruction was given over a two-day period, each session lasting approximately 50 minutes, with the post-test administered at the end of the second day of instruction. Instructors were informed in advance about the purpose of the study and were provided guidance on how to administer the treatment. The principle investigator observed the instructors in two of the four sections on the first day and all four sections on the second day of instruction. The sessions were not recorded, but no major differences were noted in the instruction or the administration of either the exercises or tests.

Instruction on the first day was conducted in each section's regular classroom and consisted of explicit instruction introducing the target form followed by the referential exercises (see Appendices D and E, Aktivität 1a – 3). The second day of instruction was conducted in a

computer lab. Due to inclement weather, both days of instruction were delayed by two days, but the sections were scheduled to meet in the computer lab that week, so the intervention days simply represented a shift in their regular schedule. The affective exercises (Appendices D and E, Aktivität 4a – 5) were completed at the beginning of the second day and the post-test (Appendices A and B) was administered during the second half of the session.

During the post-test, think-aloud protocols were collected from the participants as they attempt each task. Audio equipment available in the lab was used to administer the listening portion of the test (see Appendices A and B) and to record the think-aloud protocols for both tasks. As they completed each item, participants were asked to verbalize their thoughts about what leads them to make their choices. Prior to administration of the post-test, participants were instructed on what is expected of them during the test and were provided with an example of a think-aloud protocol (see Appendix C). Following the first study, it was noted that no time was given for the participants to practice thinking aloud, so three practice sentences were added prior to the start of the post-test with reminders of instructions given after each.

3.4. Think-aloud protocols

Think-aloud protocols were employed as a way of discovering details about the participants' understanding of the target form that would not be easily noticed from test answers alone. This section describes their use in SLA research, their employment in this study, and caveats regarding their use.

3.4.1. Use in SLA

Think-aloud protocols have been used extensively in psychology and other fields of cognitive research, and are growing in popularity in SLA research. A number of SLA studies have successfully used these protocols (e.g. Leow & Morgan-Short, 2004; Rosa & Leow, 2004; Rosa

& O'Neill, 1999; Rossomondo, 2007), and several studies have examined their applicability and validity within the scope of SLA research (e.g. Bowles, 2008, 2010a, 2010b; Ellis & Barkhuizen, 2005; Leow, 2001b). A growing number of researchers point out the benefits of including various types of verbal reports, including think-aloud protocols. Leow and Morgan-Short (2004) insist, for example, that they provide “a more robust type of data that cannot be obtained through pretest + treatment + posttest research methodology” (p. 37), the very methodology that happens to be dominate in PI research. In another study, Leow (2001a) mentions, “Offline measures can only infer whether learners paid attention to targeted forms in the input, offering a coarse-grained measurement of attention” (p. 499).

3.4.2. Use in Processing Instruction

Qualitative measures have also been successfully employed in PI research, but only in a limited manner. Culman, Henry, & VanPatten (2009), for example, provided participants with a questionnaire following the treatment asking if they had used any “tricks” to interpret the sentences. The authors reported that 20 participants from the group receiving both EI and SI stated they used the target definite article to interpret the sentences, while only three from the SI-only group reported doing so (pp. 28-29). The authors point out that the results may not be reliable as they believe the participants in the SI-only group may not have understood what was meant by tricks (p. 29). Bowles (2010a) also points out that there is a potential that reports taken after the fact may not be an accurate reflection of the thoughts the participants had during the task as they may have difficulty remembering what they were thinking (p. 14).

3.4.3. Use in Current Study

The present study seeks to obtain similar information using online measures during the post-test to capture the participants' thought processes at the same time they were interpreting the target

sentences. Bowles (2010a) notes that according to Ericsson and Simon (1993), “concurrent reports will be more complete and accurate (veridical) than retrospective reports, since participants who think aloud during a task are not subject to memory decay” (p. 113). Given the veridicality issue that arises with retrospective measures, online measures were used in this study during the post-test, rather than offline measures, to capture the participants’ thought processes at the same time they were completing the post-test tasks.

According to Rossomondo (2007): “[T]he employment of think-aloud protocols enables researchers who work within the input processing framework to address the variation that exists between individual learners with respect to comprehension and processing of a new form in the input” (p. 61). Use of think-aloud protocols in the second pilot and both studies revealed various problems that could have been intervening variables in the quantitative data, including evidence of a lack of familiarity with case markings, and personal difficulties that participants were experiencing, such as fatigue and anxiety, which relate directly to participant inattention and attitude as described by Mackey and Gass (2005). Another possible intervening variable is that participants may give a correct answer for the wrong reasons, and one such case was discovered during the second pilot. The use of think-aloud protocols in this study should reveal any faulty reasoning that would not be uncovered by the quantitative data alone or possible causes of variation between learners in the acquisition of two-way prepositions.

3.4.4. Effects of verbalization

Think-aloud protocols and other verbal reporting measures have been the subject of some controversy in SLA research, however. Leow (2001a) points out that one way a learner’s internal processes may be affected is by the additional cognitive load that think-aloud protocols may introduce, though he does emphasize that this limitation is not supported empirically (p. 115).

Leow and Morgan-Short (2004) also cite research that suggests, “By thinking aloud, participants’ internal processes may differ from what they would have been had they not performed the verbalization” (p. 38). Bowles (2010) further acknowledges the criticism that “verbalization ... imposes an additional load on the subjects” (p. 14) and also that verbalization may alter the participants’ cognitive processes, with the potential result that protocols will not accurately reflect their thoughts.

This effect that verbalization may have on participant task performance, known as reactivity, has been investigated in a number of studies. Bowles (2010a) conducted a meta-analysis of 9 studies (Leow and Morgan-short (2004); Bowles and Leow (2005); Polio and Wang (2005); Sachs and Polio (2007); Sachs and Suh (2007); Rossomondo (2007); Bowles (2008); Yoshida (2008); Sanz et al (2009)) that specifically examined their use in the context of SLA. She summarizes her meta-analysis, stating the major finding to be that:

[T]hinking aloud while completing a verbal task has a small effect on post-task performance. In other words, compared to participants completing the same tasks silently, participants who think aloud tend to perform only slightly better or slightly worse on post-tests (p. 110).

In particular, she notes that “in 86 percent of the effect size calculations, the 95 percent confidence interval overlaps zero, indicating that the *d* value is not significantly different from zero. This finding suggests that verbal reports can reliably be used as a data collection tool” (p. 138).

3.4.5. Reactivity considerations for the current study

The arguments presented in Rosa and O’Neill (1999) as well as Leow and Morgan-Short (2004) against the use of think-aloud protocols appear to be directed against their use in conjunction with learning tasks and the main concern is possible interference with the learning process. It is worth noting that in the present study, the protocols are not used during the learning process, but

in the post-test phase. Although their use occurs after the learning tasks are complete, some of these concerns may still be relevant, though any effect should be rather small. Rosa and O'Neill (1999), for example, mention one possible effect that may be relevant to this study: "Concurrent think-aloud protocols could very well induce some learners to perform in a more systematic manner than they would otherwise" (p. 519).

Bowles (2008) found no reactivity for both non- and metalinguistic protocols during a problem-solving task (p. 376). In addition, Bowles (2010) points out that "verbalizations that include additional reasoning or justifications that would not normally figure into the normal solution process...are more likely to be reactive, or to affect task performance" (p. 113). Since the participants in the present study are asked to explain why they make their choices, their reports are certainly metalinguistic; the question is whether their justifications are a part of their normal processing or not; a question that likely cannot be adequately answered. Bowles (2010) also notes that justifications or explanations that are a normal part of the problem-solving process should not affect participants' accuracy on the task (p. 64).

Despite the possibility of reactivity, think-aloud protocols are still taken in this study to be a valuable tool for data collection. Rosa and O'Neill (1999) note, "It is only possible to make claims regarding learner's internal processes when there is evidence of such processes" (p. 519). Ellis (2004) concurs, arguing that think-aloud protocols can provide valuable insight into "what kinds of explicit knowledge learners exploit and in what ways" (p. 268). Bowles (2010) argues in favor of the value that think-aloud protocols add to research, stating: "If researchers simply infer what learners are thinking about based on their production data, they risk missing at least part of what is really going on as learners process and produce a second language" (p. 8).

The major effect noticed in Rosa and Leow (2004) was that participants doing concurrent verbal reports spent more time on task when compared to participants that were not tasked with verbal reports. However, the second pilot and both studies showed that participants were able to complete the listening tasks well within the time given while also doing concurrent verbal reports and with little to no difficulty. As such, this study holds that the benefits of using the protocols will outweigh any possible negative effects.

3.4.6. Coding method

The protocols were transcribed and then coded to look for evidence for the degree to which the participants were attending to the target article and whether or not they had accurately mapped each target case (accusative or dative) to the appropriate meaning (direction / “into”; location / “in”). The protocols were also analyzed for evidence of any intervening variables that may have affected the quantitative analysis.

3.4.6.1. Coding scheme

Each protocol was coded for three elements: Article (A), Case (C), and Meaning (M). Each element was given a numerical value: 0 if the element was not present, 1 if the element was present but incorrect, 2 if the element was both present and correct. In the case of the Article element, the participant had to demonstrate that he or she was attending to the target article by explicitly mentioning the article in a way that made it clear he or she was attending to the target article. For the Case element, the participant had to explicitly state the case of the target article. For the Meaning element, the participant had to either explicitly state the meaning of the case (accusative = destination / “into”; dative = location / “in”) or describe the prompt in a way that showed a clear connection between case and meaning.

3.4.6.2. Coding examples

The following three excerpts demonstrate how the coding scheme is applied to actual protocols. All three are taken from the listening task of the post-test during the second study. Prompt is the sentence that the participant heard and Protocol is the participant's recorded response that he or she made while marking the answer sheet:

Excerpt 3-1:

| | | | |
|--------------|--|-------|-------|
| Participant: | 14S1 | | |
| Task: | Listening | | |
| Prompt: | <i>Heidi läuft in der Küche</i> | | |
| Response: | Well, it was <i>der</i> , so that's dative, therefore it's <i>in</i> | | |
| Coding: | A = 2 | C = 2 | M = 2 |

In this example, the participant explicitly states the correct target article (A=2), showing that she is attending to it, assigns the correct case to the target article (C=2), and assigns the correct meaning to the case (M=2).

Excerpt 3-2:

| | | | |
|--------------|---|-------|-------|
| Participant: | 14S11 | | |
| Task: | Listening | | |
| Prompt: | <i>Bello läuft in der Wohnung</i> | | |
| Response: | läuft in der... <i>der</i> is accusative, so it's going to be <i>into</i> | | |
| Coding: | A = 2 | C = 1 | M = 2 |

In this example, the participant correctly identifies the target article (A=2) but assigns the incorrect case to the article (C=1). The meaning is coded 2 (M=2), however, because he assigned the correct meaning to the case that he stated, even though it is the wrong case for the article.

Excerpt 3-3:

| | | | |
|--------------|--------------------------------|-------|-------|
| Participant: | 14S10 | | |
| Task: | Listening | | |
| Prompt: | <i>Heidi fährt in das Dorf</i> | | |
| Response: | <i>das</i> is into | | |
| Coding: | A = 2 | C = 0 | M = 2 |

In this example, the participant explicitly states the correct target article (A=2), but does not explicitly state the article's case (C=0). She does, however, state a meaning (*into*). Despite the lack of a case in the protocol, M is still coded 2, since it is the correct meaning for the case of the target article. The assumption made here is that a correct assignment of meaning is due to a correct assignment of case, with the understanding that an examination of the participant's overall trends may suggest otherwise.

3.4.7. Inter-rater reliability

To determine reliability of the coding and to mitigate the effects of researcher bias, the principal investigator and two independent raters coded the same subset of the participant responses. The codes for all three raters were compared using an online reliability calculator developed by Freelon (<http://dfreelon.org/utills/recalfront/recal3/>). Verification of the online calculator's reliability is described in Freelon (2010).

One independent rater holds a PhD in German Applied Linguistics and is an expert, non-native speaker of German. The second rater was a fellow PhD candidate in German Applied Linguistics with the principal investigator and also an expert non-native speaker of German. Both raters have extensive experience teaching German to non-native speakers and have taught the same curriculum taught to the study's participants.

Due to their knowledge of the language, the target grammar structure, and Applied Linguistics, both independent raters are considered competent and trustworthy collaborators. Their status as non-native speakers who have taught this grammar structure further enhances their qualification as they are familiar with the difficulties that students have with the structure as well as the nuances of the students' utterances in the protocols.

3.4.7.1. First round

Ten percent of the responses from each task for both test groups were randomly selected for coding. This percentage is considered to be a sufficient portion of the overall data by Mackey and Gass (2005) when objective and low-inference coding schemes are used. The responses from each group and each task were selected using a sequence of numbers generated by the random number generator (www.random.org/sequences/). Both raters were then sent instructions for coding the responses (see Appendix K).

The codings were submitted to the online reliability calculator with the following results:

- Average pairwise agreement: 94.152%
 - Pairwise agreement, coders 1 and 3: 96.491%
 - Pairwise agreement, coders 1 and 2: 92.982%
 - Pairwise agreement, coders 2 and 3: 92.982%
- Fleiss' Kappa: 0.867
 - Observed agreement: 0.942
 - Expected agreement: 0.559

Fleiss' Kappa is a variation of Cohen's Kappa that accounts for multiple raters. According to Viera and Garrett (2005, p. 362), the value of 0.942 demonstrates "almost perfect agreement" between raters.

3.4.7.2. Second round

After the initial round of coding, however, it was noted that a distinction needed to be made in the coding between a participant clearly attending to the target article and the participant simply reading the test item during the reading task. For example, in excerpt 3-4, although the

target article is explicitly stated, it is not clear if the participant is attending to the target article as he does not single it out from the rest of the utterance in any way.

Excerpt 3-4:

| | | | |
|--------------|--|-------|-------|
| Participant: | 14S10 | | |
| Task: | Reading | | |
| Prompt: | <i>Der Vogel fliegt in der Schule</i> | | |
| Response: | <i>Der Vogel fliegt in der Schule, B</i> | | |
| Coding: | A = 2 | C = 0 | M = 2 |

Due to this change, a second set of protocols was randomly selected, again equaling ten percent of the total number for each task in both groups. The same raters were asked to code the new set at the same time as the principle investigator.

The codings for the second round were submitted to the same online reliability calculator with the following results:

- Average pairwise agreement: 95.322%
 - Pairwise agreement, coders 1 and 3: 95.322%
 - Pairwise agreement, coders 1 and 2: 94.737%
 - Pairwise agreement, coders 2 and 3: 95.906%
- Fleiss' Kappa: 0.891
 - Observed agreement: 0.953
 - Expected agreement: 0.569

According to Viera and Garrett (2005, p. 362), the value of 0.891 demonstrates “almost perfect agreement” between raters.

The high rate of agreement between the independent raters established confidence in the rating procedures. The primary investigator then coded the remaining responses using the described coding procedure.

3.5. Summary

Materials used during the intervention to teach the target grammar form were piloted prior to the main experiments in order to ensure they were appropriate for each experimental condition and that they were uniform in their presentation across conditions. Pre- and post-tests were designed as data collection instruments to be used for quantitative analysis to show gains in learning. They were also piloted and refined in order to ensure their reliability and validity. Finally, think-aloud protocols were designed and piloted in order to capture qualitative data that could provide insights not normally deducible from quantitative analysis. The procedures for employing and coding these protocols were also tested and found to be reliable. Analysis of the data collected using these methods will be discussed in the next chapter.

Chapter 4: Results

4.1. Introduction

In this chapter, the data analysis results are presented. A mixed-methods approach is used to answer each of the research questions. First, a quantitative analysis is performed on the aggregate data to determine if the presence or absence of redundant lexical cues made a difference in learner acquisition of the target form. Pre- and post-test scores are compared within and between groups and statistical analyses are presented to show how significant the differences are between the sets of data.

Following this, qualitative analysis of the think-aloud protocols is considered. Individual protocols are presented in excerpts and are discussed to reveal noteworthy details that provide insight into factors affecting the learners' acquisition of two-way prepositions. Where possible, protocols from different participants are compared to highlight trends that may show evidence of generalizable patterns of behavior.

4.2. Analysis of the raw test scores and gains

This section reports the results in response to Research Question 1: Does removing redundant lexical cues from the input lead to greater gains in learner interpretation of German two-way prepositions than if the cues are included in the input? This question is answered by comparing participant scores on the post-test and participant gains from the pre- to the post-test. Scores for the first and second data collections are combined (first study) as they incorporate the same pre- and post-tests. Scores for the third data collection (second study) are considered separately due to the changes made in the pre- and post-tests.

4.2.1 Method of Analysis

Participant responses on the answer sheets were scored 1 point per correct answer and 0 points per incorrect answer. The means for each group were then calculated for both the listening and reading tasks on the pre- and post-tests. A breakdown by participant of the scores for both tests is given in Appendix J.

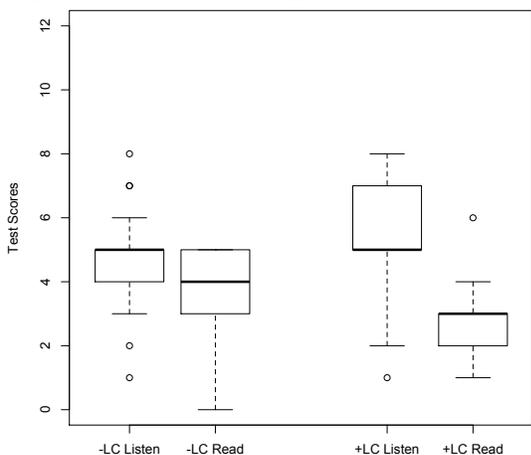
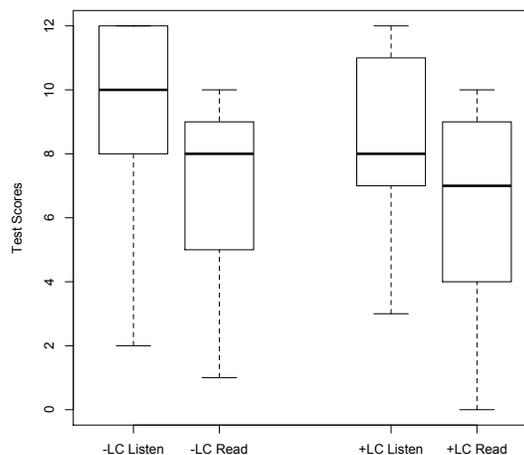
For all comparisons, the statistics programs R (Version 3.1.2; R Core Team, 2013) and StatPlus®:mac LE (Version 2009; 2009) were used with $\alpha = .05$. Effect sizes were calculated as Hedges' g on the basis of means, standard deviations, and number of participants using Ellis' Effect Size Calculators (<http://www.polyu.edu.hk/mm/effectsizefaqs/calculator/calculator.html>).

The null hypothesis in all comparison tests is that there is no difference between the two test groups. Because of the low number of participants ($n=3$) in the Control group for the second study, the group's scores were not included in the statistics. The independent variable in all comparisons is the treatment group (+/-LC). The dependent variable is the score on each task, except in the comparison of gains, where it is the difference in the score between the pre- and post-test. Descriptive statistics for the first study are shown in Table 4-1 and box plots of the pre-test and post-test scores in Figures 4-1 and 4-2. Descriptive statistics for the second study are shown in Table 4-2 and box plots of the scores for the second study in Figures 4-3 and 4-4.

