

EFFICACY OF GESTURES AND RECASTS
ON THE ACQUISITION OF L2 GRAMMAR

By

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ABSTRACT

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This study investigated whether gestures can be used to enhance noticing of the saliency of linguistic targets during verbal recasts and whether they can lead to better L2 grammar acquisition. Previous studies on corrective feedback have shown that explicit feedback seems to be more effective than implicit feedback in general (e.g. Li, 2010) because learners are theorized to notice target structures more easily when feedback is explicit in nature. However, recasts, which are traditionally considered as a type of implicit feedback, are among the most favored types of feedback in language classrooms (e.g. Ellis & Sheen, 2006). In a different but related domain, some gestural studies have illustrated that teachers use specific gestures in language classrooms, especially when teaching temporal and spacial concepts (Hudson, 2011). Furthermore, some studies have argued that the use of gestures seems to promote learning because gestures enhance memorization (e.g. Tellier, 2008) and because gestures add to the presented verbal information (e.g. Flevares & Perry, 2001; Goldin-Meadow, 2004). What has not been addressed is to what extent these gestures lead to L2 acquisition overall. In this study, I followed the Interactionist framework and examined the efficacy of gestures when used alongside recasts.

This study examined whether gestures can be used to make the linguistic targets of recasts more salient, which potentially leads to noticing, and to test whether the provision of gestures results in better L2 grammar learning with regard to English regular past tense verbs and locative prepositions. Eighty low-intermediate ESL students participated in this study. The students were

randomly assigned to one of the following conditions: the control condition (Control), the verbal recasts only condition (Verbal Recast Only), or the verbal recasts plus gestures condition (Recasts + Gesture). They participated in four communicative tasks which elicited the target structures. Following any non-target-like production of the target structures, learners received recasts according to the condition they had been assigned. In addition, the learners also completed pretests, immediate posttests, and delayed posttests that assessed their explicit grammar knowledge and oral production of the target structures. Using the test scores, I conducted repeated-measures ANOVA to examine whether the short and long term L2 grammar acquisition varied in the aforementioned conditions. In addition, nine participants from the two experimental conditions took part in a stimulated recall session and addressed their thoughts during recasts.

The data obtained from the stimulated recall session showed that the learners did not recognize the correction and the target structures regardless of the condition. Furthermore, no development was observed in their explicit grammar knowledge for either structure because of their high level of knowledge they had prior to this study. As for the oral production, the learners did not exhibit any difference with regard to the acquisition of regular past tense verbs. However, they exhibited a significant difference in the acquisition of locative prepositions. Specifically, the Verbal Recast Only and Recasts + Gesture conditions surpassed the Control condition in the immediate posttest. In the delayed posttest, the Recasts + Gesture condition surpassed the others. This finding suggests that participants in the Verbal Recast Only and Recasts + Gesture conditions learned without noticing at the level of awareness. Furthermore, this suggests the advantage that the Recasts + Gesture condition had compared to the Verbal Recast Only and Control conditions, possibly because of the impact of gestures on learners' memories.

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DEDICATION

For my family

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Chapter 1: Introduction

For many years researchers in the field of second language acquisition (SLA) have been interested in how to maximize the language learning experiences of learners in the classroom. Teaching methods have changed notably in the last half-century, and so have the materials and activities used in classrooms. For instance, current teaching method emphasizes on the interaction in the classroom following *focus on form*. (Long, 1996). However, in the 1970s, the popular teaching method was explicit grammar teaching in which “parts of the language are taught separately and step by step so that acquisition is a process of gradual accumulation of parts until the whole structure of language has been built up.” (Wilkins, 1976, p.2) As people became aware of the rather problematic aspects of this method, other approaches gained popularity, such as focus on meaning, which imitates first language acquisition, and then focus on form, which attempts to draw the attention of learners to language while maintaining the communicative context. The idea of focus on form evolved from the Interaction Hypothesis, which argues that the interaction among learners or between learners and teachers leads to successful second language (L2) acquisition (Long, 1996).

As the Interaction Hypothesis gained prominence since the late 1980s, the analysis of classroom interaction – the investigation of how teachers and students, or students among themselves, talk to each other – has attracted great attention. A number of initial studies that followed the Interactionist framework examined negotiation for meaning, during which an utterance is made more comprehensible to learners. This more comprehensible input provides the learners with opportunities for developing form-function relationships (e.g. Gass, 1997, 2003;; Gass & Mackey, 2006; Gass & Varonis, 1994; Long, 1996, 2007; Mackey, 2007; Mackey, Abbul, & Gass, 2012; Pica, 1994, 1996; Varonis & Gass, 1985). Researchers further examined

student-teacher interactions, specifically learner errors and subsequent error correction, or corrective feedback, by teachers.

The present study investigated whether gestures, when used along with verbal recasts – traditionally a form of implicit feedback – can promote noticing and facilitate L2 grammar acquisition. A growing number of studies have investigated the efficacy of corrective feedback. One central topic has been what types of corrective feedback lead to L2 learning. Researchers have approached this in relation to the implicitness (e.g. recasts in which the learner's utterance is repeated but with the correct form) and explicitness (e.g. metalinguistic feedback which includes the explicit explanation of learners' mistakes) of the feedback. Overall, researchers found that explicit feedback seems to be more effective in terms of L2 learning in general because the targets of the corrections become more salient to learners (e.g. Carroll & Swain, 1993; Ellis, Loewen, & Erlam, 2006), which provides the learners with opportunities for noticing, which is essential for L2 development (Schmidt, 1990; Schmidt & Frota, 1986). However, one of the criticisms by language teachers of such explicit feedback, and of metalinguistic feedback in particular, is that it seems to interrupt the flow of communication, and as such generally teachers still incorporate recasts because explicit feedback is not a time-efficient form of error correction in language classrooms (Ellis & Sheen, 2006; Han, 2002; Leeman, 2003; Loewen & Philp, 2006). This study examined whether pedagogical gestures can enhance the saliency of linguistic targets while providing a non-interruptive form of corrective feedback.