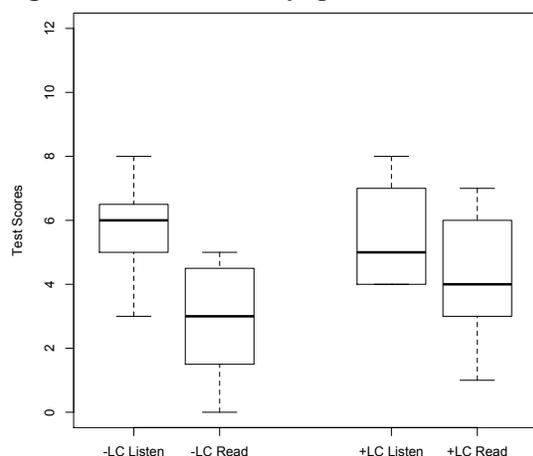
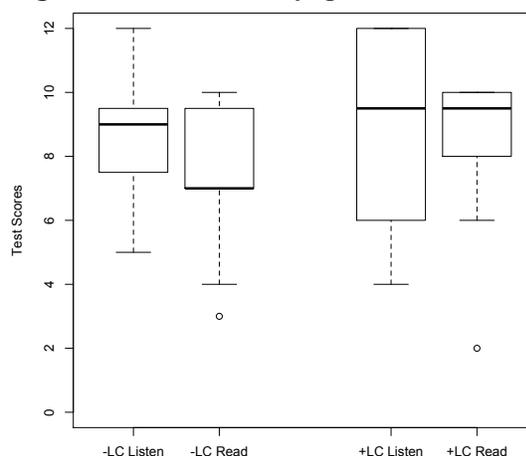
Table 4-1: Descriptive statistics of all data sets, first study

| | | Pretest | | Post test | |
|-----------|-------------------|---------|---------|-----------|---------|
| | | -LC | +LC | -LC | +LC |
| Listening | N | 21 | 22 | 21 | 22 |
| | Mean ¹ | 4.6 | 5.5 | 9.6 | 8.5 |
| | SD | 1.69031 | 1.73829 | 2.53922 | 2.63181 |
| | SE | 0.36886 | 0.37060 | 0.55410 | 0.56110 |
| | Reading | N | 21 | 22 | 21 |
| | Mean | 3.6 | 2.9 | 7.0 | 6.5 |
| | SD | 1.53219 | 1.04550 | 2.99126 | 2.92326 |
| | SE | 0.33435 | 0.22290 | 0.65275 | 0.62324 |

1. Maximum score for the Listening task = 12; for the Reading task = 10.

Figure 5: First Study, pre-test scores**Figure 6:** First study, post-test scores**Table 4-2:** Descriptive statistics of all data sets, second study

| | | Pretest | | Post test | |
|-----------|---------|---------|---------|-----------|---------|
| | | -LC | +LC | -LC | +LC |
| Listening | N | 11 | 10 | 11 | 10 |
| | Mean | 5.7 | 5.7 | 8.7 | 9.2 |
| | SD | 1.48268 | 1.55242 | 2.00413 | 2.82135 |
| | SE | 0.46887 | 0.51747 | 0.63376 | 0.94045 |
| | Reading | N | 11 | 10 | 11 |
| | Mean | 3.0 | 4.3 | 7.4 | 8.3 |
| | SD | 1.70561 | 2.05183 | 2.22681 | 2.45153 |
| | SE | 0.53936 | 0.68394 | 0.70418 | 0.81718 |

Figure 7: Second study, pre-test scores**Figure 8:** Second study, post-test scores

Prior to submitting the data to comparison tests, the scores for each task on each test were tested for normal distribution using a Shapiro-Wilk test. Two data sets in the second study were found to lack normal distribution: +LC Listening, pre-test ($W=0.84$, $p=0.04414$) and +LC Reading, post-test ($W=0.7292$, $p=0.001992$). Because of this and the low sample sizes for all groups (First study: -LC $n=21$, +LC $n=22$; Second study: -LC $n=11$, +LC $n=10$), a non-parametric t -test (Mann-Whitney-Wilcoxon) was used for all comparisons.

4.2.2. Comparison of Results of the Pre-test

The scores of each task on the pre-test were compared to ensure that both groups were equal prior to the treatment. The results of the comparison are shown in Tables 4-3 and 4-4:

Table 4-3: Comparison of pre-test task scores, first study

| Task | <u>U</u> | <u>95% CI</u> | <u>p</u> |
|-----------|----------|---------------|----------|
| Listening | 308 | [0, 4] | 0.06206 |
| Reading | 228 | [-2, 2] | 0.9511 |

Table 4-4: Comparison of pre-test task scores, second study

| Task | <u>U</u> | <u>95% CI</u> | <u>p</u> |
|-----------|----------|---------------|----------|
| Listening | 58 | [-2, 2] | 0.8573 |
| Reading | 36 | [-3, 1] | 0.1871 |

Comparison of the scores shows a trend toward significance in the listening task for the first study and scores for the reading task favors the +LC group over the -LC group in the second study, but since the differences are not statistically significant, both the -LC and +LC groups in both studies are considered equal prior to the intervention.

4.2.3. Comparison of Results of the Post-test

A comparison of the scores for each task on the post-test shows if there is any difference between the -LC and +LC groups after the treatment (Tables 4-5 and 4-6).

Table 4-5: Comparison of post-test task scores, first study

| <u>Task</u> | <u>U</u> | <u>95% CI</u> | <u>Hedges' g</u> | <u>p</u> |
|-------------|----------|---------------|--------------------|----------|
| Listening | 293 | [0, 3] | 0.4174 (small) | 0.1295 |
| Reading | 267 | [-1, 2] | -0.3768 (small) | 0.384 |

Table 4-6: Comparison of post-test task scores, second study

| <u>Task</u> | <u>U</u> | <u>95% CI</u> | <u>Hedges' g</u> | <u>p</u> |
|-------------|----------|---------------|----------------------|----------|
| Listening | 46.5 | [-3, 2] | -0.1998 (trivial) | 0.5657 |
| Reading | 39 | [-3, 1] | -0.3699 (small) | 0.258 |

The results show that there is no statistically significant difference between groups on either task. A comparison of the means for both tasks again favors the +LC group in the second study, but the differences are not statistically significant.

4.2.4. Comparison of participant gains from pre- to post-test

Two types of gains from the pre-test to the post-test were measured: one within groups to ensure that each group did in fact improve after the treatment, and one between groups to

compare the amount of improvement between experimental conditions. To determine if the improvement within groups was significant, means of the post-test scores were compared to the means of the pre-test scores using non-parametric *t*-tests (Mann-Whitney-Wilcoxon). The results of the within-groups comparison are shown in Tables 4-7 and 4-8.

Table 4-7: Comparison of scores from pre- to post-test within groups, first study

| | | <u>-LC</u> | <u>+LC</u> |
|-----------|------------------|------------|------------|
| Listening | N | 21 | 22 |
| | U | 27 | 87 |
| | 95% CI | [-7, -4] | [-5, -2] |
| | Hedges' <i>g</i> | -1.6372 | -1.4732 |
| | <i>p</i> | 0.00000105 | 0.0002335 |
| Reading | N | 21 | 22 |
| | U | 74 | 58.5 |
| | 95% CI | [-5, -2] | [-5, -2] |
| | Hedges' <i>g</i> | -2.1302 | -1.6960 |
| | <i>p</i> | 0.0002061 | 0.000014 |

Table 4-8: Comparison of scores from pre- to post-test within groups, second study

| | | <u>-LC</u> | <u>+LC</u> |
|-----------|------------------|------------|------------|
| Listening | N | 11 | 10 |
| | U | 14.5 | 16.5 |
| | 95% CI | [-5, -1] | [-7, -1] |
| | Hedges' <i>g</i> | -2.2719 | -1.3212 |
| | <i>p</i> | 0.002561 | 0.01169 |
| Reading | N | 11 | 10 |
| | U | 10 | 11.5 |
| | 95% CI | [-6, -2] | [-7, -2] |
| | Hedges' <i>g</i> | -1.5154 | -1.5665 |
| | <i>p</i> | 0.0009063 | 0.003654 |

The results show that the differences between the pre- and post-test for each group in each task are very significant. According to Ellis (2009) the effect sizes (Hedges' *g*) for all eight

measurements are classified as very large, suggesting that the treatments teaching the target grammar structure were a major factor in the gains made by both groups.

To compare the amount of improvement between the -LC and +LC groups, gains from the pre-test to the post-test for each participant were measured by subtracting the pre-test score from the post-test score for each task. The descriptive statistics for the first study are shown in Table 4-9 and box plots of the gains in Figures 4-5 and 4-6. The descriptive statistics for the second study are shown in Table 4-10 and box plots of the gains in Figures 4-7 and 4-8.

Table 4-9: Descriptive statistics of the gains (Post-test – Pre-test), first study

| | | <u>-LC</u> | <u>+LC</u> |
|-----------|------|------------|------------|
| Listening | N | 21 | 22 |
| | Mean | 5.05 | 3.00 |
| | SD | 3.10606 | 3.62531 |
| | SE | 0.6778 | 0.77292 |
| Reading | N | 21 | 22 |
| | Mean | 3.43 | 3.5 |
| | SD | 3.51527 | 3.17355 |
| | SE | 0.7671 | 0.6766 |

Figure 9: First study, Listening task gains

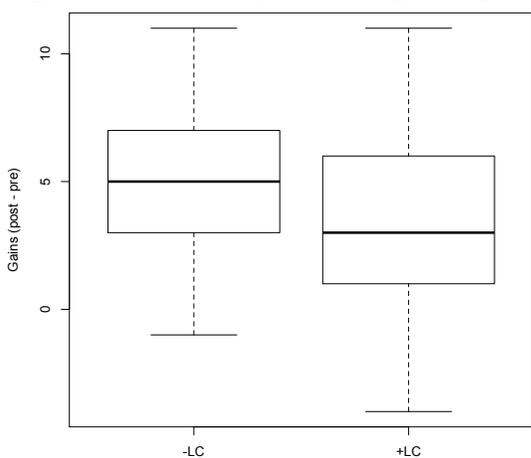


Figure 10: First study, Reading task gains

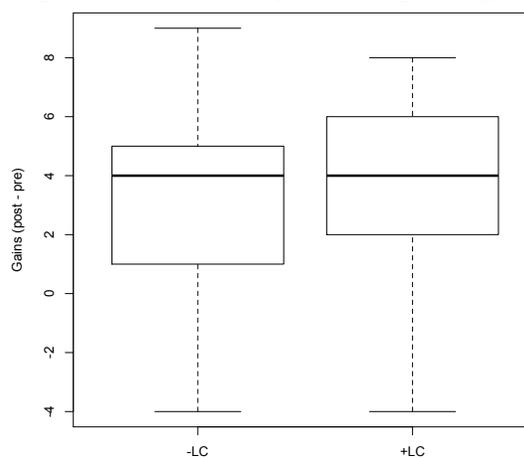
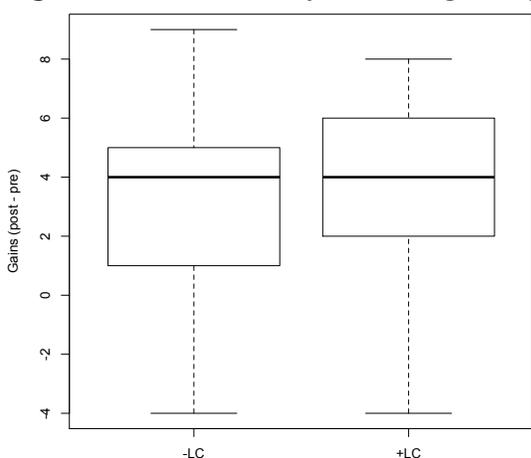
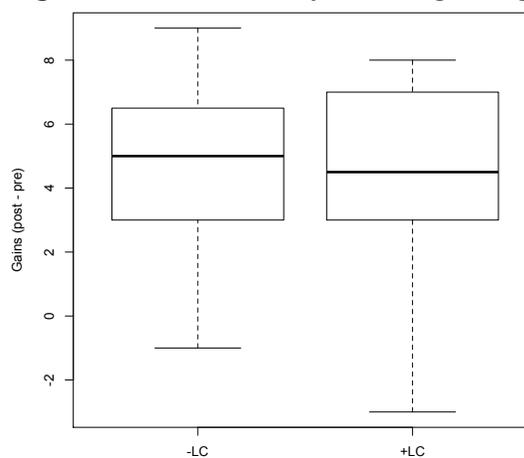


Table 4-10: Descriptive statistics of the gains (Post-test – Pre-test), second study

| | | <u>-LC</u> | <u>+LC</u> |
|-----------|------|------------|------------|
| Listening | N | 11 | 10 |
| | Mean | 3 | 3.5 |
| | SD | 2.82843 | 2.95334 |
| | SE | 0.8528 | 0.93393 |
| Reading | N | 11 | 10 |
| | Mean | 4.36 | 4 |
| | SD | 3.23335 | 3.66903 |
| | SE | 0.97489 | 1.12546 |

Figure 11: Second study, Listening task gains**Figure 12:** Second study, Reading task gains

Resulting gains from each task for each group were submitted to a Shapiro-Wilk normality test to check for normal distribution and all four conditions for both studies were found to be distributed normally. Parametric *t*-tests (Welch two-sample) were then used to compare the means of the gains for each task between groups (Tables 4-11 and 4-12).

Table 4-11: Comparison of the means of the gains, first study

| <u>Task</u> | <u>t</u> | <u>df</u> | <u>95% CI</u> | <u>Hedges' g</u> | <u>p</u> |
|-------------|----------|-----------|---------------|----------------------|----------|
| Listening | 1.9572 | 40.526 | [-0.07, 4.17] | 0.6114 (medium) | 0.05724 |
| Reading | -0.1131 | 40.353 | [-2.2, 1.97] | -0.0353 (trivial) | 0.9105 |

Table 4-12: Comparison of the means of the gains, second study

| <u>Task</u> | <u>t</u> | <u>df</u> | <u>95% CI</u> | <u>Hedges' g</u> | <u>p</u> |
|-------------|----------|-----------|---------------|---------------------|----------|
| Listening | -0.3953 | 18.617 | [-3.15, 2.15] | -0.166 (trivial) | 0.6971 |
| Reading | 0.2442 | 18.3 | [-2.76, 3.49] | 0.1002 (trivial) | 0.8098 |

The results show a trend toward significance for the Listening task of the first study, with the means favoring the -LC group, but no statistically significant difference between the two groups for each task in either study.

4.2.5. Summary of the aggregate results

The lack of statistically significant differences between the two groups in the post-test and gains analyses allows us to accept the null hypothesis that there is no difference between the two test groups, both of which significantly improved from the pre-test to the post-test. The small and trivial effect sizes in most of the between-groups analyses also suggest that the independent variable (+/-LC) had a negligible effect on the dependent variable (test scores). The trend toward significance in the Listening task of the -LC group from the first study may be due to the fact that three participants in the corresponding +LC group had negative gains (-2, -4, -2) from pre-test to post-test in the Listening task. One of the participants, 13N7, appears to have reversed the ideas of location and destination, correctly identifying the case for seven of the target items but associating the wrong meaning with the case. In two responses, the participant misheard the article and identified not only the wrong case but the wrong meaning for that case, resulting in two correct answers. The responses for the participant with the -4 change, 13N8, show a similar pattern. The responses for the final participant, 13N19 are too inconsistent to suggest any patterns.

4.3. Analysis of think-aloud protocols

This section reports the results in response to the second research question by analyzing the think-aloud protocols.

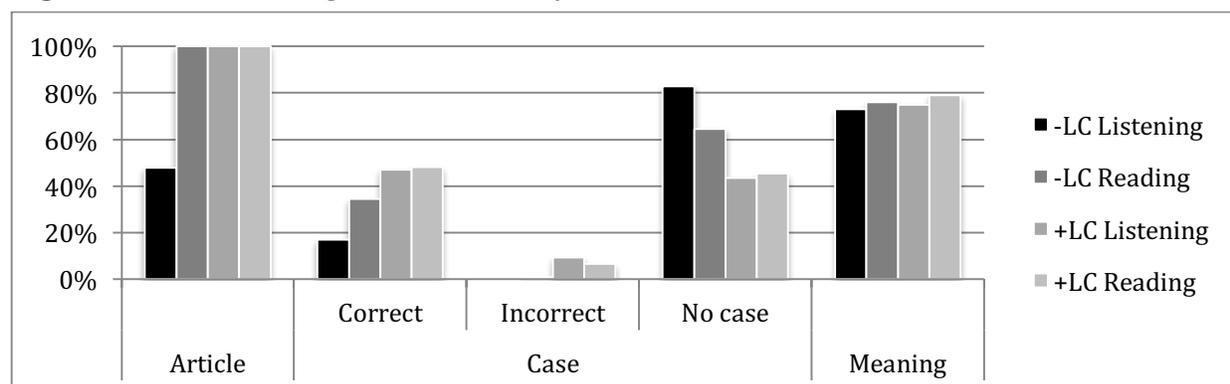
Research question 2: Does removing redundant lexical cues lead learners to more effectively map each case to the appropriate meaning for two-way prepositions?

4.3.1. Overview of the protocols

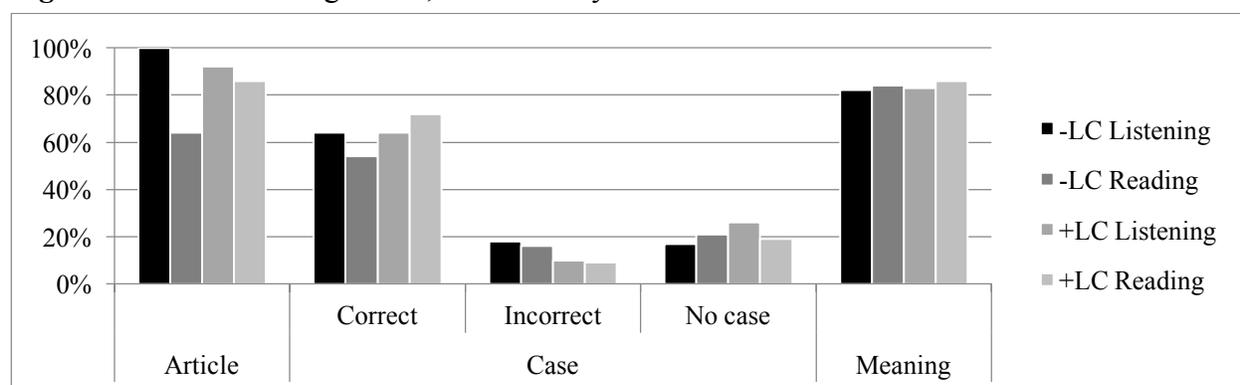
After the participants' responses were coded, they were sorted according to coding and examined for trends that might answer research questions 2 and 3. Tables 4-13 and 4-14 and Figures 4-9 and 4-10 show an overview of the coding trends for the responses for each group in each task.

Table 4-13: Overview of think-aloud protocols, first study

| | <u>-LC</u> | | <u>+LC</u> | |
|---------------------------------------|------------------|----------------|------------------|----------------|
| | <u>Listening</u> | <u>Reading</u> | <u>Listening</u> | <u>Reading</u> |
| Total target responses | 48 | 130 | 204 | 170 |
| References to target article | 23 (48%) | 130 (100%) | 204 (100%) | 170 (100%) |
| Assignment of case to target article: | | | | |
| Correct | 8 (17%) | 45 (34.6%) | 96 (47.1%) | 82 (48.2%) |
| Incorrect | 0 (0%) | 1 (0.8%) | 19 (9.3%) | 11 (6.5%) |
| None | 40 (83%) | 84 (64.6%) | 89 (43.6%) | 77 (45.3%) |
| Correct meaning assigned to case | 35 (73%) | 99 (76%) | 154 (75%) | 134 (79%) |

Figure 13: Plot of coding trends, first study**Table 4-14:** Overview of think-aloud protocols, second study

| | <u>-LC</u> | | <u>+LC</u> | |
|---------------------------------------|------------------|----------------|------------------|----------------|
| | <u>Listening</u> | <u>Reading</u> | <u>Listening</u> | <u>Reading</u> |
| Total target responses | 132 | 110 | 120 | 100 |
| References to target article | 132 (100%) | 70 (64%) | 110 (92%) | 86 (86%) |
| Assignment of case to target article: | | | | |
| Correct | 85 (64%) | 59 (54%) | 77 (64%) | 72 (72%) |
| Incorrect | 24 (18%) | 18 (16%) | 12 (10%) | 9 (9%) |
| None | 23 (17%) | 23 (21%) | 31 (26%) | 19 (19%) |
| Correct meaning assigned to case | 108 (82%) | 92 (84%) | 100 (83%) | 86 (86%) |

Figure 14: Plot of coding trends, second study

One thing that is immediately clear is that both groups are attending to the article to a high degree. Although the percentage of explicit references in the -LC Reading task for the second study is considerably lower than the other data points in that study, the lack of an explicit reference does not necessarily mean that a participant did not attend to the article, only that he or she failed to explicitly mention it. The fact that the same group makes explicit references to the target article 100% of the time in the Listening task suggests the possibility that the group's actual rate of attention to the article in the reading task was higher than shown.

4.3.2. Evidence of correctly mapping meaning to form

The data also suggests that both the -LC and +LC groups in both studies are fairly equal in assigning the correct meaning to each case. Since proper mapping of meaning to form is necessary for input to become intake, this observation led me to consider another metric: measuring the difference between the groups in correct mapping of meaning to case. I counted the number of responses that were coded M=2 (the meaning assigned to the case is explicitly stated and is the correct meaning) for each participant in each task, regardless of whether the proper case was assigned to the article or not. In a very limited number of cases, a participant's answer sheet was consulted for the reading task to determine whether or not the correct meaning was marked. Since the pictures used to interpret the target sentences clearly demonstrated the meanings, the marked answer was taken as an explicit assignment of meaning to the case. A breakdown of the number of M = 2 codes for each participant is shown in Appendix L.

All data sets were submitted to a Shapiro-Wilk test to check for normal distribution and all were found not to be normally distributed. They were then submitted to a non-parametric *t*-test (Mann-Whitney-Wilcoxon) for comparison. The results are given in Tables 4-15 and 4-16:

Table 4-15: Comparison of number of responses coded M = 2, first study

| <u>Task</u> | <u>n</u> | <u>U</u> | <u>95% CI</u> | <u>Effect Size</u> | <u>p</u> |
|------------------------|----------|----------|---------------|---------------------|----------|
| Listening ¹ | 252 | -- | -- | -- | -- |
| Reading | 300 | 104.5 | [-1, 1] | -0.21667 (small) | 0.812 |

1. Statistics for this task could not be done because protocols from only four participants were collected for the -LC group due to technical difficulties resulting in a loss of data.

Table 4-16: Comparison of number of responses coded M = 2, second study

| <u>Task</u> | <u>n</u> | <u>U</u> | <u>95% CI</u> | <u>Effect Size</u> | <u>p</u> |
|-------------|----------|----------|---------------|-----------------------|----------|
| Listening | 252 | 49 | [-2, 2] | -0.03942 (trivial) | 0.6911 |
| Reading | 210 | 42 | [-2, 0] | -0.12890 (trivial) | 0.3284 |

The results show no statistically significant difference between the -LC and +LC groups for either task in properly mapping the meaning to the case.

Problems with the first study, namely the lack of protocols due to data loss and imbalances found in the prompts with regard to the gender and case of target nouns, make it difficult to tell if there is any noticeable difference between the -LC and +LC groups in most of the qualitative analyses. These same problems also make it difficult to tell if the changes made between the first and second studies had any impact on participant learning.

For the remaining analyses, protocols from both studies will be analyzed together. Because the results discussed above and the trends yet to be discussed do not suggest any difference between the -LC and +LC groups in the second study, the protocols will also be examined without consideration for the +/-LC test condition.

The focus for the remainder of this chapter will shift away from comparing test conditions and toward factors affecting acquisition. Several trends that were noticed during the analysis of the think-aloud protocols will be considered in the next few sections. These trends

point to a variety of impediments to participants learning the target structure, including faulty strategies used, incomplete understanding of the underlying structures, or faulty mapping of meaning to the target forms.

4.3.3. Overreliance on verbs

In twelve instances, participants were found to rely on the verb rather than on the case of the target article to determine the meaning of the sentences. This supports the abovementioned hypothesis that learners may focus more on the verb than on the grammar form in order to derive meaning from the input. Four of the instances were from participant 14N2, three from participant 12S4 and the remaining five were each from different participants. Examples are given in Excerpts 4-1 through 4-3:

Excerpt 4-1:

| | | | |
|--------------|---|-------|-------|
| Participant: | 14N2 | | |
| Task: | Listening | | |
| Prompt: | <i>Heidi geht in die Küche</i> (Heidi is walking in the [feminine, accusative, direction] kitchen.) | | |
| Response: | <i>Geht</i> (is walking) is used when you're referring to when you're going to a place. | | |
| Coding: | A = 0 | C = 0 | M = 2 |

Excerpt 4-2:

| | | | |
|--------------|--|-------|-------|
| Participant: | 12S4 | | |
| Task: | Listening | | |
| Prompt: | <i>Der Kellner läuft in das Restaurant.</i> (The waiter is running into the [neuter, accusative, direction] restaurant.) | | |
| Response: | <i>läuft</i> (is running), which makes it a destination. | | |
| Coding: | A = 0 | C = 0 | M = 2 |

Excerpt 4-3:

| | | |
|----------------------|---|--|
| Participant: | 13S4 | |
| Task: | Reading | |
| Prompt: ² |  <p>Hans geht... _____ in das Restaurant. _____ in den Restaurant. _____ in dem Restaurant.</p> | <p>Translation:</p> <p>Hans is going... _____ into the [neuter, accusative, destination] restaurant. _____ in *the [masculine, accusative] restaurant. _____ in the [neuter, dative, location] restaurant.</p> |
| Response: | <i>Hans geht, geht</i> is accusative, so <i>den</i> ...Restaurant is neuter, so <i>das</i> . | |
| Coding: | A = 2 | C = 2 M = 1 |

In all three of these examples, the participants specifically mention a verb of motion and connect it with either the idea of destination or with the accusative case, demonstrating that they are relying on the verb rather than the case of the target article to determine the meaning of the sentence. This same trend applied to all twelve cases where the participants' responses showed a clear reliance on the verb. In no case did the participants associate a verb of motion with movement within a location. While the reading task in the first study did include verbs that would be associated with location, such as *lesen* (to read), *schlafen* (to sleep), and *kochen* (to cook), the nature of the task makes it difficult to tell if the participants are attending to the verb or are relying on the associated picture to determine the correct meaning. This difficulty was one of the reasons the task was changed for the second study. Whereas the participant in Excerpt 4-3 explicitly associates the verb with the accusative case, none of the participants explicitly associated non-motion verbs with either location or the dative case.

² The images in excerpts 4-3, 4-8, 4-9, 4-10, 4-12, and 4-20 to 4-27 were created using The Sims 3 © 2009 Electronic Arts. EA's position is that "permission is not required to make traditional educational use of our game content" (EA Permission Requests Team, personal communication, May 5, 2016).

4.3.4. Two mapping errors resulting in correct responses

One interesting coding that was considered was A = 2, C = 1, M = 1 (Article is given and correct; case is given, but incorrect; meaning is given, but incorrect). Because the incorrect case was assigned to the article and the incorrect meaning assigned to that case, this resulted in a correct answer for the wrong reasons. An example is shown in Excerpt 4-4:

Excerpt 4-4:

| | | | |
|--------------|---|-------|-------|
| Participant: | 14N2 | | |
| Task: | Reading | | |
| Prompt: | <i>Heidi wirft das Frisbee in der Küche.</i> (Heidi is throwing the Frisbee in the [feminine, dative, location] kitchen.) | | |
| Response: | For the third one, <i>der</i> is used in, I believe that <i>der</i> is accusative, and that's when you're in a place, so I'm gonna say B. | | |
| Coding: | A = 2 | C = 1 | M = 1 |

The participant chose the “B” answer on the answer sheet, indicating a meaning of “location” or “in”. In this excerpt, the participant incorrectly assigns the accusative case to the article *der* and then maps the incorrect meaning of “in” to that case. This resulted in a correct answer, but the reasoning behind the participant’s selection of the answer is clearly incorrect.

There were a total of seventeen instances of this coding. Four of them belong to one participant (14S9) who all four times incorrectly identified the definite article *der* as indicating the nominative case and assigned it the meaning of location, as seen in Excerpt 4-5:

Excerpt 4-5:

| | | | |
|--------------|--|-------|-------|
| Participant: | 14S9 | | |
| Task: | Listening | | |
| Prompt: | <i>Bello läuft in der Wohnung.</i> (Bello is running in the [feminine, dative, location] living room.) | | |
| Response: | <i>Der Wohnung</i> is nominative. I'm gonna go with “in”. | | |
| Coding: | A = 2 | C = 1 | M = 1 |

In five of these instances the participants assigned the meaning of “other” in the listening tasks, as seen in Excerpt 4-6:

Excerpt 4-6:

| | | | |
|--------------|---|-------|-------|
| Participant: | 13N11 | | |
| Task: | Listening | | |
| Prompt: | <i>Der Bus fährt in der Stadt.</i> (The bus is driving in the [feminine, dative, location] city.) | | |
| Response: | <i>in der Stadt</i> , meaning <i>der</i> is accusative, <i>der...</i> no, it's other because <i>der</i> is an accusative. | | |
| Coding: | A = 2 | C = 1 | M = 1 |

Out of the seventeen instances, eleven of them involved the article *der* and four involved the article *dem* (Excerpt 4-7):

Excerpt 4-7:

| | | | |
|--------------|--|-------|-------|
| Participant: | 13N8 | | |
| Task: | Listening | | |
| Prompt: | <i>Seine Schwester läuft in dem Kaufhaus.</i> (His sister is running in the [neuter, dative, location] store.) | | |
| Response: | <i>Dem</i> is accusative, so that would be location. | | |
| Coding: | A = 2 | C = 1 | M = 1 |

On the surface, this excerpt appears to be a straightforward confusion of form with case and then an incorrect mapping of meaning with case, but when other responses by the same participant are examined, it is difficult to tell where the problem actually lies. The other responses show inconsistency in mapping case to meaning as well as difficulty in identifying the correct case for the article. In the next response by the same participant, he comments: “*die* is accusative, so it would be location”, but then in response to the prompt “*Der Kellner läuft in das Restaurant* // The waiter is running into the [neuter, accusative, destination] restaurant”, he first misidentifies *das* as dative case but then assigns the correct meaning to the dative: “It’s the dative version, so that’ll be location” contradicting his previous statements.

While these responses demonstrate that the participant has not adequately mapped the correct meanings to each case for two-way prepositions, they reveal a more important trend, namely that he has not adequately mapped the accusative and dative cases to their respective

forms. This trend is especially evident for the entire study population when particular articles are isolated.

4.3.5. The article *der*

The fact that a large portion of these responses involved the article *der* alerted me to a possible trend where participants were assigning the incorrect case to the article. All responses with the coding $C = 1$ (case is assigned, but incorrect) were then examined to determine which ones involved *der*.

The article *der* can be problematic because it appears in three out of the four cases in German, in two different genders, and in both singular and plural. Table 4-17 shows all instances of *der* shown in the order that the participants learn the cases:

Table 4-17: The definite articles in all four cases

| <u>Case</u> | <u>Masculine</u> | <u>Feminine</u> | <u>Neuter</u> | <u>Plural</u> |
|-------------|------------------|-----------------|---------------|---------------|
| Nominative | <i>der</i> | <i>die</i> | <i>das</i> | <i>die</i> |
| Accusative | <i>den</i> | <i>die</i> | <i>das</i> | <i>die</i> |
| Dative | <i>dem</i> | <i>der</i> | <i>dem</i> | <i>den</i> |
| Genitive | <i>des</i> | <i>der</i> | <i>des</i> | <i>der</i> |

The only case in which the article *der* does not appear is the accusative. At the time of the study, the participants had not yet been exposed to the genitive case, but had been exposed to the other three. Because two-way prepositions govern the accusative and dative cases, the participants should have been able to notice that *der* only appears in the feminine dative with regard to these prepositions. As already seen, however, it was misidentified as nominative or accusative in a number of cases.

Table 4-18 compares the number of times that all the articles were identified with the incorrect case or were assigned an incorrect meaning without explicit assignment of case in target items:

Table 4-18: Comparison of articles

| | <u>der</u> | <u>die</u> | <u>das</u> | <u>dem</u> | <u>den</u> |
|----------------------------|------------|------------|------------|------------|------------|
| Correct case | 68 | 138 | 138 | 164 | 32 |
| Correct meaning, no case | 42 | 34 | 50 | 70 | 27 |
| Total correct references | 110 | 172 | 188 | 234 | 59 |
| Incorrect case | 59 | 4 | 5 | 5 | 3 |
| Incorrect meaning, no case | 27 | 28 | 22 | 20 | 12 |
| Total incorrect references | 86 | 32 | 27 | 25 | 15 |

While all articles were misidentified to some degree, *der* was misidentified far more often with the incorrect case.

The article *der* occurred a total of 222 times in all of the responses. Out of those, it was misidentified as accusative or associated with the meaning of “destination” or “into” a total of 81 times. In five responses the article was identified as “other” in the listening exercises without explicit connection to case. Altogether, when the article was encountered or used, it was misidentified 39% of the time with either the wrong case or the wrong meaning without explicit mention of the case.

One difference between the first and second studies is that all three genders—masculine, feminine, and neuter—were used as target items in the first study, whereas only feminine and neuter target items were used in the second study, which partially accounts for the low number of misidentifications of *den* in Table 4-18.

Evidence of assigning the accusative case to *der* appeared in both studies, however. In a protocol from the first study, for example, the participant recognizes the meaning of destination in a prompt and assigns the meaning to the accusative case, but chooses the nominative form of the article, even after recognizing that the noun is masculine:

Excerpt 4-8:

| | | |
|--------------|--|--|
| Participant: | 13N7 | |
| Task: | Reading | |
| Prompt: |  <p>Hans geht... <input type="checkbox"/> in der Garten. <input type="checkbox"/> in dem Garten. <input type="checkbox"/> in den Garten.</p> | <p>Translation:</p> <p>Hans is going... <input type="checkbox"/> in *the [masculine, nominative] garden. <input type="checkbox"/> in the [masculine, dative, location] garden. <input type="checkbox"/> into the [masculine, accusative, destination] garden.</p> |
| Response: | Hans ... so he's going into it, so that is a destination, destination makes it accusative and <i>Garten</i> is male, so... <i>der Garten</i> . | |
| Coding: | A = 1 | C = 1 M = 2 |

In another protocol involving the same prompt, the participant also correctly associates destination with the accusative case but still selects the nominative form of the article. In this example, however, while he does not explicitly state the gender of the target noun, he initially chooses the correct accusative form, then changes his mind and selects the nominative form:

Excerpt 4-9:

| | | |
|--------------|--|--|
| Participant: | 13N6 | |
| Task: | Reading | |
| Prompt: |  <p>Hans geht... <input type="checkbox"/> in der Garten. <input type="checkbox"/> in dem Garten. <input type="checkbox"/> in den Garten.</p> | <p>Translation:</p> <p>Hans is going... <input type="checkbox"/> in *the [masculine, nominative] garden. <input type="checkbox"/> in the [masculine, dative, location] garden. <input type="checkbox"/> into the [masculine, accusative, destination] garden.</p> |
| Response: | Hans <i>geht in den</i> because he's going, err... he's going into so it's <i>der Garten</i> , which is accusative. | |
| Coding: | A = 1 | C = 1 M = 2 |

In another protocol by the same participant, he clearly assumes *der* to be a nominative and is aware of the change that occurs from nominative *der* to dative *dem*:

Excerpt 4-10:

| | | | |
|--------------|--|---|-------|
| Participant: | 13N6 | | |
| Task: | Reading | | |
| Prompt: |  <p>Hans liest... _____ in dem Bibliothek. _____ in der Bibliothek. _____ in die Bibliothek.</p> | <p>Translation:</p> <p>Hans is reading... _____ in *the [neuter, dative] library. _____ in the [feminine, dative, location] library. _____ into the [feminine, accusative, destination] library.</p> | |
| Response: | <i>Hans liest</i> in the library, he's already in the library and that's dative, and <i>der Bibliothek</i> changes to <i>dem</i> , so it's <i>dem Bibliothek</i> . | | |
| Coding: | A = 1 | C = 2 | M = 2 |

While none of the other responses by this participant show whether he is aware of the change from *der* to *den* in the accusative, one protocol from the listening task does suggest that the participant may have adopted the strategy “accusative = no change in the article”:

Excerpt 4-11:

| | | | |
|--------------|---|-------|-------|
| Participant: | 13N6 | | |
| Task: | Listening | | |
| Prompt: | <i>Der Bus fährt in der Stadt.</i> (The bus is driving in the [feminine, dative, location] city.) | | |
| Response: | I hear <i>ders</i> and <i>Stadt</i> would be <i>der</i> , and it doesn't change , so it's still accusative, so it's destination because they are going to. | | |
| Coding: | A = 2 | C = 1 | M = 2 |

Other responses by the same participant are not as explicit in their references to this possible strategy, but do support the above observation to some degree:

Excerpt 4-12:

| | | |
|--------------|--|--|
| Participant: | 13N6 | |
| Task: | Reading | |
| Prompt: |  <p>Heidi kommt... _____ in die Küche. _____ in der Küche. _____ in den Küche.</p> | <p>Translation:</p> <p>Heidi is coming... _____ into the [feminine, accusative, destination] kitchen. _____ in the [feminine, dative, location] kitchen. _____ in *the [masculine, accusative] kitchen.</p> |
| Response: | <i>Heidi kommt</i> , she's coming into the kitchen, so that would be destination which is accusative, Kitchen is, I guess it's <i>die Küche</i> , so it's going to stay the same , so it's <i>die Küche</i> . | |
| Coding: | A = 2 | C = 2 M = 2 |

While masculine nouns were not included in the target nouns for the second study, similar patterns emerge where *der* is identified as accusative:

Excerpt 4-13:

| | | |
|--------------|--|----------------------------------|
| Participant: | 14S11 | |
| Task: | Listening | |
| Prompt: | <i>Bello läuft in der Wohnung.</i> (Bello is running in the [feminine, dative, location] living room.) | |
| Response: | <i>läuft in der...der</i> is accusative, so it's going to be into | |
| Coding: | A = 2 | C = 1 M = 2 |

Other responses by this same participant demonstrate a general recognition of accusative case forms and a correct mapping of the meanings to those cases:

Excerpt 4-14:

| | | |
|--------------|--|----------------------------------|
| Participant: | 14S11 | |
| Task: | Listening | |
| Prompt: | <i>Heidi fährt in die Stadt.</i> (Heidi is driving in the [feminine, accusative, destination] city.) | |
| Response: | <i>die Stadt...accusative</i> , so it's into | |
| Coding: | A = 2 | C = 2 M = 2 |

Excerpt 4-15:

| | | | |
|--------------|--|-------|-------|
| Participant: | 14S11 | | |
| Prompt: | <i>Bello läuft in das Café.</i> (Bello is running into the [neuter, accusative, destination] café.) | | |
| Response: | The first one is going to be A because <i>das</i> makes it accusative and that means it's going into | | |
| Coding: | A = 2 | C = 2 | M = 2 |

A response to one of the distractor items supports the possibility that more than one participant adopted the strategy mentioned earlier that change = dative, while no change = accusative:

Excerpt 4-16:

| | | | |
|--------------|--|--|--|
| Participant: | 14N8 | | |
| Task: | Listening | | |
| Prompt: | <i>Bello läuft aus der Schule.</i> (Bello is running out of the [feminine, dative] school.) | | |
| Response: | I think that would be dative because it should be <i>die Schule</i> and it's changed. | | |
| Coding: | (Distractor) ¹ | | |

1. Distractors are not coded because they are not target items and the Meaning coding is irrelevant for them.

Other distractors also show the misidentification of *der* as an accusative article:

Excerpt 4-17:

| | | | |
|--------------|---|--|--|
| Participant: | 12N3 | | |
| Task: | Listening | | |
| Prompt: | <i>Das Auto fährt aus der Stadt.</i> (The car is driving out of the [feminine, dative] city.) | | |
| Response: | <i>der Stadt</i> is in the accusative, so it's a location, or a destination | | |
| Coding: | (Distractor) | | |

Although there are only a few explicit references to the idea that no change in the article indicated the accusative case, the fact that a number of participants identified *der* as accusative suggests the possibility that others adopted the strategy that a change in the article indicates the dative case, while no change indicates the accusative case.