Gestures have been a topic of interest in a number of fields, including developmental psychology and education. Researchers have reported that gesturing and seeing gestures promotes cognitive development (e.g. Cook, Yip, & Goldin-Meadow, 2010; Goldin-Meadow, Cook, & Mitchell, 2009; Goldin-Meadow & Sandhofer, 1999; Goldin-Meadow & Singer, 2003). Studies

on gestures have gained attention in the field of SLA by approaching L2 narrative and classroom data from a multimodal perspective. For example, Adams (1998) reported that speakers use gestures (e.g. pantomime, emblems, and metaphors) to facilitate the comprehension of L2 listeners. In a language classroom context, teacher gestures seem to help student comprehension (e.g. Allen, 2000; Lazaraton, 2004; Sime, 2006) and carry pedagogical characteristics (e.g. Hudson, 2011; Zhao, 2007). For instance, Hudson (2011) identified gestures that ESL teachers used when teaching abstract concepts, such as verb tense and prepositions, and reported that these gestures were particularly helpful in the teaching of abstract concepts. To date, however, no studies have addressed the extent to which exposure to pedagogical gestures promotes L2 learning.

This study examined the effectiveness of pedagogical gestures during recasts targeting regular past tense verbs and locative prepositions. Specifically, this intervention study investigated whether pedagogical gestures can enhance the saliency of linguistic targets and promote noticing. An intervention study was constructed to assess participants' L2 learning in three feedback conditions: no feedback (Control), verbal recasts only (Verbal Recast Only), and verbal recasts accompanied by pedagogical gestures (Recasts + Gesture). The participants took part in pretests, posttests, and delayed posttests that were designed to measure their explicit grammar knowledge and use of the target structures in oral production. Repeated-measure ANOVA was administered using the test scores to examine the impact of gestures on L2 learning. Also, a subset of the learners took part in a stimulated recall session to examine if there was a difference in the learner noticing when the recasts were provided with or without gestures.

Chapter 2: Corrective Feedback

This study attempts to bridge the gap between the arguments of researchers and the practices of teachers with regard to recasts; while theoretically and empirically recasts may not be as effective as explicit corrections (although see Long, 2007), they are still the favored form of error correction by language teachers. In this section, I first review the background of focus on form, from which the majority of interaction studies have arisen. Then, I review those studies that examined the efficacy of different types of corrective feedback. Finally, I summarize the research studies on recasts.

Corrective feedback is one of the most researched areas in one field of SLA, and studies on corrective feedback evolved from the observation of classroom interactions. Many opportunities are available for L2 learners to receive feedback on their production from teachers, peers, and interlocutors when they make mistakes in class. Generally, research has found that such feedback has a positive influence on L2 learning.

Focus on Form

Extensive research on corrective feedback has been done in the field of SLA within the Interactionist framework on which the theoretical arguments of focus on form are based. Focus on form bridges the two major arguments about teaching methods; the first emphasizes the explicit grammar teaching but in non-communicative context, which was popular in the 1960s and still is in many places. The basic theory behind explicit grammar teaching is that target languages are divided into smaller pieces and learners learn each individually; eventually, learners would be able to reconstruct linguistic systems by combining each linguistic piece taught. This method was often used in conjunction with an audio-lingual method, in which learners practiced forms

repeatedly following the audio materials. However, this approach has been heavily criticized because it does not entail any communicative component and often does not equip learners with high communicative competence.

The second is communicative language teaching. Communicative language teaching, or focus on meaning, became prevalent in language classrooms in the early 1980s. Advocates of focus on meaning tried to recreate naturalistic language learning as it occurs in first language (L1) acquisition (Krashen, 1985). Given that humans are capable of learning their L1s without specific linguistic instruction and that more emphasis is given on interpreting and conveying meaning, advocates of focus on meaning theorized that people should also be able to learn L2s by simply focusing on meaning. Issues with this approach became apparent, however, as the number of bilingual studies grew; learners who followed this approach were able to communicate but lacked linguistic accuracy, even with considerable amounts of L2 exposure (see Swain, 1991 for the summary).

Focus on form was proposed to capture the strength of both approaches while dealing with these criticisms. It was motivated by the Interaction Hypothesis, which argues that a crucial site for language development is the interaction between learners and other speakers, especially, but not only, between learners and more proficient speakers (Long, 1997).

Focus on form is an integral part of the Interaction Hypothesis (Long, 1991). One of the important components of focus on form is corrective feedback, specifically that learners can benefit from the error correction from teachers or interlocutors. The Interaction Hypothesis claims that “negotiation of meaning, and especially negotiation work that triggers interactional adjustments by the native speaker or more competent interlocutor, facilitates acquisition because it connects input, internal student capacities, particularly selective attention, and output in

productive ways” (Long, 1991, pp. 45-46). During the negotiation of meaning, learners are also able to become aware of the gap between the target language and their interlanguage (IL) (e.g. Robinson, Mackey, Gass, & Schmidt, 2012; Schmidt, 1990, 1993, 2001; Schmidt & Frota, 1986).

Based on this notion, focus on form also emphasizes the importance of interaction, but it specifically argues for the importance of bringing the attention of learners to language while they are engaging in meaningful interactions. For example, when students are tasked with developing a travel plan, they may talk among themselves or ask their teacher for clarifications on the particular grammar points or vocabulary words they need to use during the task. Researchers have noted that focusing on linguistic forms (such as vocabulary, grammar, morphology, syntax, or discourse conventions) during interaction can beneficially draw the attention of students to linguistic elements as they arise (incidentally), which makes the forms more likely to be learned (Ellis, 2001; Long, 1991). Focus on form is considered to be particularly beneficial to L2 students because (a) the attention of students is acutely focused on non-target-like or missing linguistic elements since they need those elements to complete the task, and (b) focus on form helps students notice gaps between the aspects of the L2 they know and use and more target-like language forms, both of which are considered essential for L2 learning (Schmidt & Frota, 1986).

To understand how such interaction helps language learning, investigators researched various aspects of interaction, including but not limited to student-student and student-teacher negotiation for meaning, language-related episodes, and corrective feedback.