4.3.6. Distractors

While the distractors are not target items, they do provide valuable information, such as evidence of the over-application of the meanings of “destination” and “location” to prepositions that are not two-way prepositions:

Excerpt 4-18:

| | |
|--------------|--|
| Participant: | 14N10 |
| Task: | Reading |
| Prompt: | <i>Der Dieb geht aus dem Haus.</i> (The thief is going out of the [neuter, dative] house.) |
| Response: | <i>Der Dieb geht aus dem Haus</i> , it's <i>dem</i> , so that means he is moving around in the house, B, dative. |
| Coding: | (Distractor) |

Excerpt 4-19:

| | |
|--------------|---|
| Participant: | 14N8 |
| Task: | Listening |
| Prompt: | <i>Bello rennt um das Auto.</i> (Bello is running around the [neuter, accusative] car.) |
| Response: | So that would be into, she gets into the car, and that would be accusative. |
| Coding: | (Distractor) |

In a number of cases, participants did not recognize the accusative or dative prepositions in the distractors and attempted to apply the two-way preposition meanings to them based on the case of the article, or on the activity shown in the picture for the reading tasks. Focusing solely on the reading task for the first study, out of 60 distractors for which the participants should have selected the article *dem*, the article *das* was selected for 42 of them, as shown in excerpts 4-20 and 4-21:

Excerpt 4-20:

| | |
|--------------|--|
| Participant: | 13S7 |
| Task: | Reading |
| Prompt: | <div style="display: flex; align-items: flex-start;">  <div style="margin-left: 20px;"> <p>Translation:</p> <p>Hans is coming... _____ out of *the [neuter, accusative] house. _____ out of *the [masculine, accusative] house. _____ out of the [neuter, dative] house.</p> </div> </div> <p>Hans kommt... _____ aus das Haus. _____ aus den Haus. _____ aus dem Haus.</p> |
| Response: | <i>Hans kommt aus das Haus.</i> It's neuter, but it is a destination, so it's accusative, so <i>aus das Haus</i> . |
| Coding: | (Distractor) |

Excerpt 4-21:

| | |
|--------------|--|
| Participant: | 12S3 |
| Task: | Reading |
| Prompt: | <div style="display: flex; align-items: flex-start;">  <div style="margin-left: 20px;"> <p>Translation:</p> <p>Hans is coming... _____ out of *the [neuter, accusative] house. _____ out of *the [masculine, accusative] house. _____ out of the [neuter, dative] house.</p> </div> </div> <p>Hans kommt... _____ aus das Haus. _____ aus den Haus. _____ aus dem Haus.</p> |
| Response: | he's coming out of the house, so <i>Hans kommt</i> , ok so that's accusative and <i>Haus</i> is neuter, so... <i>kommt aus das Haus</i> |
| Coding: | (Distractor) |

The preposition *aus* (out of) always requires the dative case, but in both excerpts the participants reason that, because the picture indicates motion, the article must be in the accusative case, despite the fact that it is the object of the dative preposition *aus*.

In 15 of the distractors, participants incorrectly selected the article *den* for the same

reason:

Excerpt 4-22:

| | |
|--------------|--|
| Participant: | 12N6 |
| Task: | Reading |
| Prompt: | <div style="display: flex; align-items: flex-start;">  <div style="margin-left: 20px;"> <p>Translation:</p> <p>Hans is coming... _____ out of *the [neuter, accusative] house. _____ out of *the [masculine, accusative] house. _____ out of the [neuter, dative] house.</p> </div> </div> <p>Hans kommt... _____ aus das Haus. _____ aus den Haus. _____ aus dem Haus.</p> |
| Response: | <i>Hans kommt aus den Haus</i> because he's leaving the house and it's accusative. |
| Coding: | (Distractor) |

Excerpt 4-23:

| | |
|--------------|--|
| Participant: | 12N8 |
| Task: | Reading |
| Prompt: | <div style="display: flex; align-items: flex-start;">  <div style="margin-left: 20px;"> <p>Translation:</p> <p>Hans is coming... _____ out of *the [neuter, accusative] house. _____ out of *the [masculine, accusative] house. _____ out of the [neuter, dative] house.</p> </div> </div> <p>Hans kommt... _____ aus das Haus. _____ aus den Haus. _____ aus dem Haus.</p> |
| Response: | <i>Hans kommt aus den Haus</i> because it is a destination. |
| Coding: | (Distractor) |

While the remaining three distractors from this group did have the correct answer of *dem*, in none of the instances does the participant select *dem* because of the dative preposition *aus*:

Excerpt 4-24:

| | |
|--------------|--|
| Participant: | 13N10 |
| Task: | Reading |
| Prompt: | <div style="display: flex; align-items: flex-start;"> <div style="flex: 1;">  <p>Hans kommt... _____ aus das Haus. _____ aus den Haus. _____ aus dem Haus.</p> </div> <div style="flex: 1; padding-left: 20px;"> <p>Translation:</p> <p>Hans is coming... _____ out of *the [neuter, accusative] house. _____ out of *the [masculine, accusative] house. _____ out of the [neuter, dative] house.</p> </div> </div> |
| Response: | <i>Hans kommt aus dem Haus</i> because he's leaving it, so it's not like a destination. |
| Coding: | (Distractor) |

In this particular instance, the participant still seems to be overgeneralizing the concepts of destination and location. Because he is making his choice based on what the meaning is *not*, he appears to be limiting his understanding to the dichotomy of destination or location.

4.3.7. Overgeneralization of *den*

The same trend discussed above of using *den* to indicate accusative or destination regardless of gender also occurs several times in target items, suggesting that some participants may have overgeneralized the article as the accusative or destination marker:

Excerpt 4-25:

| | | | |
|--------------|--|---|-------|
| Participant: | 13S9 | | |
| Task: | Reading | | |
| Prompt: |  <p>Hans kommt... _____ in dem Wohnzimmer. _____ in den Wohnzimmer. _____ in das Wohnzimmer.</p> | <p>Translation:</p> <p>Hans is coming... _____ into *the [neuter, dative] living room. _____ into *the [masculine, accusative] living room. _____ into the [neuter, accusative] living room.</p> | |
| Response: | <i>Hans kommt</i> , he's coming into the living room, so that is accusative, so it would be <i>den</i> . | | |
| Coding: | A = 1 | C = 2 | M = 2 |

Excerpt 4-26:

| | | | |
|--------------|---|--|-------|
| Participant: | 12N2 | | |
| Task: | Reading | | |
| Prompt: |  <p>Heidi kommt... _____ in die Küche. _____ in der Küche. _____ in den Küche.</p> | <p>Translation:</p> <p>Heidi is coming... _____ into the [feminine, accusative, destination] kitchen. _____ in the [feminine, dative, location] kitchen. _____ in *the [masculine, accusative] kitchen.</p> | |
| Response: | Ok, so, for the first picture, it's a picture of a woman walking into the kitchen and the sentence says <i>Heidi kommt</i> and it's going to be...since she's going to a destination, it's going to be accusative, and so it is going to be <i>in den Küche</i> . | | |
| Coding: | A = 1 | C = 2 | M = 2 |

In the case of the first participant (13S9), she is consistent in associating *den* with both accusative and destination regardless of the gender of the target noun. None of her responses show any clear recognition of the gender of the target items, despite the fact that the genders

were given to the participants on the answer sheet. While it is possible she simply mistook all the accusative target nouns to be masculine, it seems more likely that she simply over-generalized the article *den* with the accusative case.

In the case of the second participant (12N2), her application of the article *den* is inconsistent as seen in Excerpt 4-27:

Excerpt 4-27:

| | | | |
|--------------|--|---|-------|
| Participant: | 12N2 | | |
| Task: | Reading | | |
| Prompt: |  <p>Hans ist...</p> <p>_____ in das Wohnzimmer. _____ in dem Wohnzimmer. _____ in den Wohnzimmer.</p> | <p>Translation:</p> <p>Hans is sitting... _____ in *the [neuter, accusative, destination] living room. _____ in the [neuter, dative, location] living room. _____ in *the [masculine, accusative] living room.</p> | |
| Response: | And then Hans is sitting in the <i>Wohnzimmer</i> so he's at a location, so that makes it the dative and so it's going to be <i>den Wohnzimmer</i> , because <i>den</i> is the dative form of <i>das</i> . | | |
| Coding: | A = 1 | C = 1 | M = 2 |

The article *den* does appear in the dative case, as the plural dative marker, and it is possible that the participant incorrectly applied it here to a singular noun. Another possibility is that she confused *den* with *dem*, which is the proper definite article for a singular dative neuter noun. She does, however, correctly select *dem* in two cases, both for the masculine nouns *der Park* and *der Keller* (the basement), and also incorrectly selects it for a dative feminine noun (*die Bibliothek*; the library), although for the correct meaning, suggesting she has possibly overgeneralized *dem* as the dative marker for all genders. In either case, her use of *den* here

contradicts her earlier use of it with a feminine noun in the accusative case, and her use of *den* in general suggests a lack of familiarity with the case system rather than confusion of articles.

4.3.8. Summary

Analysis of the participants' responses to the target prompts reveals that they are in fact attending to a high degree to the target article and are also mapping the correct meaning to each case to a high degree as well. This suggests that the treatment was effective in addressing these two issues, regardless of whether lexical cues were present or not. By isolating the erroneous use of different articles, we notice that the main obstacle to acquisition of two-way prepositions seems to be that the participants have not yet fully acquired the morphology for the articles and other determiners associated with the accusative and dative cases. A fuller discussion of why this may be the case will be presented in the next chapter.

Chapter 5: Discussion and Conclusion

5.1. Introduction

In this chapter, we will turn to a discussion of the results and their implications. First, the results will be discussed in relation to the two research questions, including insights from theoretical frameworks that may illuminate aspects of the study's results. Next, implications for the teaching of German grammar in general and two-way prepositions in particular will be presented.

Following this will be a discussion of the implications of the present study. Finally, limitations and ideas for future research will be presented.

5.2. Research Question 1: Do Lexical Cues make a difference?

The first research question asked: Does removing redundant lexical cues from the input lead to greater gains in learner interpretation of German two-way prepositions than if redundant lexical cues are included in the input? This question was answered primarily by the quantitative analysis comparing the post-test results to the pre-test results. In this study, the lexical cue in question was the verb, as learners may associate verbs of motion with destinations and not consider the possibility that motion can occur within a location. Evidence from the think-aloud protocols supports this hypothesis, as several participants identified the case of the article based on the fact that the verbs in question were verbs of motion. The results strongly suggest that the presence or absence of the verb in the input does not affect learner interpretation, as there was no significant difference between the two experimental conditions.

5.2.1. Possible role of Explicit Information

DeKeyser and Prieto Botana (2015) raise an interesting point that may suggest a possible explanation of the lack of difference between the two groups. They mention in their review of PI

studies that Explicit Information (EI) seemed to only be effective for grammar forms that were complex. Although the target structure for this study is manifested solely in the morphology of determiners, it may qualify as a complex form due to the fact that these prepositions govern two cases rather than one. In this study, both experimental groups were provided the exact same explicit explanation of the grammar form and strategy training.

Examination of the think-aloud protocols shows consistent use of meta-linguistic terminology (“dative”, “feminine”, etc.) and a focus on the dual nature of the prepositions (location vs. destination; in vs. into). Although these determiners have possibly the lowest saliency of any component of the input, they clearly occupy an inordinately large amount of the participants’ attention. This suggests that the participants not only attended to the EI provided but actively used that information to complete the tasks on the post-test. The high rate of explicit identification of the target article and the high rate of identification of the case of that article suggests that the EI helped direct the participants’ attention to the target form.

5.2.2. Limited scope and focus of the study

This raises the related possibility that there was no difference between the groups because of the narrow focus of the intervention and the post-test. The two-day intervention focused solely on this one grammar form, allowing the participants’ full attention to be directed toward it. While focusing on one thing at a time is generally a good idea, the fact that the post-test occurred immediately after the intervention may have affected the outcome. In essence, both groups may have been primed for the post-test and the results may be a reflection of their exclusive focus on the target form.

5.2.3. Both groups do show learning

Regardless of what may have affected the results of the post-test, it is clear from the fact that both groups show significant increases from pre- to post-test that learning did take place, suggesting that they equally benefitted from the interventions, regardless of the test condition.

5.3. Research Question 2: Lexical cues and form-meaning connections

The second research question asked: Does removing redundant lexical cues lead learners to more effectively map each case to the appropriate meaning for two-way prepositions? When the think-aloud protocols are examined for how often the participants associate the correct meaning with the case, regardless of whether the case is correct or not, it becomes clear that most of them are mapping meaning to case correctly. Because there is no significant difference between the experimental conditions, it does not appear that the presence or absence of the verb made any difference in helping participants map the correct meaning to the form.

5.4. Case acquisition and two-way prepositions

While the results do not suggest any difference due to the presence or absence of the lexical cues, qualitative analysis of the think-aloud protocols does reveal information about difficulties the participants encountered in learning the target form. This information may provide some insight into the acquisition of two-way prepositions and has implications for their instruction in the classroom.

5.4.1. Difficulties with acquisition of two-way prepositions

Learning the German case system is not an easy task for English L1 learners. Jackson (2007) makes the comment that “[m]any learners give up ever mastering German case markings, with such comments as ‘All these words for “the” are confusing’” (p. 418). She also illustrates the low

salience of case markings, mentioning that “learners have access to a variety of information, including semantic information and a larger discourse context, which reduces the need to interpret case marking information correctly” (p. 419). Because learners map all definite articles to the same meaning and are often able to rely on other information in the input to correctly interpret utterances, the importance of German articles can easily be overlooked by them.

Jackson (2007) also mentions that, according to the competition model (Bates and MacWhinney, 1989), lower-proficiency learners will tend to rely on the most salient cues from their L1 rather than the appropriate cues from the L2 to determine agency. In her research, she focused on the fact that word order is more rigid in English than in German and that English L1 learners of German will transfer word order rules to German. While she does not explicitly state this, her description implies that the case markings that are critical to processing agency in German are less salient to English L1 learners.

This process is even more complicated with two-way prepositions. According to Baten (2011), learners tend to acquire correct case use with two-way prepositions relatively late in comparison to other forms, despite their frequent appearance in typical input provided to German L2 learners. Baten (2013) points out that the complexity of the prepositions lies in the fact that the case is determined by semantic motivations and not solely by the verb or preposition. Not only does the learner “have to learn the different morphological forms” and “grasp the underlying system of forms and functions,” (p. 11) they also have to associate multiple forms with the same preposition and then associate each of those forms with conceptual meanings. Baten (2013) refers to this type of case marking as “conceptual marking” (p. 15), which fits well into the MOGUL framework.

5.4.2. Acquisition from the MOGUL perspective

The hypothesis from this framework that is most applicable to the present discussion is that representations stored in memory always have a certain level of activation known as its resting activation level. When a representation is used in a parse, its activation level is raised and, as long as it stays raised for the entire parse, its resting activation level is increased slightly.

According to Truscott and Sharwood Smith (2004a), the result of this is that the given representation is now more available for processing since “processors use the currently most active items and current activation is determined in part by resting activation levels” (p. 6). A processor will first select the most highly active representation associated with items found in the input. If multiple representations are associated with a particular item in the input, competition between those items ensues and selection of one over the other may depend on the resting activation level of each representation.

5.4.2.1. Evidence from the article *der*

This hypothesis may help understand the phenomena observed in conjunction with the article *der* in the present study. Looking at the article from the perspective of the learner, it has been associated since the early stages of learning German with the concept of masculine with regard to the classification of German nouns. Repeated processing of masculine nominative nouns helps to increase the resting activation level of this conceptual structure.

When learners are introduced to the dative case, they are then asked to map the form *der* with the grammatical function of feminine dative in addition to its already established function of masculine nominative. This creates competition between the two functions that are associated with the same form. From the MOGUL perspective, the grammatical function of masculine nominative should be selected more often because it will have the higher resting activation level.

The data collected for this study seems to bear this out to some degree. The textbook used in the course in which the study was conducted introduces two-way prepositions fairly soon after the dative case is introduced. When the learners are asked to add the conceptual meanings associated with two-way prepositions to the same article, they have had considerably less time³ to process the link between *der* and the feminine dative than they have had to process its link to the masculine nominative, meaning that the resting activation level of masculine nominative is considerably higher. The fact that the majority of times *der* was misidentified it was understood as an indicator of a masculine noun suggests that the resting activation level of the conceptual structure associated with masculine is higher than the resting activation level of the conceptual structure associated with feminine.

5.4.2.2. Evidence from the articles *dem* and *den*

To a lesser degree, this same phenomenon can be seen in the overgeneralization of the articles *dem* and *den*. Overwhelmingly, learners correctly identified the article *dem* as dative, which is the only case in which this article appears. As VanPatten and Borst (2011) point out, when there is a one-to-one correspondence between form and function, the case marker becomes an immediate clue. One participant in the second pilot study commented that the article *dem* was like a trigger that immediately told him the case was dative and the meaning was location rather than destination.

In a few instances, as shown in Chapter 4, learners associated the article *dem* with the dative case for all genders and not just for masculine and neuter. From the MOGUL perspective

³ Another possible intervening factor is that, at the university where the study took place, the dative is introduced at the end of one semester and two-way prepositions at the beginning of the subsequent semester with a substantial break between the two. This may allow enough time for information learned about the dative to degrade considerably before two-way prepositions are introduced.

as described above, this would make sense because the article appears only in the dative case and so its link to the concept of dative would not be in competition with any other structure.

In the same way, several learners from the first study⁴ associated the article *den* with the concept of accusative regardless of the gender of the noun. This article represents the only change between the nominative and accusative cases, as seen in Table 4-17, and can easily be understood as the only real marker of the accusative case. While *den* does also appear as the marker for dative plural, the interventions focused exclusively on singular nouns, so exposure to this article as dative plural was limited. As with *dem*, there would have been little competition between conceptual structures and, so, *den*'s association with accusative could easily be selected. The concept of masculine, on the other hand, is strongly associated with the article *der*, meaning that *den* and *dem* would be in competition with *der*, increasing the likelihood that the concept of masculine would be rejected for these two articles.

5.4.3. Processability Theory and case acquisition

Baten (2011), examining German case acquisition from the perspective of Processability Theory (Pienemann, 1998, 2005), notes that German L2 learners tend to follow a similar sequence to German L1 learners in the acquisition of case. He summarizes data from a study by Diehl et al. (2000) that shows that L2 learners will first use the nominative as the default case, then begin to differentiate between case forms. He notes that learners will first use the new cases in free variation then eventually more systematically.

From the data collected in the present study, the article *der* is clearly the default article for the masculine, as evidenced by its misidentification as such when it is actually the feminine

⁴ Masculine nouns were avoided in the second study because of the difficulty of distinguishing *den* from *dem* in the audio prompts.

dativ. While the learners' overgeneralization of *den* and *dem* do not necessarily exhibit free variation, they do show a stage of development that is less than full acquisition. The data may then support these observations to some extent.

5.5. Similar learner gains between the groups

The MOGUL framework may also provide insight into why both experimental groups showed similar and considerable gains. According to Sharwood Smith (2010), acquisition is memory change that is brought about by processing input and is, therefore, a side-effect of processing. The implication of this is that exposure to input is not enough, it needs to be processed for the information in the input to be acquired. The goal of input enhancement in general and PI in particular is to draw the learner's attention to the target structures in the input, thereby increasing the likelihood that they will be processed.

A considerable proportion of the information provided as EI can be classified as meta-linguistic information. While this information may not contribute directly to growth in the learner's language module, Sharwood Smith and Truscott (2014) argue that growth in meta-linguistic knowledge can contribute indirectly to such growth. They claim that meta-linguistic knowledge, stored in memory as conceptual structures, helps the learner create or improve "the right semantic and pragmatic contexts to be associated with particular syntactic patterns" (p. 271) thereby indirectly facilitating syntactic acquisition.

Both experimental groups were provided the same EI in both studies. This information would have been stored as conceptual structures in each learner's memory. The activation level of these structures would have been raised into consciousness and, because conceptual and perceptual structures in memory are tightly co-indexed, the activation level of any perceptual structures the learner associated with these concepts would also be raised into consciousness. As

learners move to process the input in the exercises following the introduction of the EI, those structures remain activated and links between the form (perceptual structures) and meaning (conceptual structures) would be strengthened: as they use the meta-linguistic knowledge from the EI to parse the input, they construct perceptual structures that co-index with the conceptual structures, enhancing form-meaning connections.

The fact that a significant amount of improvement occurred regardless of experimental condition, along with the considerable use of meta-linguistic references in the think-aloud protocols indicates at the very least that the conceptual information provided by the EI was highly activated as learners were processing the input. Another possible indicator is the fact that the destination/location dichotomy was applied to almost all of the distractors. These elements used prepositions that required only one case, but the information provided by the EI was applied to them as well. This may indicate that the activation levels of the conceptual structures associated with this dichotomy caused them to win out in competition with the actual semantic information of the prepositions, as well as the semantic information provided by the verb.

5.6. Contributions

In this section, contributions made to instructed SLA in German and research gaps addressed by the present study will be discussed.

5.6.1. Input Processing and Processing Instruction

5.6.1.1. Explicit Information

The first contribution that this study makes is that it is the first study of German within the PI framework to focus on the Lexical Preference Principle. While there have been two other German PI studies (Culman et al. 2009; VanPatten and Borst, 2012) that have also focused on case markings, their concern was with the First Noun Principle and the processing of accusative

case markings in OVS sentences. A significant finding in both Culman et al. (2009) and VanPatten and Borst (2012) is the contribution that Explicit Information (EI) made to the rate at which participants learned the target form. Those participants who had received EI began correctly processing accusative case markings in OVS sentences earlier than those who had not received EI. This finding contradicted previous PI research that had suggested that EI does not play a role in PI interventions. While the present study is not designed to confirm or refute the findings of either of the other German PI studies concerning the role of EI, the participant responses collected from the think-aloud protocols suggest that EI possibly contributed significantly to their learning.

5.6.1.2. The Lexical Preference Principle

In contrast to the German PI studies mentioned above, which focus on the First Noun Principle, the present study contributes to the growing empirical PI research by examining the Lexical Preference Principle. The results obtained are similar to Rossomondo (2007) in that they do not lend support to the Lexical Preference Principle. Both studies, while differing in language and structure, found that the presence of lexical cues neither contributed to nor detracted significantly from participants learning the target forms in each study.

5.6.1.3. German Two-Way Prepositions

Other input processing studies of German SLA that have focused on case markings (Jackson 2008a, 2008b; Jackson and Dussias, 2009; Culman et al. 2009; VanPatten and Borst, 2012) were concerned with how learners process accusative case markers, particularly in OVS sentences. In contrast, the present study examined the acquisition of German two-way prepositions.

While Jackson (2008a) found that lower-proficiency learners relied more on semantic information than on case markings, the present study found that most participants, who were all

second-semester learners, relied almost exclusively on case markings to process target sentences. A significant contributor to this difference may have been the EI provided in the treatment, which drew the learners' attention to the target form. Jackson (2008a) did not employ PI, so any explicit instruction that her participants may have received on the target form likely did not include the strategy training that is necessary to PI.

5.6.2. Think-aloud protocols

This use of think-aloud protocols was inspired by potential problems with the retrospective questionnaire administered by Culman et al. (2009). The authors used the questionnaire as a qualitative measure, but since it was retrospective, it did not capture the participants' thoughts during the experiment itself. The present study, on the other hand, employed think-aloud protocols during the post-test as a primary data collection tool. Each participant's reasoning for making their selections on the post-test was recorded as they were completing each task.

Culman et al. (2009) mention that the results obtained from the questionnaire may not have been accurate as some of the participants may not have understood what the researchers meant by "tricks" on the questionnaire. Another potential problem is discussed by Mackey and Gass (2005) while describing introspective measures in general and stimulated recall in particular. The authors talk about the possibility of recall interference and the fact that, as time passes, the memory of the event is less clear and recall is less reliable. Since the questionnaire administered by Culman et al. (2009) came after the post-test, whatever time lapsed may have caused further inaccuracies in participant recall. Decay of memory is minimized in the present study by collecting the participants' thoughts at the same time they are completing the tasks.

The use of think-aloud protocols also helped to address two research gaps mentioned by Shintani (2015) and DeKeyser and Prieto Botana (2015) mentioned previously in Chapter 2.

Shintani (2015) noted the need for research that demonstrates how learners process input. The data collected show the difficulties that some of the participants had in processing certain articles and sheds light on how they processed the information in the input. The application of a cognitive theoretical framework then helped explain why these processing difficulties occurred.

DeKeyser and Prieto Botana (2015) pointed out the need for PI research to assess how well the participants learned or attended to the EI provided to them. In the present study, participant responses from the think-aloud protocol suggest that the participants not only paid attention to the EI but used it actively to complete the tasks on the post-test. This is evidenced by the high rate of identification of the target article, identification of the article's case, and correct association of meaning to the case.

5.7. Implications

Because this study is focused primarily on the acquisition of German grammar in general and two-way prepositions in particular within the context of classroom instruction, the implications from this study will be focused on those related to language pedagogy.

5.7.1. Explicit instruction

While there has been much debate in the past about the value of explicit instruction, this study does provide evidence that explicit instruction can facilitate learning. After only a short intervention, the overwhelming majority of participants were able to correctly interpret the semantic distinctions of two-way prepositions. Although the objection may be raised that the main learning that took place was in the learners' meta-linguistic understanding *about* the language, Sharwood Smith and Truscott (2014) have argued, as mentioned above, that the development of this knowledge facilitates the development of their language system by leading them to create better perceptual structures, or forms, with which to associate conceptual

structures, or meanings. In other words, properly conducted explicit instruction can lead to greater accuracy in a short amount of time.

5.7.2. The importance of German articles

Another implication raised by the study is that more emphasis needs to be placed on *why* the German articles are important, and that this should take place early on. Based on the author's experience and review and use of a number of beginning German textbooks, the importance of articles is rarely, if ever, emphasized. It is common for instructors inform their students that they should learn the definite article with the noun—e.g. to learn *der Hund* rather than just *Hund*—in order to learn the gender of the noun, without giving information about cases or why they should learn noun genders in the first place.

An approach that may prove more productive in the long run would be to demonstrate from the very beginning the fact that these articles will change, and that those changes convey meaning. This could be seen as an extension of EI: informing the students about the articles and that they might be tempted to ignore these articles, but shouldn't. Rather than being applicable to a single intervention, however, it would be applicable to a whole course of instruction. It would perhaps be even more effective if this EI were repeated throughout the course, especially when new case forms are learned.

5.7.3. Increase attention to accusative and dative case mapping

Another implication is that more attention needs to be paid to the form-meaning mapping of the individual cases before attempting the two-way prepositions. The fact that almost half of the occurrences of the article *der* were identified as the wrong case and gender demonstrates that this form-meaning mapping is very weak. Since the form *der* maps to multiple conceptual structures, unlike the article *dem*, learners should be afforded more opportunities to process *der* as a

feminine dative. It is important to note also that, as Sharwood Smith and Truscott (2014) have mentioned, exposure is not enough, the forms need to be processed for acquisition to take place.

5.8. Limitations

There are several limitations to the present study that may have affected the results and the conclusions based on those results. These limitations will be noted in the following section as well as suggestions for addressing them.

5.8.1. Number of participants

The number of participants for this study is relatively low and split across two separate experiments. While no significant difference was found between the two experimental groups, the independent variable may have such low power that the effect can only be seen with a much larger pool of participants.

There are two particular ways this limitation could be addressed. One is to repeat the same experiment over multiple semesters until a sufficiently large number of participants for each experimental condition is reached. Another way would be to conduct the experiment at the same time in multiple locations. This would require coordinating with venues where the curriculum is the same or at least similar enough that differences between the venues could be mitigated. Finally, the two approaches could easily be combined, conducting the same experiment in multiple locations over several semesters.

5.8.2. Short-term nature of the study

Another limitation of this study is that it only examines learning in the short term. The post-test was conducted immediately after the intervention and the long-term effects of the intervention were not measured. The obvious implication would be to address this limitation by adding one or more longitudinal components. Participants could be retested at subsequent points in the same

semester, such as in the immediate chapter exam and again in the final exam for the course. Participants could also be tracked and retested in subsequent semesters.

5.9. Future research

Along with the suggestions given for increasing the participant pool and adding longitudinal components, there are several ways that the present study could be either extended or supplemented.

5.9.1. Effect of instructional changes prior to treatment

One possibility would be to conduct a multi-semester experiment where one of the pedagogical implications is implemented prior to the two-way preposition treatment. For example, one group of participants could be given the suggested EI about German articles at the beginning of the semester, a second group provided the same EI at multiple points in the semester, and a third group not provided any EI about articles, but simply given the usual instructions. In the subsequent semester, all participants would be provided the same instruction about two-way prepositions and then tested following the intervention. The groups would be compared to see if there is any difference between them in their ability to interpret two-way prepositions, or even in their ability to interpret and use the German case system in general.

5.9.2. Investigation of a learner corpus

An ancillary study that could be conducted would be to examine a learner corpus to track how learner case interpretation and use changes over a period of several semesters. Such an investigation could reveal insights that either support or refute some of the conclusions made in this study, but could also be useful for German instructed SLA in general. It could provide

support for an acquisition sequence or may reveal areas where improvement in German pedagogy is needed.

5.10. Conclusion

Despite the limitations and problems encountered in carrying out this study, valuable insights can be gleaned from the results that were obtained. Examining the results within the overarching framework of input processing in general and MOGUL in particular, the data collected from the study, especially the participant responses in the think-aloud protocols, provides insights into the strategies learners use. This in turn carries with it certain implications for German instructed SLA that can guide future classroom practices. While showing that a certain approach to teaching German two-way prepositions can be effective, the study reveals areas where future research can provide further insights into the teaching of German grammar.

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Appendices

Appendix A: Test Version A, First Study

Instructions:

When giving this to your students, refer to it as a **diagnostic exercise**. You should stress the point that it is just to see how much knowledge they already have, to prepare for an upcoming lesson, but it won't affect their grades.

Read the following sentences to your students. Remember to speak distinctly! You may repeat each sentence once, but don't allow more than 30 seconds before you move on to the next one.

Once you have completed the listening portion, move directly to the written portion. You may want to give them instructions for both before starting.

Script for Listening Task:⁵

- | | |
|---|--|
| 1. Der Hund läuft in dem Zimmer. | <i>The dog is running inside the room.</i> |
| 2. Seine Schwester geht in das Kaufhaus. | <i>His sister is going into the store.</i> |
| 3. Mein Vater reist mit meiner Mutter. | <i>My father is traveling with my mother. *</i> |
| 4. Der Bus fährt in die Stadt. | <i>The bus is driving into the city.</i> |
| 5. Meine Familie reist in der Schweiz. | <i>My family is traveling in Switzerland.</i> |
| 6. Der Junge läuft in das Museum. | <i>The boy is running into the museum.</i> |
| 7. Der Kellner läuft in dem Restaurant. | <i>The waiter is running in the restaurant.</i> |
| 8. Das Auto fährt aus der Stadt. | <i>The car is driving out of the city. *</i> |
| 9. Meine Katze läuft in dem Kino. | <i>My cat is running in the cinema.</i> |
| 10. Viele Kinder laufen in das Hotel. | <i>Many children are running into the hotel.</i> |
| 11. Sein Sohn läuft in der Kirche. | <i>His son is running in the church.</i> |
| 12. Ihre Tochter läuft in die Bäckerei. | <i>Her daughter is running into the bakery.</i> |
| 13. Der Hund geht um die Bank. | <i>The dog is going around the bank. *</i> |
| 14. Er fährt sein Fahrrad in die Schule. | <i>He is riding his bicycle into the school.</i> |
| 15. Meine Freundin wandert in den Bergen. | <i>My girlfriend is hiking in the mountains.</i> |

* - denotes distractor items

⁵ This script was provided to the instructors for the pretest, who read it to the participants. The same items were recorded for the post-test and administered using audio recording equipment.

Answer sheet (Post-test):⁶**Listening Exercise:**

You will hear several simple sentences read to you. Decide whether each sentence is indicating action at a location, movement to a destination, or something else (other). Place a check mark in the appropriate column for each sentence you hear.

After you hear each sentence read, please talk out loud about what you notice in the sentence that leads you to make your choice. Remember to do this after every sentence!

| | <u>Location</u> | <u>Destination</u> | <u>Other</u> | |
|-----|-----------------|--------------------|--------------|--|
| 1. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 2. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 3. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 4. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 5. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 6. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 7. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 8. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 9. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 10. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 11. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 12. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 13. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 14. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 15. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |

⁶ This same answer sheet was provided for both versions of the post-test. For the pre-test, the sentence “Think out loud about your decision!” was removed.

Reading Task (Instruction and vocabulary information, Post-test):⁷

On the next couple of pages, you will be presented with a set of pictures. Below each picture is a sentence with three possible endings. Put a check mark in the blank next to the ending that reflects what you see happening in the picture.

****Like the listening exercise, think out loud about why you chose one ending over the others.

Here are the genders of some of the words you will see in this portion of the exercise:

Masculine:

Garten
Keller
Park

Feminine:

Bibliothek
Küche
Bar

Neuter:

Restaurant
Museum
Arbeitszimmer
Wohnzimmer
Schlafzimmer
Haus

Turn in your answer sheet when you are done.

⁷ The same instructions were given for both versions of the post-test. The same instructions were provided for the pre-test, with the instruction to think out loud removed.

Reading task answer sheet:⁸

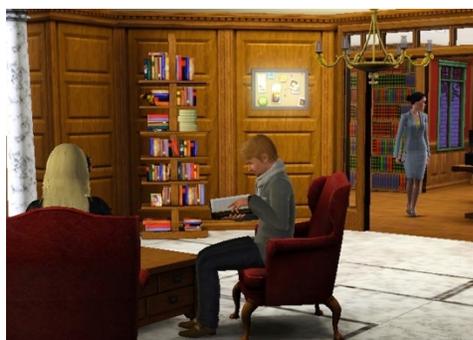
Hans geht...

- _____ in der Garten.
 _____ in dem Garten.
 _____ in den Garten.



Hans und Heidi essen...

- _____ in dem Restaurant.
 _____ in das Restaurant.
 _____ in den Restaurant.



Hans liest...

- _____ in dem Bibliothek.
 _____ in der Bibliothek.
 _____ in die Bibliothek.



Hans kommt...

- _____ aus das Haus.
 _____ aus den Haus.
 _____ aus dem Haus.



Hans kommt...

- _____ in den Museum.
 _____ in das Museum.
 _____ in dem Museum.



Hans und Heidi spielen...

- _____ in der Keller.
 _____ in den Keller.
 _____ in dem Keller.

⁸ All images on pages 118, 119, 121, and 122 created using The Sims 3 © 2009 Electronic Arts. EA's position is that "permission is not required to make traditional educational use of our game content" (EA Permission Requests Team, personal communication, May 5, 2016).



Heidi kommt...

- _____ in die Küche.
- _____ in der Küche.
- _____ in den Küche.



Heidi kommt...

- _____ in dem Arbeitszimmer.
- _____ in das Arbeitszimmer.
- _____ in den Arbeitszimmer.



Hans und Heidi spielen...

- _____ in dem Park.
- _____ in den Park.
- _____ in der Park.



Heidi geht...

- _____ aus das Zimmer.
- _____ aus den Zimmer.
- _____ aus dem Zimmer.



Hans und Heidi kommen...

- _____ in den Bar.
- _____ in die Bar.
- _____ in der Bar.



Hans ist...

- _____ in das Wohnzimmer.
- _____ in dem Wohnzimmer.
- _____ in den Wohnzimmer.

Appendix B: Test Version B, First Study

Instructions:

When giving this to your students, refer to it as a **diagnostic exercise**. You should stress the point that it is just to see how much knowledge they already have, to prepare for an upcoming lesson, but it won't affect their grades.

Read the following sentences to your students. Remember to speak distinctly! You may repeat each sentence once, but don't allow more than 30 seconds before you move on to the next one.

Once you have completed the listening portion, move directly to the written portion. You may want to give them instructions for both before starting.

Script for Listening Exercise:

- | | |
|---|--|
| 1. Seine Schwester läuft in dem Kaufhaus. | <i>His sister is running in the store.</i> |
| 2. Meine Freundin wandert in die Berge. | <i>My girlfriend is hiking into the mountains.</i> |
| 3. Der Hund geht um das Auto. | <i>The dog is going around the car. *</i> |
| 4. Meine Familie reist in die Schweiz. | <i>My family is traveling to Switzerland.</i> |
| 5. Der Junge läuft in dem Museum. | <i>The boy is running in the museum.</i> |
| 6. Er fährt sein Fahrrad in der Schule. | <i>He is riding his bicycle in the school.</i> |
| 7. Sein Sohn läuft in die Kirche. | <i>His son is running into the church.</i> |
| 8. Der Kellner läuft in das Restaurant. | <i>The waiter is running into the restaurant.</i> |
| 9. Das Auto fährt aus dem Hotel. | <i>The car is driving out of the hotel. *</i> |
| 10. Viele Kinder laufen in dem Hotel. | <i>Many children are running in the hotel.</i> |
| 11. Der Bus fährt in der Stadt. | <i>The bus is driving in the city.</i> |
| 12. Ihre Tochter läuft in der Bäckerei. | <i>Her daughter is running in the bakery.</i> |
| 13. Mein Vater reist mit meiner Mutter. | <i>My father is traveling with my mother. *</i> |
| 14. Meine Katze läuft in das Kino. | <i>My cat is running into the cinema.</i> |
| 15. Der Hund läuft in das Zimmer. | <i>The dog is running into the room.</i> |

* - denotes distractor items

Reading task answer sheet:



Heidi kocht...

- _____ in die Küche.
- _____ in der Küche.
- _____ in den Küche.



Hans kommt...

- _____ in dem Wohnzimmer.
- _____ in den Wohnzimmer.
- _____ in das Wohnzimmer.



Heidi arbeitet...

- _____ in dem Arbeitszimmer.
- _____ in das Arbeitszimmer.
- _____ in den Arbeitszimmer.



Hans und Heidi tanzen...

- _____ in die Bar.
- _____ in der Bar.
- _____ in den Bar.



Heidi geht...

- _____ aus dem Zimmer.
- _____ aus den Zimmer.
- _____ aus das Zimmer.



Heidi geht...

- _____ in der Park.
- _____ in dem Park.
- _____ in den Park.



Hans liest...

- _____ in den Garten.
- _____ in dem Garten.
- _____ in der Garten.



Hans kommt...

- _____ in die Bibliothek.
- _____ in der Bibliothek.
- _____ in den Bibliothek.



Hans kommt ...

- _____ aus das Haus.
- _____ aus dem Haus.
- _____ aus den Haus.



Heidi kommt...

- _____ in der Keller.
- _____ in den Keller.
- _____ in dem Keller.



Hans schläft ...

- _____ in das Museum.
- _____ in den Museum.
- _____ in dem Museum.



Hans geht...

- _____ in das Restaurant.
- _____ in den Restaurant.
- _____ in dem Restaurant.

Appendix C: Post-test listening script, First Study

Instructions to the students:⁹

This part of your quiz is a listening exercise. You will hear me read ten sentences out loud. On your worksheet, decide if each sentence is referring to a destination, a location, or something else, and place a check mark in the appropriate column to the right.

While you are deciding which one to check, please think out loud about your decision: what do you hear that leads you to that decision?

Listen closely to the following example. In this example, the student needs to decide if the sentence is something that was done yesterday or will be done tomorrow. You will hear me read a sentence, then you will hear the student talking out loud about (his/her) choice.

Nummer 1: Hans musste nach Hamburg fahren.

ad-lib making a decision to select “yesterday”. Focus on noticing the “musste” as opposed to muss.¹⁰

Make sure you do this after every sentence you hear. You will only have fifteen seconds to answer after each sentence, so make sure you don't take too much time to decide!

When you have finished the listening exercise, wait for further directions from your instructor.

Now, make sure you have your answer sheet ready for the listening exercise. The quiz will begin in just a few seconds.

(pause)

Read script.

⁹ These instructions were recorded and the participants listened to them prior to starting the listening task of the post-test.

¹⁰ One of the instructors recorded this portion, providing a voice other than the researcher's, in order to emphasize that this is what the students should be doing.

Appendix D: Test Version A, Second Study

Instructions (pre-test):¹¹

When giving this to your students, refer to it as a **diagnostic exercise**. You should stress the point that it is just to see how much knowledge they already have, to prepare for an upcoming lesson, but it won't affect their grades.

Read the following sentences to your students. Remember to speak distinctly! You may repeat each sentence once, but don't allow more than 30 seconds before you move on to the next one.

Once you have completed the listening portion, move directly to the written portion. You may want to give them instructions for both before starting.

Script for Listening Exercise:

| | | |
|-----|-----------------------------------|---|
| 1. | Bello rennt in dem Theater | <i>Bello races in the theater</i> |
| 2. | Heidi fährt in dem Dorf | <i>Heidi drives in the village</i> |
| 3. | Bello läuft in der Bäckerei | <i>Bello runs in the bakery</i> |
| 4. | <i>Bello rennt um das Auto</i> | <i>Bello runs around the car *</i> |
| 5. | Heidi fährt in der Stadt | <i>Heidi drives in the city</i> |
| 6. | Bello geht in das Museum | <i>Bello goes into the museum</i> |
| 7. | Heidi fährt in das Zentrum | <i>Heidi drives into the center</i> |
| 8. | Bello läuft in das Restaurant | <i>Bello runs into the restaurant</i> |
| 9. | <i>Bello rennt um das Café</i> | <i>Bello races around the café *</i> |
| 10. | Bello geht in die Wohnung | <i>Bello goes into the apartment</i> |
| 11. | Bello rennt in der Garage | <i>Bello races in the garage</i> |
| 12. | Heidi geht in die Küche | <i>Heidi goes into the kitchen</i> |
| 13. | <i>Bello läuft aus der Schule</i> | <i>Bello runs out of the school *</i> |
| 14. | Bello läuft in dem Kino | <i>Bello runs in the cinema</i> |
| 15. | Heidi reist in die Schweiz | <i>Heidi travels (in)to Switzerland</i> |

* - denotes distractor items

¹¹ Post-test instructions were recorded and are included as part of the script in Appendix F.