Implicit vs. Explicit Corrective Feedback

Research studies frequently agree that providing corrective feedback can help L2 acquisition (see Truscott, 1999, for an exception). Some meta-analyses published in the last decade found that corrective feedback may be especially helpful for the acquisition of

grammatical and lexical features (e.g. Mackey & Goo, 2007 but see also Li, 2010; Lyster & Saito, 2010; Russell & Spada, 2006; Li, 2010; Lyster & Saito, 2010; Russell & Spada, 2006). These studies also examined what type of feedback results in L2 learning most effectively in terms of the implicitness and explicitness of feedback, that is, how explicitly or implicitly teachers commented on the structures or linguistic aspects with which their students had trouble. In general, a common type of implicit feedback is the recast, which is a partial or complete reformulation of a learner's erroneous L2 production that maintains its meaning (Lyster & Ranta, 1997). The examples of explicit feedback is metalinguistic feedback, in which teachers provide learners with metalinguistic comments about their erroneous production (Ellis, 2006), and explicit error correction, in which teachers or native speakers specifically talked about errors made by learners (Lyster, 1998).

A few studies have directly compared the efficacy of corrective feedback in relation to its explicitness and implicitness, and overall, these studies reported the beneficial function of explicit feedback in comparison to implicit feedback (e.g. Carroll & Swain, 1993; Ellis, et al., 2006; Li, 2009). These studies argue that explicit feedback tends to be more effective because the target of the correction is more salient with explicit feedback than with implicit feedback, and this allows learners to notice the gaps between their own language and the target-like use.

Carroll and Swain (1993), the initial study that compared the effectiveness of metalinguistic feedback with other types of negative feedback, including recasts, found that metalinguistic feedback resulted in better learning outcomes with longer effect than recast. Carroll and Swain investigated the efficacy of four different types of negative feedback on the acquisition of the English dative alternation by 100 L1 Spanish speakers. First, the participants were familiarized with the targeted structure, and then they participated in an exercise on dative

alternation. During this exercise, the researchers provided four types of feedback: (1) metalinguistic feedback, (2) negative feedback without metalinguistic feedback, (3) recasts, and (4) indirect feedback (e.g. “Are you sure?”). Finally, the participants took part in two recall sessions that were designed to measure their understanding of the target structures. They found that the metalinguistic feedback and recast groups outperformed the other conditions in the immediate recall session, and that the metalinguistic feedback group significantly outperformed the rest in the delayed recall session. Carroll (2001), in her later study, also found that explicit feedback was more effective than recasts.

The aforementioned studies were conducted in a laboratory setting, however, classroom research presented similar results as well. Ellis, et al. (2006) also showed the clear advantage of using explicit metalinguistic explanation over recasts. The researchers randomly assigned a total of 34 low-intermediate ESL learners to three conditions: recasts, metalinguistic explanations, and no feedback. The learners in the two treatment groups performed two tasks in triads and received a particular type of feedback when they made mistakes with regular past tense verbs. One pretest and two posttests were administered. The results revealed that the learners benefited more from explicit feedback than implicit feedback. Ellis et al. explained why explicit feedback was more effective, saying, “metalinguistic feedback is longer...[and] it might have been better attended to and perceived as overtly corrective... and [metalinguistic feedback] seems more likely to lead to greater depth of awareness of the gap between what was said and the target form, thereby facilitating the acquisition of implicit knowledge.” (p.363).

Lyster (2004) also compared the efficacy of recasts (implicit feedback) and other types of feedback in the acquisition of French gender markings and found that prompts that contained metalinguistic feedback were more facilitating than recasts. In his explanation, prompts provided

opportunities for self-repair for learners; learners were not given the correct form but had to produce the correct form by themselves. He argued that the beneficial role of prompts in contrast to recasts is a result of pushed output (Swain, 1995), however, the results still revealed the advantage of a more corrective form of feedback. Prompts are a type of corrective feedback but this study will not specifically examine them because of the focus of the study concerns recasts.

Recasts

In the previous section, I explained that studies reported in general that explicit feedback seems to be more beneficial for L2 development. That is not to say, however, that recasts are completely ineffective. Recasts, as a type of implicit feedback, are overall the most commonly used type of corrective feedback in language classrooms (e.g. Doughty, 1994; Havranek, 1999; Lyster & Ranta, 1997; Mackey, Gass, & McDonough, 2000 but see also Oliver, 1995). Long (1996) defined recasts as “utterances that rephrase a child’s utterance by changing one or more sentence components (subject, verb, or object) while still referring to its central meanings” (p.434). Investigators have found that recasts were favored because they did not interrupt the flow of communication and because they saved time spent on correction (Ellis & Sheen, 2006; Han, 2002; Leeman, 2003; Loewen & Philp, 2006).

Theoretically, recasts should facilitate L2 development because recasts include the target-like use, which enables learners to notice the gap between their IL and the target-like production, resulting in IL development (Long, 2007). However, the occurrence of such noticing in recasts is still up for debate. For instance, Lyster and Ranta (1997) found that recasts resulted in the lowest uptake for learners, even though recasts were the most commonly used form of error correction. However, this does not dispute the efficacy of recasts completely. Some studies presented the favorable impact of recasts on L2 learning (Doughty & Varela, 1998; Mackey & Philp, 1998;

Nassaji, 1998, Oliver, 1995), while others showed the opposite (Havranek, 1999; Leeman, 2000; Lyster, 1998, 2001, 2004; Lyster & Ranta, 1997; Sheen, 2004, 2007; Slimani, 1992) or were inconclusive (Loewen & Nabei, 2007; Long, Inagaki, & Ortega, 1998; Yang & Lyster, 2010).

Researchers accounted for such discrepancies by analyzing various inter-learner and contextual factors, and they identified four aspects that impact the efficacy of recasts: (1) individual differences among learners, (2) classroom context, (3) linguistic targets, and (4) characteristics of oral recasts. The individual differences include learners' levels of proficiency, their readiness for a target structure, and their analytic skill (Ammar & Spada, 2006; Mackey & Philp, 1998; Sheen, 2007). Ammar and Spada found that learners with higher levels of proficiency are more likely to recognize recasts as corrections. Similarly, Mackey and Philp found that the readiness of learners for target structures is important for the recognition of recasts. However, the analytic skills of learners do not seem to impact the efficacy of recasts (Sheen, 2007). The second aspect highlights the context of language classrooms and the characteristics of tasks when recasts are provided (e.g. Philp & Mackey, 2010; Nicholas, Lightbown, & Spada, 2001). Nicholas et al. justified the discrepancies between the studies of recasts by analyzing their classroom contexts, and they suggested that classrooms with a stronger focus on forms will enable learners' noticing. Some studies also mentioned that recasts resulted in higher rates of noticing (uptake) in traditional language classes but not in meaning-based classrooms, such as immersion programs (Lyster & Mori, 2006; Sheen, 2004). The third aspect concerns the linguistic targets of recasts. Overall, the studies reported the mixed finding with regards to the noticeability of grammatical features. Some reported that the lexical items and grammar are likely to be noticed during corrective feedback (e.g. Ellis, 2007; Iwashita, 2003; Leeman, 2003; Long, 2007; Mackey, et al., 2000; Ortega & Long, 1997) but the recent meta-analysis by Lyster, Saito, & Sato (2013)

showed that corrective feedback targeting grammar (morphosyntax) is less likely to be accurately noticed followed by successful repair than the one targeting lexis and pronunciation, even though the grammatical errors are most frequently targeted in corrective feedback. In addition, some grammatical structures (e.g. comparative and irregular past tense verbs) seem to benefit more than others from recasts. However, an extensive list of structures that may benefit from recasts is still unknown. The fourth aspect concerns how recasts are provided. Being opaque in nature, the level of explicitness of recasts seems to be affected by how recasts are provided. (Loewen & Philp, 2006; Sheen, 2006). For instance, Loewen and Philp investigated the relationship between the characteristics of recasts and uptake and the accuracy of learners' posttest scores. Their results showed that some specific aspects of recasting, including stress, declarative intonation, use of one correction, and multiple feedback moves, resulted in higher rates of successful uptake. In addition, interrogative intonation, shortened length, and use of one change were associated with the accuracy of the test scores. Sheen (2006) also found that three characteristics of recasts (length, type of correction, and linguistic focus) were related to learner uptake and identified six characteristics of recasts (mode, length, type of correction, linguistic focus, reduction, and number of corrections) associated with learner repair. All these factors have been associated with how corrective recasts appear to learners and whether linguistic targets are salient enough for learners to notice.

Overall, these studies showed that recasts are the favored form of correction in language classrooms because they take less time in class and do not interrupt communication. However, the studies also showed that explicit feedback may be more effective in general but its efficacy depends on contextual factors, individual differences among learners, linguistic targets, and types of recasts. Additionally, the level of explicitness of recasts can be manipulated by fine-tuning the

characteristics of the recasts.

Noticing

As briefly mentioned earlier, one of the reasons that learning outcomes varied depending on the type of feedback is that learners may or may not have been able to recognize the corrective nature of feedback, which would encourage the noticing of target structures and may ultimately have lead to IL development. The general consensus is that the more salient target structures are, the more likely learners are to notice them, resulting in better language learning outcomes. On the implicit/explicit continuum of types of feedback, more explicit feedback tends to make target structures more salient, although the structures targeted in implicit feedback (e.g. with recasts) need not be less salient.

The concept of noticing and attention emerged from work that emphasized the importance of input in L2 learning, specifically comprehensible input (Krashen, 1985). Although Krashen's Input Hypothesis has been criticized for its one-sided emphasis on input as the driver of SLA (Schmidt & Frota, 1986; Swain, 1985), input is still believed to be crucial for language acquisition as it represents the primary data (i.e. target forms) to which learners can attend (Robinson, 1995; Schmidt, 1990, 1995, 2001; Tomlin & Villa, 1994).

Overall, researchers have agreed on the importance of learners' attention to and noticing of target structures for IL development, however, there are some variations in their understanding in terms of the extent to which noticing is necessary and whether noticing needs to occur with consciousness/awareness. The best-known holistic approach that highlighted the importance of attention and noticing is the Noticing Hypothesis proposed by Schmidt (1990; 1995; 2001; Schmidt & Frota, 1986). In this hypothesis, Schmidt claimed that learners' attention to and awareness of structures are needed for noticing to occur, and that conscious noticing is vital for

L2 learning. My interpretation of noticing is based on this argument. However, instead of viewing noticing as one monolithic process, Tomlin and Villa (1994) viewed it as a combination of three interrelated processing systems: alertness, orientation, and detection. Alertness refers to the readiness to handle input, and orientation refers to the allocation of learner attention to specific information (e.g. target structures) in the input. Both alertness and orientation interact with detection, during which learners pay attention to and cognitively register specific information. Detection promotes processing information at a higher level by directly working with short-term memory. According to Tomlin and Villa, detection is crucial for learning, but it does not necessarily require conscious awareness. However, the debate over whether detection requires awareness has not yet reached a conclusion. (See Robinson, 1995; Leow, 2000; 2010; Schmidt, 1993, 1994, 1995, Williams, 2005 for studies that argue for the necessity of awareness.) The last perspective is the one proposed by Robinson (1995; 2003), in which he explains that the learners' focal attention triggers Schmidt's noticing, and he argues that the occurrence of noticing varies depending on types of instruction and tasks. He specifically argues that task-based teaching is beneficial for promoting noticing.

Regardless of the slight variations described above, noticing is crucial for language learning, and thus accounting for the differences in the efficacy of corrective feedback in terms of noticing is necessary. In other words, the crucial factor that seems to impact learning outcomes is not the classification of feedback but how corrective feedback appears to learners with regards to its saliency. Combining the studies from noticing and the studies that explored the fine characteristics of recasts, it is evident that recasts can be manipulated to improve efficacy. Yet, to date, studies that analyzed the saliency of feedback have relied on verbal cues, and the significance of nonverbal cues has yet to be determined.