Answer sheet (Post-test):¹²**Listening Exercise:**

Heidi and her dog Bello are always in motion. Listen to Heidi talk about her and her dog and decide whether she is saying they are doing something *in* a place, going *into* the place mentioned, or if she is saying something else (*other*) about their activities. Place a check mark in the appropriate column for each sentence you hear.

After you hear each sentence read, please talk out loud about what you notice in the sentence that leads you to make your choice. **Do not** simply repeat what you hear. Tell me *why* you are making your choice. **Remember to do this after every sentence!**

Practice sentences:

| | <u>In</u> | <u>Into</u> | <u>Other</u> | |
|----|-----------|-------------|--------------|--|
| 1. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 2. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 3. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |

Listening exercise:

| | <u>In</u> | <u>Into</u> | <u>Other</u> | |
|-----|-----------|-------------|--------------|--|
| 1. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 2. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 3. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 4. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 5. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 6. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 7. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 8. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 9. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 10. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 11. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 12. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 13. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 14. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |
| 15. | _____ | _____ | _____ | <i>Think out loud about your decision!</i> |

¹² The same answer sheet was provided for both versions and both the pre- and post-tests, with the “think out loud” instructions removed for the pre-test.

Reading task answer sheet:¹³

A



Figure D-1

B



Figure D-2

Bello läuft in das Café.

A



Figure D-3

B



Figure D-4

Heidi wirft das Frisbee in der Garage.

A



Figure D-5

B



Figure D-6

Der Vogel fliegt in das Theater.

¹³ Image credits for Appendices D and E provided at the end of Appendix E.

A



Figure D-7

B



Figure D-8

Steffi fährt aus dem Haus.

A



Figure D-9

B



Figure D-10

Der Vogel fliegt in der Schule.

A



Figure D-11

B



Figure D-12

Bello rennt in das Restaurant.

A



Figure D-13

B



Figure D-14

Heidi wirft das Frisbee in die Küche.

A



Figure D-15

B



Figure D-16

Der Vogel fliegt in dem Kino.

A



Figure D-17

B



Figure D-18

Bello läuft in der Kirche.

A



Figure D-19

B



Figure D-20

Der Dieb geht durch das Fenster.

A

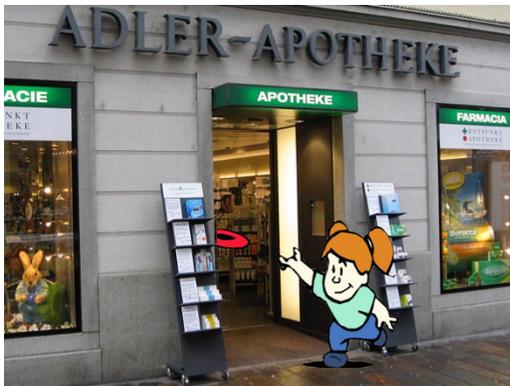


Figure D-21

B



Figure D-22

Heidi wirft das Frisbee in die Apotheke.

A



Figure D-23

B



Figure D-24

Bello läuft in dem Museum.

Appendix E: Test Version B, Second Study**Script for Listening Exercise:**

- | | | |
|-----|---------------------------------|---------------------------------------|
| 1. | Bello geht in das Kino | <i>Bello goes into the restaurant</i> |
| 2. | Bello läuft in der Wohnung | <i>Bello runs in the apartment</i> |
| 3. | <i>Bello geht um die Schule</i> | <i>Bello goes around the school *</i> |
| 4. | Bello läuft in die Garage | <i>Bello runs into the garage</i> |
| 5. | Heidi reist in der Schweiz | <i>Heidi travels in Switzerland</i> |
| 6. | Heidi fährt in die Stadt | <i>Heidi drives into the city</i> |
| 7. | Bello rennt in dem Restaurant | <i>Bello races in the restaurant</i> |
| 8. | <i>Bello geht aus dem Café</i> | <i>Bello goes out of the café *</i> |
| 9. | Bello geht in das Theater | <i>Bello goes into the theater</i> |
| 10. | Bello rennt in die Bäckerei | <i>Bello races into the bakery</i> |
| 11. | Heidi läuft in der Küche | <i>Heidi runs in the kitchen</i> |
| 12. | Heidi fährt in das Dorf | <i>Heidi drives into the village</i> |
| 13. | <i>Bello läuft aus dem Auto</i> | <i>Bello runs out of the car *</i> |
| 14. | Bello rennt in dem Museum | <i>Bello races in the museum</i> |
| 15. | Heidi fährt in dem Zentrum | <i>Heidi drives in the center</i> |

* - denotes a distractor item

Reading task answer sheet:

A



Figure E-1

B



Figure E-2

Heidi wirft das Frisbee in die Garage.

A



Figure E-3

B



Figure E-4

Bello rennt in dem Restaurant.

A

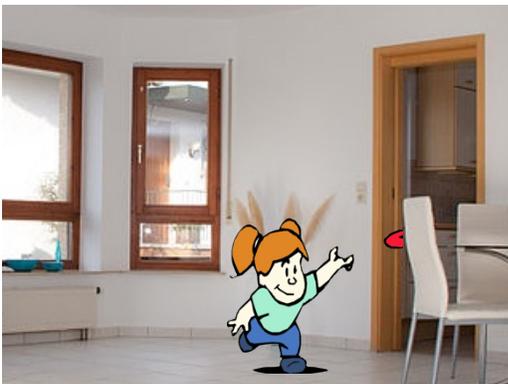


Figure E-5

B



Figure E-6

Heidi wirft das Frisbee in der Küche.

A



Figure E-7

B



Figure E-8

Steffi fährt durch die Tür.

A



Figure E-9

B



Figure E-10

Der Vogel fliegt in die Schule.

A



Figure E-11

B



Figure E-12

Bello läuft in dem Café.

A



Figure E-13

B



Figure E-14

Der Vogel fliegt in das Kino.

A

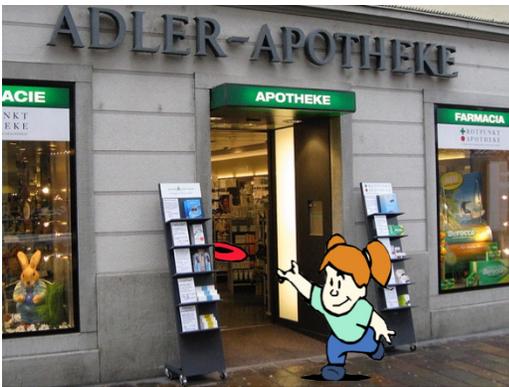


Figure E-15

B



Figure E-16

Heidi wirft das Frisbee in der Apotheke.

A

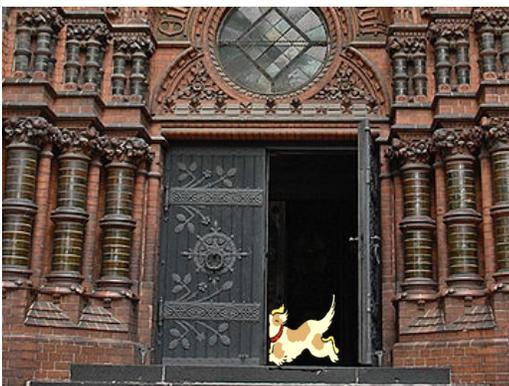


Figure E-17

B



Figure E-18

Bello läuft in die Kirche.

A



Figure E-19

B



Figure E-20

Der Dieb geht aus dem Haus.

A



Figure E-21

B



Figure E-22

Bello läuft in das Museum.

A



Figure E-23

B



Figure E-24

Der Vogel fliegt in dem Theater.

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pg

Figures D-14 and E-6: Kitchen by keresi72, cropped, Public Domain

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Appendix F: Post-test listening script

Instructions to the students¹⁴:

In this listening exercise you will hear me read ten sentences out loud. As you listen to each sentence, decide if it is indicating motion into or to a place, action in or within a place, or something else, and place a checkmark in the appropriate column on your answer sheet.

While you are marking your sheet, please think out loud about why you chose that answer. What do you hear that leads you to that decision?

Listen closely to the following example. In this example, the student needs to decide if the sentence is something that was done yesterday, or will be done tomorrow. You will hear me read the sentence, then you will hear the student talking out loud about her choice.

Example:

Hans musste nach Hamburg fahren.

“Student” response:

Umm...well I heard musste instead of muss, and that –te means that it’s past-tense, so I’m going to select “yesterday”.

Notice how she thinks about what it is that leads her to her decision. Make sure you do this after every sentence that you hear. You will only have 15 seconds to answer each sentence, so make sure you don’t take too much time to decide. When you have finished the listening exercise, wait for further directions from your instructor.

Before we begin the actual exercise, we will do three practice sentences. Listen closely to the sentence, and while you mark your answer on the sheet, remember to think out loud about what lead you to choose that answer.

Here’s the first practice sentence: *Nummer 1. Bello geht in das Zimmer.*

Did you remember to think out loud as you were marking your answer sheet? It is important you do this, so please remember to do so.

Here’s the second practice sentence: *Nummer 2: Bello sitzt in dem Zimmer.*

You’ll notice that you only have 15 seconds to answer, so don’t take too long. More importantly, don’t forget to think out loud.

Here’s the final practice sentence: *Nummer 3: Bello schläft in der Küche.*

¹⁴ This script was used to record the stimuli for the listening portion of the post-test. The primary investigator recorded the instructions, presented here, and the stimuli for each version of the test. The participants heard these instructions before beginning the post-test.

That's the end of the practice sentences. You will now begin the listening exercise itself. Now make sure you have your answer sheet ready for the exercise. You will begin in just a few seconds. Remember to think out loud while you are marking your answer.

Script is read.

Appendix G: Exercises for the -LC group, both studies

Instructions for the instructors:

The first exercise uses the slides in the presentation that come right after the grammar explanation. I've included a slide that warns the students (and you) that an exercise is coming up. While on this slide read or explain the directions on their worksheets.

The students will see two pictures and a sentence on the screen. Read the sentence out loud and allow them enough time to mark one of the letters down on their worksheet. Discuss each item before moving on to the next one.

Script for Aktivität 1a: (these are the sentences they will see on the screen)

Herr Ampelmännchen flitzt in das Theater.

Herr Ampelmännchen flaniert in das Museum.

Herr Ampelmännchen schlemmt in dem Restaurant.

Herr Ampelmännchen bummelt in das Kino.

Herr Ampelmännchen vergnügt sich in dem Haus.

Herr Ampelmännchen trödelt in dem Café.

These are the sentences for the listening exercise.

Script for Aktivität 1b:

Walther schlummert in dem Hotel.

Sabine rennt in das Zimmer.

Renate säumt in dem Theater.

Stefan döst in dem Auto.

Heidi gleitet in das Kino.

Der Hund schleicht in das Bad.

Aktivität 1a:¹⁵

For this activity, you will be shown two pictures on the screen, but you will hear and read a description for only one of the pictures. In the blanks below, write down the letter you see under the picture that is being described.

Remember, motion to or **into** a place is indicated by the Accusative Case and events **in** or within are indicated by the Dative Case. Pay attention to the article in each sentence.

Picture

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Aktivität 1b:

You will hear your instructor read several different sentences. Listen to each one and decide if it is indicating something happening **in** a location or movement **into** or to a location. Mark either the **in** or **into** column for each sentence. Remember, motion to or **into** a place is indicated by the **accusative** case and events **in** or within a place are indicated by the **dative** case.

For this exercise, all of the destinations and locations are neuter (das).

- | | <u>in</u> | <u>into</u> |
|----|------------------|--------------------|
| 1. | _____ | _____ |
| 2. | _____ | _____ |
| 3. | _____ | _____ |
| 4. | _____ | _____ |
| 5. | _____ | _____ |
| 6. | _____ | _____ |

¹⁵ All remaining items in this appendix were given to the participants on worksheets following the treatment.

Aktivität 2:

For this exercise, you will need to first select one of the two verbs given. Decide if the preposition is showing a destination or a location. If it is a destination, select the verb of motion (gehen). If not, then select the verb that shows a location (arbeiten). Next, place a check mark under the “und ich auch!” column if that sentence applies to you as well. Compare your results with a partner by reading aloud each sentence for which you selected “und ich auch.”

...und ich auch!

- | | |
|--|-------|
| 1. Claudia (geht/arbeitet) oft in die Bibliothek. | _____ |
| 2. Am Wochenende (geht/arbeitet) Karl in dem Restaurant. | _____ |
| 3. Stephanie (geht/arbeitet) jeden Tag in das Fitnesscenter. | _____ |
| 4. Max (geht/arbeitet) täglich in dem Kino. | _____ |
| 5. Morgens (geht/arbeitet) Jörg in dem Café. | _____ |
| 6. Am Sonntag (geht/arbeitet) Hannah in den Park. | _____ |
| 7. Pia (geht/arbeitet) täglich in das Kaufhaus. | _____ |
| 8. In dem Supermarkt (geht/arbeitet) Max am Wochenende. | _____ |

Aktivität 3:

You are riding on a train in Germany and a lady next to you is talking loudly on her cell phone. She seems to be answering a series of questions, giving only very short answers. Read her answers and decide if they indicate something happening **in** a place or motion **into** or to a place. Write **in** or **into** in the blank next to each phrase.

Remember, motion **into** (Wohin?) is indicated with the Accusative case and action **in** or within (Wo?) is indicated by the Dative case.

- | | |
|-------|--|
| _____ | 1. An dem Fenster. |
| _____ | 2. Auf den Tisch. |
| _____ | 3. Hinter das Sofa. |
| _____ | 4. In dem Schrank. |
| _____ | 5. Neben dem Bett. |
| _____ | 6. Über die Brücke. |
| _____ | 7. Unter dem Stuhl. |
| _____ | 8. Vor das Restaurant. |
| _____ | 9. Zwischen den Bahnhof und die Disko. |

Aktivität 4a:¹⁶



a.

b.

c.

d.



e.

f.

g.



h.

i.

j.

Look at each of the pictures above, and then match the letter below each picture to the proper German word for that location.

_____ das Schlafzimmer

_____ der Park

_____ das Restaurant

_____ die Kirche

_____ das Fitnesscenter

_____ die Stadtmitte

_____ das Kaffeehaus

_____ der Supermarkt

_____ die Bibliothek

_____ das Klassenzimmer

¹⁶ Image credits for activities in Appendices G and H provided at the end of Appendix H.

Aktivität 4b:

Look at the following sentences. Each mentions a time and a place that “ich” goes to or **into** regularly. Next to each sentence, put a check mark in the appropriate column for how often you go to the same destination in a month.

| Ich gehe... | <u>t</u> äglich | <u>o</u> ft | <u>m</u> anchmal | <u>s</u> elten | <u>n</u> ie |
|--------------------------|-----------------|-------------|------------------|----------------|-------------|
| 1. in das Klassenzimmer. | _____ | _____ | _____ | _____ | _____ |
| 2. in das Fitnesscenter. | _____ | _____ | _____ | _____ | _____ |
| 3. in das Kaffeehaus. | _____ | _____ | _____ | _____ | _____ |
| 4. in die Bibliothek. | _____ | _____ | _____ | _____ | _____ |
| 5. in den Supermarkt. | _____ | _____ | _____ | _____ | _____ |
| 6. in das Restaurant. | _____ | _____ | _____ | _____ | _____ |
| 7. in die Stadtmitte. | _____ | _____ | _____ | _____ | _____ |
| 8. in das Schlafzimmer. | _____ | _____ | _____ | _____ | _____ |
| 9. in die Kirche. | _____ | _____ | _____ | _____ | _____ |
| 10. in den Park | _____ | _____ | _____ | _____ | _____ |

Now compare your results with a partner by reading aloud each statement, using the adverb that you selected.

For example, if you select *selten* for statement #2, you would say to your partner:

Ich gehe *selten* in das Fitnesscenter.

How many items do you have in common? _____

Aktivität 5: Der verrückte Mitbewohner.

Review these words for rooms and items you might find in a house or apartment:

| | |
|----------------------|-------------------|
| Arbeitszimmer: _____ | Badezimmer: _____ |
| Esszimmer: _____ | Garage: _____ |
| Küche: _____ | Regal: _____ |
| Schlafzimmer: _____ | Schrank: _____ |
| Wecker: _____ | Wohnzimmer: _____ |

You've just moved in to your new apartment with a new roommate and you find some of his belongings **in** odd places. Look at the list of items and places where they are and decide if that is a normal or odd (komisch) place for it. Check the column that reflects your decision.

| <u>Was?</u> | <u>Wo?</u> | <u>Normal</u> | <u>Komisch</u> |
|-------------|-----------------------|---------------|----------------|
| Computer | in dem Arbeitszimmer. | _____ | _____ |
| Sofa | in dem Schlafzimmer. | _____ | _____ |
| Bett | in der Garage. | _____ | _____ |
| Lampe | in dem Wohnzimmer. | _____ | _____ |
| Bier | in dem Badezimmer. | _____ | _____ |
| Gitarre | in der Küche. | _____ | _____ |
| Stuhl | in dem Esszimmer. | _____ | _____ |
| Buch | in dem Regal. | _____ | _____ |
| Wecker | in dem Schrank. | _____ | _____ |

Appendix H: Exercises for the +LC group, both studies*Instructions for the instructors:*

The first exercise uses the slides in the presentation that come right after the grammar explanation. I've included a slide that warns the students (and you) that an exercise is coming up. While on this slide read or explain the directions on their worksheets.

The students will see two pictures and a sentence on the screen. Read the sentence out loud and allow them enough time to mark one of the letters down on their worksheet. Discuss each item before moving on to the next one.

Script for Aktivität 1a: (these are the sentences they will see on the screen)

Herr Ampelmännchen geht in das Theater.

Herr Ampelmännchen geht in das Museum.

Herr Ampelmännchen isst in dem Restaurant.

Herr Ampelmännchen geht in das Kino.

Herr Ampelmännchen spielt in dem Haus.

Herr Ampelmännchen trinkt in dem Café.

These are the sentences for the listening exercise.

Script for Aktivität 1b:

Walther schläft in dem Hotel.

Sabine geht in das Zimmer.

Renate sitzt in dem Theater.

Stefan ist in dem Auto.

Heidi läuft in das Kino.

Der Hund geht in das Bad.

Aktivität 1a:¹⁷

For this activity, you will be shown two pictures on the screen, but you will hear and read a description for only one of the pictures. In the blanks below, write down the letter you see under the picture that is being described.

Remember, motion to or **into** a place is indicated by the Accusative Case and events **in** or within are indicated by the Dative Case. Pay attention to the article in each sentence.

Picture

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Aktivität 1b:

You will hear your instructor read several different sentences. Listen to each one and decide if it is indicating something happening **in** a location or movement **into** or to a location. Mark either the **in** or **into** column for each sentence. Remember, motion to or **into** a place is indicated by the **accusative** case and events **in** or within a place are indicated by the **dative** case.

For this exercise, all of the destinations and locations are neuter (das).

- | | <u>in</u> | <u>into</u> |
|----|------------------|--------------------|
| 1. | _____ | _____ |
| 2. | _____ | _____ |
| 3. | _____ | _____ |
| 4. | _____ | _____ |
| 5. | _____ | _____ |
| 6. | _____ | _____ |

¹⁷ All remaining items in this appendix were given to the participants on worksheets following the treatment.

Aktivität 2:

For this exercise, read the sentences below, then place a check mark under the “und ich auch!” column if that sentence applies to you as well. Compare your results with a partner by reading aloud each statement for which you checked “und ich auch.”

| | <u>...und ich auch!</u> |
|---|-------------------------|
| 1. Claudia geht oft in die Bibliothek. | _____ |
| 2. Am Wochenende arbeitet Karl in dem Restaurant. | _____ |
| 3. Stephanie geht jeden Tag in das Fitnesscenter. | _____ |
| 4. Max arbeitet täglich in dem Kino. | _____ |
| 5. Morgens arbeitet Jörg in dem Café. | _____ |
| 6. Am Sonntag geht Hannah in den Park. | _____ |
| 7. Pia geht täglich in das Kaufhaus. | _____ |
| 8. In dem Supermarkt arbeitet Max am Wochenende. | _____ |

Aktivität 3:

You are riding on a train in Germany and a lady next to you is talking loudly on her cell phone. She seems to be answering a series of questions, giving only very short answers. Read her answers and decide if they indicate something happening **in** a place or motion **into** or to a place. Write **in** or **into** in the blank next to each phrase.