Chapter 3: Gestures

Gestures

This section provides an overview of gestural studies. The first section summarizes gestural studies conducted in the field of developmental psychology that illustrate how gestures promote cognitive development and the relationship between gestures and learning. The second section presents gestural studies in the field of SLA.

Gestures, hand movements that are directly tied to speech (McNeill, 1992), play a crucial role in processes of interaction and communication. Not gesturing when speaking is almost impossible. Recent technological developments have made recording people's motions in addition to their speech easier, and this seems to have resulted in an increasing number of gestural studies in various fields, for example, psychology, anthropology, and communication, just to name a few. Some commonly researched topics are: how people use gestures during communication such as mirroring, which is imitating the gestures of an interlocutor (Parrill & Kimbara, 2006), how gestures reveal the understanding of abstract concepts such as direction (Kita, Danziger, & Stolz, 2001), and how the production of gestures promotes the learning of complex ideas (Núñez, 2008). To provide background on gestural studies, this section covers the following topics: (1) processing of co-speech gestures, (2) gestures and cognitive development, (3) gesturing and learning, and (4) exposure to gestures and learning. Although some gestural studies also cover sign languages, such studies are not covered in this section because this paper specifically examines pedagogical gestures.

Processing of gestures. The focus of this study was to investigate whether learners benefited from co-speech gestures with pedagogical functions during recasts. Because no SLA studies have addressed this very specific issue so far, reviewing some L1 studies is important to

account for how people process co-speech gestures. Recent neuroscience studies reported three major findings with regard to the processing of gestures; seeing gestures (1) triggers semantic processing (Kelly, Kravitz, & Hopkins, 2004; Kelly, Ward, Creigh, & Bartolotti, 2007), (2) activates the premotor cortex, which involves the processing of actions (Özyürek, Willems, Kita, & Hagoort, 2007; Willems, Özyürek, and Hagoort, 2007) and (3) allows the brain to decrease the need for semantic control and to use the additional source for information (Skipper, Goldin-Meadow, Nusbaum, & Small, 2007).

First, with regard to the types of processing triggered by gestures, Kelly, Kravitz, and Hopkins (2004) examined what type of processing occurs when people view co-speech gestures by examining via electroencephalography how human brains respond to gestural stimuli. In one condition, subjects saw an actor gesturing corresponding to the characteristics of an object, such as the width or height. In another condition, the gestures did not match the property. The researchers observed a stronger negative deflection in the latter condition than in the former condition, and this effect was the largest around 400 ms after the gesture. This is known as N400 effect, which indicates the difficulty in the semantic processing – which is an effort to understand the meaning of a word or a sentence – of an item into a previous context. This suggests that seeing gestures triggered semantic processing. Instead of an object, Wu and Coulson (2005) used a cartoon movie, and Holle and Gunter (2007) used ambiguous words instead of an object. Both studies also observed an N400 effect and argued that seeing gestures activated semantic processing.

Second, researchers found that there was no difference in the neural time course, but there was a variation in the neural locus with regards to the processing of language and co-speech gestures. Özyürek et al. examined whether the neural time course differs when processing

language or gestures. Their subjects heard sentences that contained a focus word accompanied by gestures in one of two conditions. In one condition, the word is anomalous with respect to the context of the sentence. In the second condition, the gesture is anomalous. The researchers found that both conditions demonstrated an N400 effect, and the onset latencies of these conditions did not vary. This indicates that there was no difference in the time course of incorporating meaningful information that came from gestures or from spoken words into the sentences. However, they found a difference with regard to the neural locus. They used fMRI and found that in both conditions a region in the left inferior frontal cortex, which plays a crucial role when integrating information verbally and gesturally, was activated. In addition, they found that the subjects in the gesturally incongruent condition activated the premotor cortex, which is usually triggered by seeing many types of actions. In short, there was no difference in the processing of co-speech gestures and spoken sentences with regard to the neural time course. However, there was a variation in terms of the neural locus. Seeing co-speech gestures not only activated the premotor cortex, but its level of activation varied significantly depending on the gestures that the people saw. These findings suggest that when the corrective feedback involves gestures, the learners not only process the information given verbally but they also process the one given gesturally. If this is the case, learners are provided with more input, when the relevant information of corrective feedback is given both verbally and gesturally.

Finally, researchers examined how the presence or absence of co-speech gestures impacted neural responses to speech. Skipper, Goldin-Meadow, Nusbaum, and Small (2007) examined the difference in the processing of sentences in three conditions. In the first condition, subjects watched a person telling a story with natural hand gestures, that is, the speaker was allowed to gesture as they would normally. In the second condition, the person told the same story

with adaptor gestures, such as adjusting glasses. The person told the same story in the third condition but left their hands at rest. They found that seeing natural gestures divided the labor of processing into two areas of the brain: Broca's area, which is activated when processing languages, and the primary motor cortex, which is triggered by seeing actions. This indicates that the listeners needed less semantic selection by Broca's area when gestures were present. The authors explained that this was because natural gestures helped the listener comprehension in a way that they needed less semantic control which is needed for processing the meaning of language. That is, meaningful gestures allowed the brain to use additional sources of information, resulting in less effort in semantic control. If this is the case, learners are able to process the information of the corrective feedback with less effort with regards to semantic processing, when the meaningful gestures are present.

Gestures and cognitive development. The present study examined the facilitative role of gestures in language learning, but it is worthwhile to explore studies that reported on the facilitative roles of gestures in learning in general. Developmental psychologists have investigated how gesturing helps children learn abstract mathematical concepts (e.g. Cook, et al., 2010; Goldin-Meadow, et al., 2009; Goldin-Meadow & Sandhofer, 1999; Goldin-Meadow & Singer, 2003). In addition, some researchers have specifically examined how exposure to the gestures of teachers and adults promotes learning in children (Goldin-Meadow, 2004).

Gesturing and learning. The majority of studies that focused on the production of gestures were from studies on cognitive development. A number of works in the 1990s dealt with close examinations of the gestures of children. Since 2000, researchers further examined the relationship between gesturing and learning. Works by Goldin-Meadow and her colleagues explored the facilitative functions of gesturing when learning mathematical concepts. For instance,

Goldin-Meadow et al. (2009) manipulated the gestures of children during a math lesson to examine the impact of gesturing on mathematical concepts (addition and subtraction). All the children were presented with a white board with equivalent equations written on them (e.g. $4 + 5 + 7 = ___ - 7$), and they were assigned to one of the three conditions. The first group of children was instructed to point out relevant numbers (4 and 5) while describing the mathematical concepts of adding and subtracting. The second group was told to point at partially correct numbers (5 and 7), and the third group was told not to gesture. They found that the children in the first condition surpassed those in the remaining conditions, and that the ones who did not gesture at all learned the least among the three groups.

Exposure to gestures and learning. Furthermore, researchers also examined the effects of exposure to gestures on learning. Some studies argued that the gestures of teachers or adults are essential for learning because (1) the attention levels of students/children are influenced by the gestures of teachers/caretakers (e.g. Deák, Flom, & Pick, 2000; Goldin-Meadow, 2004), (2) gestures facilitate comprehension (e.g. Church, 1999; Goldin-Meadow, Kim, & Singer, 1999; Perry, Birch, & Singleton, 1995; Valenzano, Alibali, & Klatzky, 2003), and (3) gestures help with the retention of information (Cohen & Otterbein, 1992; Feyereisen, 1998).

Studies that examined the relationship between the eye gaze of children (as a sign of attention) and gestures showed that children were more likely to pay attention when adults used gestures (e.g. Deák, et al., 2000; Goldin-Meadow, 2004). Deák et al. (2000) assessed the attention of children by examining whether their eye gaze focused on a target object. Sitting across from the children, adult caretakers were instructed to (a) look at the object, (b) look at the object while using a pointing gesture, or (c) look at the object while using a pointing gesture and verbalizing. Their results revealed that the adults' pointing gestures resulted in a higher ratio of children's eye

gaze focusing on the target objects. They also found that pointing gestures that used larger spatial areas attracted more attention to the target objects. However, no effect was observed for verbalization. The participants of these studies were limited to children, but the findings may suggest the possibility of enhancing the attention of adult L2 learners when gestures are used. (See the following section for SLA gestural studies.).

Some studies also explored the relationship between exposure to gestures and comprehension of mathematical concepts (Church, 1999; Golden-Meadow, et al., 1999; Perry, et al., 1995; Valenzano, et al., 2003) and unfamiliar/ambiguous language (Church, Ayman-Nolley, & Mahootian, 2004; McNeil, Alibali, & Evans, 2000; Thompson, Driscoll, & Markson, 1998). Studies also revealed that seeing gestures helped the students when they were confused (Flevaris & Perry, 2001), and that adults were better able to understand the speech of children when seeing children's gestures (Alibali, Flevaris, & Goldin-Meadow, 1997; Goldin-Meadow, Wein, & Chang, 1992).

The last group of studies showed that seeing gestures enhanced the short-term memory of subjects (R. L. Cohen & Otterbein, 1992; Feyereisen, 1998). R. L. Cohen and Otterbein conducted a study that involved the recall of L1 sentences presented in a video. Adult participants viewed a video that contained L1 sentences and wrote down as many sentences as possible. Three versions of the video were used: (1) L1 sentences only, (2) L1 sentences plus pantomimic gestures, and (3) L1 sentences plus meaningless gestures. The researchers found that the participants who were exposed to sentences illustrated by pantomimic gestures remembered significantly more sentences than the other participants. Feyereisen conducted a similar study but with iconic gestures. The results showed that the participants recalled the sentences most often when the sentences were accompanied by meaning-matched iconic gestures.

This section provided a brief summary of three aspects that account for the positive relationship between exposure to gestures and learning. First, by looking at gestures, participants were reported to be more focused on target objects. Second, participants were able to better comprehend speech that was ambiguous or difficult to understand when looking at gestures. Third, exposure to gestures helped short-term memorization. Combining the three findings, these studies suggest that exposure to gestures plays an integral role in learning in general. However, the majority of the studies here took place in a laboratory setting. Next, I will review gestural studies conducted in a classroom context.

Use of gestures in the classroom by teachers. Studies conducted in a laboratory setting are informative but classroom research brings in ecological validity. These educational studies examined how teachers used gestures in classrooms and reported two major findings: (1) teachers used gestures in the classroom (Alibali, et al., 1997; Crowder, 1996; Perry, et al., 1995; Roth, 2001; Roth & Lawless, 2002a, 2002b), (2) teachers used gestures to increase the attention of students, resulting in better learning (e.g. Flevares; Perry, et al., 1995).

Some of the studies that have been conducted in the late 1990s and early 2000s documented how gestures were used in math and science classrooms (e.g. Flevares; Perry, et al., 1995). The studies frequently illustrated the attention of students to teacher gestures (Alibali, et al., 1997; Crowder, 1996; Perry, et al., 1995; Roth, 2001; Roth & Lawless, 2002a, 2002b).

In addition, researchers took further steps to identify the efficacy of teacher gestures on learning in a classroom context (e.g. Flevares; Perry, et al., 1995). Perry et al. examined what classroom conditions yielded the best learning of equation rules in math classrooms: (1) verbal instruction and written instruction on blackboards, (2) verbal instruction accompanied by pointing gestures, or (3) verbal instruction accompanied by pointing gestures and problem-solving

activities using objects. Upon completion of a lesson under one of the conditions, children were directed to solve a set of questions that involved equations. The results showed that the children who saw pointing gestures outperformed those who did not. The researchers argued that the gestures seem to have highlighted the key components of the lesson and resulted in more effective learning. Flevares and Perry reported similar qualitative results with regard to equation learning. In their analysis of student-teacher interactions, they found that students were more likely to produce correct responses following a teacher's verbal and gestural explanations as opposed to a verbal only explanation, possibly due to the enhanced content from gestures. They speculated that gestures made the explanation more specific and explicit.

Overall, gestural studies in math and science classrooms showed the positive impact of teacher gestures on learning because gestures enhanced the attention of learners and made the key spoken information salient. What was not addressed, however, was whether such facilitative functions of gestures are relevant to L2 learning by adult learners.