Remember, motion **into** (Wohin?) is indicated with the Accusative case and action **in** or within (Wo?) is indicated by the Dative case.

- _____ 1. Es steht an dem Fenster.
- _____ 2. Die Katze springt immer auf den Tisch.
- _____ 3. Mein Hund geht oft hinter das Sofa.
- _____ 4. Die Flasche steht in dem Schrank.
- _____ 5. Sie steht neben dem Bett.
- _____ 6. Der Zug fährt jetzt über die Brücke.
- _____ 7. Er ist unter dem Stuhl.
- _____ 8. Geh vor das Restaurant.
- _____ 9. Wir fahren zwischen den Bahnhof und die Disko.

Aktivität 4a:¹⁸



a.

b.

c.

d.



e.

f.

g.



h.

i.

j.

Look at each of the pictures above, and then match the letter below each picture to the proper German word for that location.

- | | | |
|-------------------------|-------------------------|----------------------|
| _____ das Schlafzimmer | _____ der Park | _____ das Restaurant |
| _____ die Kirche | _____ das Fitnesscenter | _____ die Stadtmitte |
| _____ das Kaffeehaus | _____ der Supermarkt | _____ die Bibliothek |
| _____ das Klassenzimmer | | |

¹⁸ Image credits for activities in Appendices G and H provided at the end of Appendix H.

Aktivität 4b:

Look at the following sentences. Each mentions a time and **destination** that “ich” goes to regularly. Next to each sentence, put a check mark in the appropriate column for how often you go to the same destination in a month.

| | <u>t</u> äglich | <u>o</u> ft | <u>m</u> anchmal | <u>s</u> elten | <u>n</u> ie |
|--|-----------------|-------------|------------------|----------------|-------------|
| 1. Ich gehe oft in das Klassenzimmer. | _____ | _____ | _____ | _____ | _____ |
| 2. Ich gehe manchmal in das Fitnesscenter. | _____ | _____ | _____ | _____ | _____ |
| 3. Ich gehe täglich in das Kaffeehaus. | _____ | _____ | _____ | _____ | _____ |
| 4. Ich gehe selten in die Bibliothek. | _____ | _____ | _____ | _____ | _____ |
| 5. Ich gehe manchmal in den Supermarkt. | _____ | _____ | _____ | _____ | _____ |
| 6. Ich gehe oft in das Restaurant. | _____ | _____ | _____ | _____ | _____ |
| 7. Ich gehe manchmal in die Stadtmitte. | _____ | _____ | _____ | _____ | _____ |
| 8. Ich gehe oft in das Schlafzimmer. | _____ | _____ | _____ | _____ | _____ |
| 9. Ich gehe manchmal in die Kirche. | _____ | _____ | _____ | _____ | _____ |
| 10. Ich gehe selten in den Park | _____ | _____ | _____ | _____ | _____ |

Now compare your results with a partner by reading each statement aloud, substituting the adverb in each sentence with the one you selected.

For example, if you select *selten* for sentence #2, you would say to your partner:

Ich gehe *selten* in das Fitnesscenter.

How many items do you have in common? _____

Aktivität 5: Der verrückte Mitbewohner.

Review these words for rooms and items you might find in a house or apartment:

| | |
|----------------------|-------------------|
| Arbeitszimmer: _____ | Badezimmer: _____ |
| Esszimmer: _____ | Garage: _____ |
| Küche: _____ | Regal: _____ |
| Schlafzimmer: _____ | Schrank: _____ |
| Wecker: _____ | Wohnzimmer: _____ |

You've just moved in to your new apartment with a new roommate, who has put things in some odd places. Look at the list of items and places where they are now located and decide if that is a normal or odd (komisch) place for it. Check the column that reflects your decision.

| | <u>Normal</u> | <u>Komisch</u> |
|--|----------------------|-----------------------|
| Der Computer ist in dem Arbeitszimmer. | _____ | _____ |
| Das Sofa ist in dem Schlafzimmer. | _____ | _____ |
| Sein Bett ist in der Garage. | _____ | _____ |
| Eine Lampe ist in dem Wohnzimmer. | _____ | _____ |
| Sein Bier ist in dem Badezimmer. | _____ | _____ |
| Seine Gitarre ist in der Küche. | _____ | _____ |
| Ein Stuhl ist in dem Esszimmer. | _____ | _____ |
| Seine Bücher sind in dem Regal. | _____ | _____ |
| Sein Wecker ist in dem Schrank. | _____ | _____ |

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All images are found on pages 140 and 146 under Aktivität 4a.

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Appendix I: Language Experience Survey, both studies

The following survey questions were used in an electronic survey delivered via Blackboard.

1. What is your name? First: Last:
2. Are you ...
 ___ Male
 ___ Female
3. Are you a ...
 ___ Freshman
 ___ Sophomore
 ___ Junior
 ___ Senior
4. In what year were you born?
5. What is/are your major(s) and minor(s)?
6. What is your native language?
7. How many years have you lived in an English speaking country?
8. Which language(s) do you speak with your family?
9. Do your parents speak German?
10. Which language(s) do you speak when you have conversations with your friends?
11. How many semesters of German have you taken in college, not including the current Semester?
12. How many years (or semesters) of German did you take in Middle School / High School, if any?
13. Have you ever been to a German speaking country?
14. If you have been to a German-speaking country, how much time did you spend there?
15. In what month and year was your most recent visit to a German-speaking country?
16. What other languages have you studied, and how long have you studied them?
17. Why are you studying German (instead of Spanish, Russian, Korean, etc.)?
18. Do you plan on using German after this semester (for travel, for business, for study abroad, for communication with friends, etc)? Please explain.

Appendix J: Test scores by participant

Table J-1: Listening task scores, first study

| -LC | | | | +LC | | | |
|--------------------|------------|-------------|-------------|--------------------|------------|-------------|-------------|
| Participant | Pre | Post | Gain | Participant | Pre | Post | Gain |
| 12S1 | 5 | 8 | 3 | 12N1 | 4 | 8 | 4 |
| 12S2 | 6 | 7 | 1 | 12N2 | 1 | 12 | 11 |
| 12S3 | 7 | 11 | 4 | 12N3 | 5 | 11 | 6 |
| 12S4 | 7 | 7 | 0 | 12N4 | 8 | 11 | 3 |
| 13S1 | 5 | 10 | 5 | 12N5 | 2 | 10 | 8 |
| 13S2 | 5 | 12 | 7 | 12N6 | 5 | 10 | 5 |
| 13S3 | 2 | 10 | 8 | 12N7 | 5 | 3 | -2 |
| 13S4 | 4 | 11 | 7 | 12N8 | 8 | 4 | -4 |
| 13S5 | 3 | 2 | -1 | 12N9 | 5 | 12 | 7 |
| 13S6 | 4 | 10 | 6 | 12N10 | 5 | 11 | 6 |
| 13S7 | 4 | 12 | 8 | 12N11 | 7 | 7 | 0 |
| 13S8 | 5 | 8 | 3 | 13N1 | 7 | 11 | 4 |
| 13S9 | 5 | 8 | 3 | 13N2 | 5 | 11 | 6 |
| 13S10 | 4 | 11 | 7 | 13N3 | 6 | 7 | 1 |
| 13S11 | 6 | 12 | 6 | 13N4 | 6 | 11 | 5 |
| 13S12 | 8 | 12 | 4 | 13N5 | 7 | 8 | 1 |
| 13S13 | 4 | 9 | 5 | 13N6 | 5 | 6 | 1 |
| 13S14 | 5 | 7 | 2 | 13N7 | 5 | 7 | 2 |
| 13S15 | 3 | 12 | 9 | 13N8 | 7 | 5 | -2 |
| 13S16 | 1 | 12 | 11 | 13N9 | 5 | 8 | 3 |
| 13S17 | 3 | 11 | 8 | 13N10 | 7 | 7 | 0 |
| | | | | 13N11 | 7 | 8 | 1 |
| Mean: | 4.57 | 9.62 | 5.05 | Mean: | 5.55 | 8.55 | 3.00 |
| SD: | 1.69 | 2.58 | 3.11 | SD: | 1.74 | 2.63 | 3.63 |

Table J-2: Reading task scores, first study

| -LC | | | | +LC | | | |
|--------------------|------------|-------------|-------------|--------------------|------------|-------------|-------------|
| Participant | Pre | Post | Gain | Participant | Pre | Post | Gain |
| 12S1 | 5 | 1 | -4 | 12N1 | 3 | 4 | 1 |
| 12S2 | 4 | 10 | 6 | 12N2 | 2 | 6 | 4 |
| 12S3 | 0 | 9 | 9 | 12N3 | 2 | 9 | 7 |
| 12S4 | 3 | 7 | 4 | 12N4 | 2 | 10 | 8 |
| 13S1 | 5 | 10 | 5 | 12N5 | 3 | 7 | 4 |
| 13S2 | 4 | 8 | 4 | 12N6 | 2 | 6 | 4 |
| 13S3 | 5 | 8 | 3 | 12N7 | 4 | 10 | 6 |
| 13S4 | 3 | 8 | 5 | 12N8 | 3 | 6 | 3 |
| 13S5 | 3 | 4 | 1 | 12N9 | 2 | 8 | 6 |
| 13S6 | 5 | 9 | 4 | 12N10 | 1 | 9 | 8 |
| 13S7 | 1 | 10 | 9 | 12N11 | 3 | 10 | 7 |
| 13S8 | 4 | 2 | -2 | 13N1 | 4 | 0 | -4 |
| 13S9 | 4 | 5 | 1 | 13N2 | 4 | 9 | 5 |
| 13S10 | 5 | 9 | 4 | 13N3 | 2 | 4 | 2 |
| 13S11 | 5 | 10 | 5 | 13N4 | 4 | 4 | 0 |
| 13S12 | 5 | 9 | 4 | 13N5 | 6 | 9 | 3 |
| 13S13 | 5 | 5 | 0 | 13N6 | 3 | 7 | 4 |
| 13S14 | 2 | 6 | 4 | 13N7 | 3 | 4 | 1 |
| 13S15 | 4 | 7 | 3 | 13N8 | 3 | 8 | 5 |
| 13S16 | 1 | 10 | 9 | 13N9 | 3 | 7 | 4 |
| 13S17 | 3 | 1 | -2 | 13N10 | 3 | 0 | -3 |
| | | | | 13N11 | 3 | 5 | 2 |
| Mean: | 3.62 | 7.05 | 3.43 | Mean: | 2.95 | 6.45 | 3.5 |
| SD: | 1.57 | 2.72 | 3.37 | SD: | 1.05 | 2.92 | 3.17 |

Table J-3: Combined scores, first study

| -LC | | | | +LC | | | |
|--------------------|------------|-------------|-------------|--------------------|------------|-------------|-------------|
| Participant | Pre | Post | Gain | Participant | Pre | Post | Gain |
| 12S1 | 10 | 9 | -1 | 12N1 | 7 | 12 | 5 |
| 12S2 | 10 | 17 | 7 | 12N2 | 3 | 18 | 15 |
| 12S3 | 7 | 20 | 13 | 12N3 | 7 | 20 | 13 |
| 12S4 | 10 | 14 | 4 | 12N4 | 10 | 21 | 11 |
| 13S1 | 10 | 20 | 10 | 12N5 | 5 | 17 | 12 |
| 13S2 | 9 | 20 | 11 | 12N6 | 7 | 16 | 9 |
| 13S3 | 7 | 18 | 11 | 12N7 | 9 | 13 | 4 |
| 13S4 | 7 | 19 | 12 | 12N8 | 11 | 10 | -1 |
| 13S5 | 6 | 6 | 0 | 12N9 | 7 | 20 | 13 |
| 13S6 | 9 | 19 | 10 | 12N10 | 6 | 20 | 14 |
| 13S7 | 5 | 22 | 17 | 12N11 | 10 | 17 | 7 |
| 13S8 | 9 | 10 | 1 | 13N1 | 11 | 11 | 0 |
| 13S9 | 9 | 13 | 4 | 13N2 | 9 | 20 | 11 |
| 13S10 | 9 | 20 | 11 | 13N3 | 8 | 11 | 3 |
| 13S11 | 11 | 22 | 11 | 13N4 | 10 | 15 | 5 |
| 13S12 | 13 | 21 | 8 | 13N5 | 13 | 17 | 4 |
| 13S13 | 9 | 14 | 5 | 13N6 | 8 | 13 | 5 |
| 13S14 | 7 | 13 | 6 | 13N7 | 8 | 11 | 3 |
| 13S15 | 7 | 19 | 12 | 13N8 | 10 | 13 | 3 |
| 13S16 | 2 | 22 | 20 | 13N9 | 8 | 15 | 7 |
| 13S17 | 6 | 12 | 6 | 13N10 | 10 | 7 | -3 |
| | | | | 13N11 | 10 | 13 | 3 |
| Mean: | 8.63 | 16.63 | 8.48 | Mean: | 8.50 | 15.00 | 6.50 |
| SD: | 1.92 | 4.69 | 5.32 | SD: | 2.24 | 3.90 | 5.11 |

Table J-4: Listening task scores, second study

| -LC | | | | +LC | | | |
|--------------------|------------|-------------|-------------|--------------------|------------|-------------|-------------|
| Participant | Pre | Post | Gain | Participant | Pre | Post | Gain |
| 14S1 | 5 | 12 | 7 | 14N1 | 4 | 12 | 8 |
| 14S2 | 6 | 10 | 4 | 14N2 | 4 | 4 | 0 |
| 14S3 | 6 | 9 | 3 | 14N3 | 8 | 12 | 4 |
| 14S4 | 5 | 8 | 3 | 14N4 | 5 | 12 | 7 |
| 14S5 | 5 | 9 | 4 | 14N5 | 5 | 6 | 1 |
| 14S6 | 8 | 5 | -3 | 14N6 | 7 | 6 | -1 |
| 14S7 | 6 | 8 | 2 | 14N7 | 4 | 9 | 5 |
| 14S8 | 4 | 9 | 5 | 14N8 | 5 | 10 | 5 |
| 14S9 | 7 | 12 | 5 | 14N9 | 7 | 9 | 2 |
| 14S10 | 3 | 7 | 4 | 14N10 | 8 | 12 | 4 |
| 14S11 | 8 | 7 | -1 | | | | |
| Mean: | 5.73 | 8.73 | 3.00 | Mean: | 5.70 | 9.20 | 3.50 |
| SD: | 1.48 | 2.00 | 2.70 | SD: | 1.55 | 2.82 | 2.80 |

Table J-5: Reading task scores, second study

| -LC | | | | +LC | | | |
|--------------------|------------|-------------|-------------|--------------------|------------|-------------|-------------|
| Participant | Pre | Post | Gain | Participant | Pre | Post | Gain |
| 14S1 | 1 | 10 | 9 | 14N1 | 6 | 10 | 4 |
| 14S2 | 4 | 10 | 6 | 14N2 | 5 | 2 | -3 |
| 14S3 | 5 | 7 | 2 | 14N3 | 3 | 10 | 7 |
| 14S4 | 1 | 7 | 6 | 14N4 | 7 | 10 | 3 |
| 14S5 | 2 | 9 | 7 | 14N5 | 3 | 10 | 7 |
| 14S6 | 4 | 3 | -1 | 14N6 | 6 | 10 | 4 |
| 14S7 | 3 | 7 | 4 | 14N7 | 7 | 6 | -1 |
| 14S8 | 0 | 7 | 7 | 14N8 | 3 | 8 | 5 |
| 14S9 | 5 | 10 | 5 | 14N9 | 2 | 8 | 6 |
| 14S10 | 5 | 4 | -1 | 14N10 | 1 | 9 | 8 |
| 14S11 | 3 | 7 | 4 | | | | |
| Mean: | 3.00 | 7.36 | 4.36 | Mean: | 4.30 | 8.30 | 4.00 |
| SD: | 1.71 | 2.23 | 3.08 | SD: | 2.05 | 2.45 | 3.38 |

Table J-6: Combined scores, second study

| -LC | | | | +LC | | | |
|--------------------|------------|-------------|-------------|--------------------|------------|-------------|-------------|
| Participant | Pre | Post | Gain | Participant | Pre | Post | Gain |
| 14S1 | 6 | 22 | 16 | 14N1 | 10 | 22 | 12 |
| 14S2 | 10 | 20 | 10 | 14N2 | 9 | 6 | -3 |
| 14S3 | 11 | 16 | 5 | 14N3 | 11 | 22 | 11 |
| 14S4 | 6 | 15 | 9 | 14N4 | 12 | 22 | 10 |
| 14S5 | 7 | 18 | 11 | 14N5 | 8 | 16 | 8 |
| 14S6 | 12 | 8 | -4 | 14N6 | 13 | 16 | 3 |
| 14S7 | 9 | 15 | 6 | 14N7 | 11 | 15 | 4 |
| 14S8 | 4 | 16 | 12 | 14N8 | 8 | 18 | 10 |
| 14S9 | 12 | 22 | 10 | 14N9 | 9 | 17 | 8 |
| 14S10 | 8 | 11 | 3 | 14N10 | 9 | 21 | 12 |
| 14S11 | 11 | 14 | 3 | | | | |
| Mean: | 8.73 | 16.09 | 7.36 | Mean: | 10.00 | 17.50 | 7.50 |
| SD: | 2.60 | 4.12 | 5.23 | SD: | 1.61 | 4.65 | 4.57 |

Appendix K: IRR Coding Instructions

First round:

Background

My study examines whether structuring the input helps learners make the form / meaning connections that are necessary for proper understanding of German Two-Way Prepositions. In particular, I am looking to see if learners attend to the article more often and if they properly connect the idea of destination with the accusative case and location with the dative case. Analysis of think-aloud protocols taken during the post-test will help determine the extent to which these events are taking place.

Coding taxonomy

You should have received a separate spreadsheet containing a number of think-aloud protocols. These protocols include the stimulus, the learner's response, and some information about which learners and treatments the protocols belong to.

Following each protocol on the spreadsheet, you will find three columns labeled **Article**, **Case**, and **Meaning**. Each column will be assigned a numerical value based on whether that particular item is present in each protocol and whether or not the item is presented correctly. For all three columns, the following values are used:

- 0 = not present
- 1 = item is present, but is incorrect
- 2 = item is present and is correct

Here is what to look for to evaluate each column:

1. **Article:**
 - a. Does the learner explicitly mention the target article (the article of the prepositional object given in the **Prompt** column)?
 - b. If so, is it the correct article?
2. **Case:**
 - a. Does the learner explicitly mention the case of the target article?
 - b. If so, is it the correct case?
3. **Meaning:**
 - a. Does the learner either mention the meaning of the case, or describe the stimulus in a way that shows a connection to a particular meaning (in / into)?
 - b. If so, is it the correct meaning?
 - i. In the reading portion of the post-test, the learners were looking at pictures and had to select which one shows the correct meaning. If the learner mentions selecting the correct answer (given in the spreadsheet), assume

they have selected the correct meaning. The pictures are set up so that A = accusative / destination, B = dative / location.

The next few pages contain examples of protocols from a previous pilot and how those protocols would be coded using the given taxonomy.