Gesture Studies and SLA

In the field of SLA, the number of gestural studies, particularly those following the Interactionist framework, is fairly limited; this may be because gestures were perceived as something supplemental to spoken language (Alibali, et al., 1997; Kelly & Church, 1998). Recent studies, however, have shown that gestures do not just complement spoken language, and in fact “[gestures are] playing both an interactive, communicative, and an internal cognitive role” and are “tightly linked to language and speech” (Kendon, 2004).

This section summarizes three major areas of gestural studies in the field of SLA. The first group of studies highlights the function of gestures from a pedagogical perspective. Researchers reported that when L2 speakers used gestures, their gestures often served as a form of scaffolding

to compensate for their speech, and they facilitated their L2 production (p.76, Gullberg, 2010). In addition, researchers analyzed the gestures used in language classrooms (Gullberg, 1998; Negueruela & Lantolf, 2008) and found that teachers' gestures help L2 speakers with their comprehension (Allen, 1999). Finally, gestures were reported to facilitate in memorization, including L2 vocabulary and expression learning (Allen, 1995; Tellier, 2008).

The second group of studies investigated how L2 speakers used gestures. Several research studies have been conducted based on the notion of Slobin's thinking for speaking. The idea of *thinking for speaking* builds on the Sapir-Whorf hypothesis and argues that our minds "are trained in taking particular points of view for the purposes of speaking" and becoming retrained is extremely difficult (Slobin, 1996, p.91, cited in Choi & Lantolf, 2008). Researchers have conducted a number of studies on L2 speakers' understanding of motion verbs by comparing how they narrated stories in two languages. Choi and Lantolf, for instance, investigated how Korean L1 speakers described motion events in L2 English. Their analysis revealed that Korean L1 speakers were able to follow a target-like interpretation of spontaneous motion but not of caused motion because of the typological differences between English and Korean, despite their high proficiency levels. Similarly, some studies also reported the perception of manner of motion cannot be changed, even if learners achieved a high level of proficiency (Negueruela & Lantolf, 2008; Stam, 2006).

Not limited to the gestures of L2 learners used during motion events, researchers investigated how L2 speakers use gestures as conversation strategies to facilitate their L2 production (Gullberg, 1998, 2006). Gullberg (1998) identified that gestures were used to solve lexical problems, to signal searching for an appropriate word, to indicate turn taking, and to solve tense aspect problems. In her 2006 study, she investigated what motivated L2 learners to use

gestures by analyzing the gestures of 16 Dutch learners of French during a story-retelling task in L1 and L2 under two conditions: in one condition, the interlocutors were visible, while in the other they were not. She specifically analyzed how the participants used gestures when referring to different types of referents (anaphors, NPs, and null subjects) in relation to the proportions of accompanying gestures. Her analysis revealed that the learners gestured differently in their L1s and L2s (see, Gullberg, 2006 for the full results), however, results showed no difference between the visibility conditions when tasks were in the L2s. This finding indicates that L2 speakers used gestures to facilitate their cognitive processes.

All of these studies are unique, and I believe that they opened the door for interdisciplinary studies by bridging SLA and gestural studies. Yet, exploring whether gestures facilitate L2 development by conducting intervention studies is needed. Since the majority of these studies have been conducted qualitatively, the number of quantitative studies, which are summarized in the next section, is limited.

Exposure to gesture helps L2 acquisition. Some studies used intervention designs to assess whether gestures promote L2 comprehension (e.g. Church, et al., 2004; Sueyoshi & Hardison, 2005) and the acquisition of L2 vocabulary and expressions (Allen, 1995; Tellier, 2008). Overall, they found that the presence of gestures had a positive effect, as opposed to when gestures are absent. Sueyoshi and Hardison (2005) investigated the role of gestures and facial cues in L2 listening comprehension. Forty two low-intermediate and advanced L2 English learners participated in the study. They watched a lecture video in English in one of the following three conditions: an audiovisual lecture with facial expressions and naturally-produced gestures, an audio-visual lecture with facial expressions but without gestures, and an audio lecture without facial expressions or gestures. According to the scores of the listening comprehension test

administered after the lecture, higher-proficiency speakers who viewed the lecture with the facial cues answered the questions more accurately than those in the other two conditions, and lower-proficiency speakers who watched the lecture with facial expressions and gestures answered the greatest number of questions correctly among the three conditions. This study suggests that the gestures were more beneficial for the lower-proficiency speakers and not as beneficial for the higher-proficiency speakers. Church, et al. (2004) also reported on the facilitative roles of gestures in comprehension. They assigned students to math classes in which the instructors did not teach in their L1: Spanish-speaking children were placed in English-speaking classes and English-speaking children were placed in Spanish-speaking classes. Instructors taught each class in two conditions, one with representational gestures, meaning gestures that represented concepts in mathematics and measurement, such as to add, to remove, tall, and short, and the other with only deictic gestures. Children who the instructor taught with representational gestures performed better on tests than those in the no-gesture classes in both languages.

These findings are not limited to L2 comprehension alone; researchers have found that teacher gestures help student vocabulary learning. Allen (1995) and Tellier (2008) investigated how seeing and mimicking the gestures of teachers and researchers helped students better remember expressions and vocabulary. Tellier (2008) conducted a study with 20 monolingual French children between the ages of four and five to measure the effects of gestures on their memorization of eight English vocabulary items. Half of the children watched a video recording of the vocabulary along with being shown equivalent illustrations, and the rest watched a video of the same vocabulary along with being shown equivalent gestures. The children in the gesture group also repeated the gestures used in the video. The results indicated a positive impact for seeing gestures and gesturing; the children in the gesture group performed significantly better in a

vocabulary production task than the other children. In addition, the children in the gesture condition had a higher rate of retention of the vocabulary. Tellier concluded that this was because the exposure to gestures, in conjunction with children's gesturing, facilitated their memories. Allen (1995) also used a similar research design with regard to the acquisition of L2 French expressions and obtained similar results.

The results from these two studies need to be interpreted with caution especially when considering the efficacy of "seeing" the teachers' gestures because the participants had opportunities to gesture in both studies. While isolating the efficacy of seeing gestures is not possible, these studies indicate that being exposed to gestures facilitates vocabulary and expression acquisition.