Examples:

| Prompt | Protocol | Student | Treatment | Article | Case | Meaning |
|--|--|---------|-----------|---------|------|---------|
| <i>Seine Schwester geht in das Kaufhaus.</i> | <i>das</i> is the accusative, so it is a destination | NS2 | +LC | 2 | 2 | 2 |

In this example, all three are evaluated at 2: the learner explicitly states the correct **Article**, states the correct **Case** for the article, and correctly connects the case to the **Meaning** of destination.

| Prompt | Protocol | Student | Treatment | Article | Case | Meaning |
|--|---------------------------------------|---------|-----------|---------|------|---------|
| <i>Seine Schwester geht in das Kaufhaus.</i> | It's accusative so it's a destination | NS3 | +LC | 0 | 2 | 2 |

In this example, the learner does not state the target article, so **Article** is evaluated at 0. The other two columns are evaluated at 2 because the case and meaning are stated correctly.

| Prompt | Protocol | Student | Treatment | Article | Case | Meaning |
|---------------------------------------|---|---------|-----------|---------|------|---------|
| <i>Sein Sohn läuft in der Kirche.</i> | <i>der Kuchen</i> is destinati— or accusative, so it's a destination. | NS7 | +LC | 2 | 1 | 2 |

In this example, the right Article is mentioned, but the wrong **Case** is assigned to it. However, the correct Meaning for the case the learner mentioned is stated. What is important here is that the correct meaning is assigned to the case, even though the case is incorrect.

| Prompt | Protocol | Student | Treatment | Article | Case | Meaning |
|---|---|---------|-----------|---------|------|---------|
| <i>Er fährt sein Fahrrad in die Schule.</i> | <i>Schule in der, fährt in die Schule</i> , that's accusative, location | NS8 | +LC | 2 | 2 | 1 |

In this example, the right Article is stated with the correct Case, but the wrong **Meaning** is assigned to the case.

| Prompt | Protocol | Student | Treatment | Article | Case | Meaning |
|--------------------------------------|-------------------------------|----------------|------------------|----------------|-------------|----------------|
| <i>Der Hund läuft in dem Zimmer.</i> | <i>dem Zimmer...</i> location | NS5 | +LC | 2 | 0 | 2 |

For this example, even though no Case is explicitly mentioned, the correct Meaning is assigned to the Article's case.

| Prompt | Protocol | Student | Treatment | Article | Case | Meaning |
|--------------------------------------|-----------------|----------------|------------------|----------------|-------------|----------------|
| <i>Der Hund läuft in dem Zimmer.</i> | dog in the room | NS1 | +LC | 0 | 0 | 0 |

All three columns in this example are evaluated at 0 because no useful information is given. Even though it seems the learner may have correctly deduced the idea of location, there's no evidence given that this meaning is derived from either the article or its case.

Second round:

Background

My study examines whether structuring the input helps learners make the form / meaning connections that are necessary for proper understanding of German Two-Way Prepositions. In particular, I am looking to see if learners attend to the article more often and if they properly connect the idea of destination with the accusative case and location with the dative case. Analysis of think-aloud protocols taken during the post-test will help determine the extent to which these events are taking place.

Coding taxonomy

You should have received a separate spreadsheet containing a number of participant responses. Each line includes the stimulus, the learner's response, and some information about which learners and treatments each response belongs to.

Following each response on the spreadsheet, you will find three columns labeled **Article**, **Case**, and **Meaning**. Each column will be assigned a numerical value based on whether that particular item is present in each response and whether or not the item is presented correctly. For all three columns, the following values are used:

- 0 = not present
- 1 = item is present, but is incorrect
- 2 = item is present and is correct

Here is what to look for to evaluate each column:

1. **Article:**
 - a. Does the learner explicitly mention the target article (the article of the prepositional object given in the **Prompt** column)?
 - b. If so, is it the correct article?
2. **Case:**
 - a. Does the learner explicitly mention the case of the target article?
 - b. If so, is it the correct case?
3. **Meaning:**
 - a. Does the learner either mention the meaning of the case, or describe the stimulus in a way that shows a connection to a particular meaning (in / into)?
 - b. If so, is it the correct meaning?
 - i. In the reading portion of the post-test, the learners were looking at pictures and had to select which one shows the correct meaning. If the learner mentions selecting the correct answer (given in the spreadsheet), assume they have selected the correct meaning. The pictures are set up so that A = accusative / destination, B = dative / location.

The next few pages contain examples of responses from a pilot study and how those responses would be coded using the given taxonomy.

Examples:

| Prompt | Response | Student | Treatment | Article | Case | Meaning |
|--|--|---------|-----------|---------|------|---------|
| <i>Seine Schwester geht in das Kaufhaus.</i> | <i>das</i> is the accusative, so it is a destination | NS2 | +LC | 2 | 2 | 2 |

In this example, all three are evaluated at 2: the learner explicitly states the correct **Article**, states the correct **Case** for the article, and correctly connects the case to the **Meaning** of destination.

| Prompt | Response | Student | Treatment | Article | Case | Meaning |
|--|---------------------------------------|---------|-----------|---------|------|---------|
| <i>Seine Schwester geht in das Kaufhaus.</i> | It's accusative so it's a destination | NS3 | +LC | 0 | 2 | 2 |

In this example, the learner does not state the target article, so **Article** is evaluated at 0. The other two columns are evaluated at 2 because the case and meaning are stated correctly.

| Prompt | Response | Student | Treatment | Article | Case | Meaning |
|--|--|---------|-----------|---------|------|---------|
| <i>Seine Schwester geht in das Kaufhaus.</i> | <i>Seine Schwester geht in das Kaufhaus</i> ; accusative so, destination | NS4 | +LC | 0 | 2 | 2 |

In this example, the learner is clearly reading the prompt. Article is evaluated at 0 because, although the target article is mentioned, there is no indication that the learner is attending to the article, since he or she is simply reading the prompt.

| Prompt | Response | Student | Treatment | Article | Case | Meaning |
|---------------------------------------|--|---------|-----------|---------|------|---------|
| <i>Sein Sohn läuft in der Kirche.</i> | <i>der Kuchen</i> is destination—or accusative, so it's a destination. | NS7 | +LC | 2 | 1 | 2 |

In this example, the right Article is mentioned, but the wrong **Case** is assigned to it. However, the correct Meaning for the case the learner mentioned is stated. What is important here is that the correct meaning is assigned to the case, even though the case is incorrect.

| Prompt | Response | Student | Treatment | Article | Case | Meaning |
|---|--|---------|-----------|---------|------|---------|
| <i>Er fährt sein Fahrrad in die Schule.</i> | <i>Schule in der, fährt in die Schule, that's accusative, location</i> | NS8 | +LC | 2 | 2 | 1 |

In this example, the right Article is stated with the correct Case, but the wrong **Meaning** is assigned to the case.

| Prompt | Response | Student | Treatment | Article | Case | Meaning |
|--------------------------------------|------------------------------|---------|-----------|---------|------|---------|
| <i>Der Hund läuft in dem Zimmer.</i> | <i>dem Zimmer...location</i> | NS5 | +LC | 2 | 0 | 2 |

For this example, even though no Case is explicitly mentioned, the correct Meaning is assigned to the Article's case.

| Prompt | Response | Student | Treatment | Article | Case | Meaning |
|--------------------------------------|------------------------|---------|-----------|---------|------|---------|
| <i>Der Hund läuft in dem Zimmer.</i> | <i>dog in the room</i> | NS1 | +LC | 0 | 0 | 0 |

All three columns in this example are evaluated at 0 because no useful information is given. Even though it seems the learner may have correctly deduced the idea of location, there's no evidence given that this meaning is derived from either the article or its case.

Appendix L: Post-test scores coded M = 2

This appendix shows the post-test results for all participants according to the coding M=2 (meaning is clearly stated or otherwise described and is correct). The numbers show how many target responses were coded M=2. The maximum score is 12 for the listening task and 10 for the reading task.

Table L-1: Post-test responses coded M=2, first study

| -LC | | | | | +LC | | | | |
|-------------|------------------|---------|----------|------------|-------------|-----------|---------|----------|------------|
| Participant | Listening | Reading | Combined | Combined % | Participant | Listening | Reading | Combined | Combined % |
| 12S1 | 9 | 3 | 12 | 55% | 12N1 | 8 | 3 | 11 | 50% |
| 12S2 | 8 | 10 | 18 | 82% | 12N2 | 12 | 10 | 22 | 100% |
| 12S3 | 11 | 9 | 20 | 91% | 12N3 | 12 | 10 | 22 | 100% |
| 12S4 | 7 | 8 | 15 | 68% | 12N4 | 12 | 10 | 22 | 100% |
| 13S1 | -- ¹⁹ | 10 | -- | -- | 12N5 | 10 | 9 | 19 | 86% |
| 13S2 | -- | 9 | -- | -- | 12N6 | 12 | 9 | 21 | 95% |
| 13S3 | -- | 9 | -- | -- | 12N7 | 1 | 10 | 11 | 50% |
| 13S4 | -- | 8 | -- | -- | 12N8 | 4 | 8 | 12 | 55% |
| 13S5 | -- | 6 | -- | -- | 12N9 | 12 | 9 | 21 | 95% |
| 13S6 | -- | 9 | -- | -- | 12N10 | 11 | 8 | 19 | 86% |
| 13S7 | -- | 10 | -- | -- | 12N11 | 8 | 10 | 18 | 82% |
| 13S8 | -- | 2 | -- | -- | 13N6 | 11 | 10 | 21 | 95% |
| 13S9 | -- | 10 | -- | -- | 13N7 | 9 | 9 | 18 | 82% |
| | | | | | 13N8 | 7 | 8 | 15 | 68% |
| | | | | | 13N9 | 9 | 7 | 16 | 73% |
| | | | | | 13N10 | 7 | 8 | 15 | 68% |
| | | | | | 13N11 | 9 | 5 | 14 | 64% |
| Mean: | | 7.92 | | | Mean: | 9.06 | 8.41 | 17.47 | 79% |
| SD: | | 2.56 | | | SD: | 3.00 | 1.88 | 3.79 | |

¹⁹ The listening protocols for the 2013 participants were lost due to technical difficulties with the recording equipment.

Table L-2: Post-test responses coded M=2, second study

| -LC | | | | | +LC | | | | |
|--------------------|------------------|----------------|-----------------|-------------------|--------------------|------------------|----------------|-----------------|-------------------|
| Participant | Listening | Reading | Combined | Combined % | Participant | Listening | Reading | Combined | Combined % |
| 14S1 | 12 | 10 | 22 | 100% | 14N1 | 12 | 10 | 22 | 100% |
| 14S2 | 11 | 10 | 21 | 95% | 14N2 | 5 | 0 | 5 | 23% |
| 14S3 | 12 | 9 | 21 | 95% | 14N3 | 12 | 9 | 21 | 95% |
| 14S4 | 10 | 10 | 20 | 91% | 14N4 | 12 | 10 | 22 | 100% |
| 14S5 | 11 | 10 | 21 | 95% | 14N5 | 11 | 10 | 21 | 95% |
| 14S6 | 5 | 4 | 9 | 41% | 14N6 | 7 | 10 | 17 | 77% |
| 14S7 | 11 | 8 | 19 | 86% | 14N7 | 9 | 10 | 19 | 86% |
| 14S8 | 11 | 9 | 20 | 91% | 14N8 | 11 | 8 | 19 | 86% |
| 14S9 | 10 | 7 | 17 | 77% | 14N9 | 9 | 10 | 19 | 86% |
| 14S10 | 7 | 5 | 12 | 55% | 14N10 | 12 | 10 | 22 | 100% |
| 14S11 | 9 | 10 | 19 | 86% | | | | | |
| Mean: | 9.91 | 8.36 | 18.27 | 83% | Mean: | 10 | 8.7 | 18.7 | 85% |
| SD: | 2.07 | 2.06 | 3.93 | | SD: | 2.32 | 2.97 | 4.84 | |

Appendix M: HSCL Approvals



9/15/2011
HSCL #19552

Michael DeHaven
GERMANIC LANG & LITERATURE
2080 Wescoe

The Human Subjects Committee Lawrence Campus (HSCL) has received your response to its expedited review of your research project

19552 DeHaven/Vyatkina (GERMANIC LANG & LIT) The Effectiveness of Processing Instruction in the Teaching of German Two-Way Prepositions

and approved this project under the expedited procedure provided in 45 CFR 46.110 (f) (7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies. As described, the project complies with all the requirements and policies established by the University for protection of human subjects in research. Unless renewed, approval lapses one year after approval date.

The Office for Human Research Protections requires that your consent form must include the note of HSCL approval and expiration date, which has been entered on the consent form(s) sent back to you with this approval.

1. At designated intervals until the project is completed, a Project Status Report must be returned to the HSCL office.
2. Any significant change in the experimental procedure as described should be reviewed by this Committee prior to altering the project.
3. Notify HSCL about any new investigators not named in original application. Note that new investigators must take the online tutorial at http://www.rcr.ku.edu/hsc/hsp_tutorial/000.shtml
4. Any injury to a subject because of the research procedure must be reported to the Committee immediately.
5. When signed consent documents are required, the primary investigator must retain the signed consent documents for at least three years past completion of the research activity. If you use a signed consent form, provide a copy of the consent form to subjects at the time of consent.
6. If this is a funded project, keep a copy of this approval letter with your proposal/grant file.

Please inform HSCL when this project is terminated. You must also provide HSCL with an annual status report to maintain HSCL approval. Unless renewed, approval lapses one year after approval date. If your project receives funding which requests an annual update approval, you must request this from HSCL one month prior to the annual update. Thanks for your cooperation. If you have any questions, please contact me.

Sincerely,

Mary Hanabury
Coordinator
Human Subjects Committee Lawrence

cc: Nina Vyatkina



12/8/11
HSCL #19719

Michael DeHaven
GERMANIC LANG & LIT
Wescoe Hall

The Human Subjects Committee Lawrence reviewed your research update application for project

19719 DeHaven/Vyatkina (GERMANIC LANG & LIT) The Role of Structured Input in the Application of Processing Instruction to the Teaching of Germanic Grammar

and approved this project under the expedited procedure provided in 45 CFR 46.110 (f) (7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies. As described, the project complies with all the requirements and policies established by the University for protection of human subjects in research. Unless renewed, approval lapses one year after approval date.

Since your research presents no risk to participants and involves no procedures for which written consent is normally required outside of the research context HSCL may waive the requirement for a signed consent form (45 CFR 46.117 (c) (2)). Your information statement meets HSCL requirements. The Office for Human Research Protections requires that your information statement must include the note of HSCL approval and expiration date, which has been entered on the form sent back to you with this approval.

1. At designated intervals until the project is completed, a Project Status Report must be returned to the HSCL office.
2. Any significant change in the experimental procedure as described should be reviewed by this Committee prior to altering the project.
3. Notify HSCL about any new investigators not named in original application. Note that new investigators must take the online tutorial at http://www.rcr.ku.edu/hscl/hsp_tutorial/000.shtml.
4. Any injury to a subject because of the research procedure must be reported to the Committee immediately.
5. When signed consent documents are required, the primary investigator must retain the signed consent documents for at least three years past completion of the research activity. If you use a signed consent form, provide a copy of the consent form to subjects at the time of consent.
6. If this is a funded project, keep a copy of this approval letter with your proposal/grant file.

Please inform HSCL when this project is terminated. You must also provide HSCL with an annual status report to maintain HSCL approval. Unless renewed, approval lapses one year after approval date. If your project receives funding which requests an annual update approval, you must request this from HSCL one month prior to the annual update. Thanks for your cooperation. If you have any questions, please contact me.

Sincerely,

Jan Butin
HSCL Associate Coordinator

cc: Nina Vyatkina



APPROVAL OF PROTOCOL

November 26, 2013

Michael Dehaven
mdehaven@ku.edu

Dear Michael Dehaven:

On 11/26/2013, the IRB reviewed the following submission:

| | |
|-----------------|---|
| Type of Review: | Modification and Continuing Review |
| Title of Study: | The Role of Structured Input in the Application of Processing Instruction to the Teaching of Germanic Grammar |
| Investigator: | Michael Dehaven |
| IRB ID: | 19719 |
| Funding: | None |
| Grant ID: | None |

The IRB approved the study from 11/26/2013 to 12/8/2014.

1. Before 12/8/2014 submit a Continuing Review request and required attachments to request continuing approval or closure.
2. Any significant change to the protocol requires a modification approval prior to altering the project.
3. Notify HSCL about any new investigators not named in original application. Note that new investigators must take the online tutorial at https://rgs.drupal.ku.edu/human_subjects_compliance_training.
4. Any injury to a subject because of the research procedure must be reported immediately.
5. When signed consent documents are required, the primary investigator must retain the signed consent documents for at least three years past completion of the research activity.

If continuing review approval is not granted before the expiration date of 12/8/2014 approval of this protocol expires on that date.

Please note university data security and handling requirements for your project:
<https://documents.ku.edu/policies/IT/DataClassificationandHandlingProceduresGuide.htm>

You must use the final, watermarked version of the consent form, available under the "Documents" tab in eCompliance.

Sincerely,

Stephanie Dyson Elms, MPA
IRB Administrator, KU Lawrence Campus

Human Subjects Committee Lawrence
Youngberg Hall | 2385 Irving Hill Road | Lawrence, KS 66045 | (785) 864-7429 | HSCL@ku.edu | research.ku.edu

Appendix N: HSCL-approved information statements

Approved by the Human Subjects Committee University of Kansas,
Lawrence Campus (HSCL). Approval expires one year from 12/8/2011.
HSCL #19719

INFORMATION STATEMENT

HSCL #19719

Name of the Study: The Role of Structured Input in the application of Processing Instruction to the Teaching of German Two-Way Prepositions

Principal Investigator: Michael R. DeHaven
Other Investigators: Nina Vyatkina

INTRODUCTION

The Department of Germanic Languages and Literatures at the University of Kansas supports the practice of protection for human subjects participating in research. The following information is provided for you to inform you of the purpose and procedures of the present study and for you to decide whether you wish to participate. You should be aware that you are free to withdraw at any time without penalty.

PURPOSE OF THE STUDY

This study examines a particular method used to teach German grammar. It will provide insight into how the method works and how students learn German grammar. The results will also serve as a basis for further investigation into teaching methods, contributing to more effective foreign language instruction.

PROCEDURES

KU student participants will not be asked to complete any assignments beyond the regular course work and you will not be required to do anything extra outside of class time. The researcher will examine your responses on exercises, quizzes, and tests that will be part of the regular course of classroom instruction and will be mandatory for all students in the course. All information collected from you will be examined for evidence of the effectiveness of the teaching method that is being studied.

RISKS

There are no risks in participating in this research beyond those experienced in everyday life. Your grades will in no way be affected by participation in the proposed study.

BENEFITS

There are no direct benefits to you, but you will have had the opportunity to contribute to a worthwhile research endeavor that may improve foreign language teaching and learning practices.

PAYMENT TO PARTICIPANTS

No compensation will be provided.

PARTICIPANT CONFIDENTIALITY

Your name will not be associated in any way with the information collected about you or with the research findings from this study. The researchers will use a number or a pseudonym instead of your name. Only the researchers will have access to your personal information. The

researchers will not share information about you unless required by law or unless you give written permission. All information collected will be stored electronically in the principal investigator's password-protected computer.

The results of this research as well as samples of your work and data about you may be published in paper format or electronically. However, your identity will be kept confidential and all your personal identifiers will be removed before publishing.

Your participation is solicited, although strictly voluntary. You may refuse to participate or cancel your permission to use and disclose information collected about you, in writing, at any time, by sending your written request to Michael DeHaven at mdehaven@ku.edu. If I do not receive a cancellation request from you, it indicates your willingness to participate in this project and that you are at least age eighteen. Permission granted on this date to use the data for research purposes remains in effect indefinitely.

QUESTIONS ABOUT PARTICIPATION should be directed to:

Michael DeHaven
Principal Investigator
Dept. of Germanic Languages and
Literatures
2080 Wescoe Hall
University of Kansas
Lawrence, KS 66045
(785) 864-9178

Nina Vyatkina
Faculty Supervisor
Dept. of Germanic Languages and
Literatures
2080 Wescoe Hall
University of Kansas
Lawrence, KS 66045
(785) 864-9178

If you have any questions about your rights as a research participant you may contact the Human Subjects Committee Lawrence Campus (HSCL) office at 864-7429 or write to the Human Subjects Committee Lawrence Campus (HSCL), University of Kansas, 2385 Irving Hill Road, Lawrence, Kansas, 66045-7563, email irb@ku.edu.

INFORMATION STATEMENT

HSCL #19719

Name of the Study: The Role of Structured Input in the application of Processing Instruction to the Teaching of German Grammar

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Other Investigators: Nina Vyatkina

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researchers will not share information about you unless required by law or unless you give written permission. All information collected will be stored electronically in the principal investigator's password-protected computer.

The results of this research as well as samples of your work and data about you may be published in paper format or electronically. However, your identity will be kept confidential and all your personal identifiers will be removed before publishing.

Your participation is solicited, although strictly voluntary. You may refuse to participate or cancel your permission to use and disclose information collected about you, in writing, at any time, by sending your written request to Michael DeHaven at mdehaven@ku.edu. If I do not receive a cancellation request from you, it indicates your willingness to participate in this project and that you are at least age eighteen. Permission granted on this date to use the data for research purposes remains in effect indefinitely.

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RISKS

There are no risks in participating in this research beyond those experienced in everyday life. Your grades will in no way be affected by participation in the proposed study.

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The results of this research as well as samples of your work and data about you may be published in paper format or electronically. However, your identity will be kept confidential and all your personal identifiers will be removed before publishing.

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