Teachers' gestures in language classrooms. The aforementioned studies showed that exposure to gestures is helpful for L2 learning, but understanding how gestures are actually used in language classrooms is essential. In general, people speak differently when speaking with low-proficiency L2 speakers as opposed to when speaking with native speakers; this is usually called foreigner talk, or teacher talk in a classroom context. Adams (1998) conducted a study on foreigner talk to identify if native speakers also modify their gestures in addition to their speech when interacting with non-native speakers. She identified an increased frequency of deictic (pointing) gestures and the additional use of pantomime, metaphors, and emblems as ways native speakers facilitated the comprehension of non-native speakers.

More specifically, some studies described how teachers used gestures to identify gestures' functions (e.g. Allen, 2000; Hudson, 2011; Lazaraton, 2004; Tellier, 2006; Wang, 2009; Zhao, 2007). These studies reported that teachers often incorporated pedagogical gestures – gestures with pedagogical purposes – to teach abstract concepts such as metaphors, verb tenses, and

special relationships. For example, Zhao (2007) examined the metaphorical gestures of teachers in four university ESL composition classes. Zhao observed and videotaped four instructors and 54 ESL students in naturally-occurring settings, including student-teacher conferences, peer reviews, and student presentations. She found that teacher-presented metaphors and the gestures used to conceptualize those metaphors assisted in the learning process.

Hudson (2011) investigated how a teacher used gestures in an ESL classrooms at a U.S. university. Her qualitative analysis showed that the teacher incorporated gestures that involved the movement of the teacher's whole body when teaching grammar, pronunciation, and vocabulary. Specifically, she found that the teacher frequently used gestures to explain the concept of simple past tense verbs by incorporating deictic gestures to point to the past, which was conceptually located behind her, using her thumb. In addition, the teacher also indicated the present time by pointing to the ground. Hudson's analysis also revealed that the concept of the past was indicated by moving the whole body backwards. By making a contrast between the present and past tense using gestures and the position of her body, the teacher accentuated the difference in the time frame. Hudson's analysis also found that the instructor frequently used body movement when teaching prepositions. For instance, she walked forward to show the directional characteristics of the preposition to as in to the beach. Similarly, Tellier (2006) also reported that teachers uses gestures to manage their classrooms, evaluate the responses of students, and explain grammar, pronunciation, and new vocabulary.

Overall, previous gestural studies in language classrooms showed that teachers gestured with pedagogical purposes. Specifically, Hudson's descriptive study illustrated that the gestures, sometimes involving movement of the whole body, were used when teaching specific grammatical concepts, such as tense and prepositions. While the qualitative aspects of the studies

bring insights about how gestures are used, the question regarding the impact of such gestures on actual learning still remains unanswered. In the next section, I review studies that have quantitatively measured the effect of gestures on L2 learning.

Teacher gestures, corrective feedback, and learning. A few recent studies examined to what extent teacher gestures in language classrooms impact language learning (Allen, 2000; Hudson, 2011; Lazaraton, 2004; Tellier, 2006; Wang, 2009; Zhao, 2007).

Davies (2006) conducted one of the first studies that incorporated paralinguistic features in interaction studies. In his brief report, he examined the ratio of various types of corrective feedback, including those that were provided purely paralinguistically (Davies did not explain what he meant by “purely paralinguistic” but I assume the paralinguistic cues include gestures, eye contact, and facial expressions etc.), and the ratio of learner uptake following corrective feedback. He found that only 4% of the corrective feedback was provided only paralinguistically, but this type of feedback yielded 100% learner uptake. Furthermore, he found that when the feedback involved paralinguistic features, there was a higher ratio of uptake than when it did not involve any.

Wang (2009) conducted a quasi-experimental study by observing a total of 68 hour-long ESL classroom sessions at a university in the U.S. to identify what paralinguistic and extra linguistic cues were incorporated by the teachers when providing corrective feedback. She further examined if such cues affect L2 learning. Overall, she identified that the types of gestures were not the strongest determiner of the correctness of learner’s responses. However, the correctness was strongly influenced by the teachers’ paralinguistic cues, such as intonation. This coincides with Davies, in which he argued for the importance of paralinguistic cues to elicit correct responses from learners.

These studies provide information about how gestures are used. The analyses of learner uptake indicate the relative effectiveness of gestures used during corrective feedback. However, variables that might have affected the results (e.g. linguistic targets, learners' readiness, classroom context, to name a few.) cannot be eliminated. Therefore, to fully capture the efficacy of gestures during corrective feedback, an intervention study must be constructed with limited linguistic targets and task characteristics while still being administered in a real language classroom to maintain ecological validity. Lyster and Ranta (2013) highlighted the importance of carrying out the classroom research with regards to corrective feedback. Classroom research may bring in various uncontrollable factors, such as the uneven levels of proficiency and the different social context, as cautioned by Goo and Mackey (2013), I believe that the conducting an intervention study in a classroom setting may more realistically depict the effectiveness of different types of feedback than in a laboratory setting.

Motivation of This Study

As can be seen, feedback studies have shown that explicit feedback seems to be more beneficial than implicit feedback on L2 learning because the corrective nature of the feedback and the linguistic targets are salient (e.g. Carroll & Swain, 1993; Ellis et al., 2006), although implicit feedback, specifically recasts, is the most common type of corrective feedback (Ellis & Sheen, 2006; Han, 2002; Leeman, 2003; Loewen & Philp, 2006).

A few gestural studies in SLA have showed that gestures help with L2 comprehension (Sueyoshi & Hardison, 2005) and L2 vocabulary and expression acquisition (Allen, 1995; Tellier, 2008). Such beneficial functions are indirectly supported by findings from developmental psychology studies: (1) children exhibited better attention and participation when gestures were used (Goldin-Meadow, 2004; Perry et al. 1995), (2) gestures enhanced people's memories (R. L.

Cohen & Otterbein, 1992; Davies, 2006; Feyereisen, 1998), and (3) gestures provided additional information to verbal speech and highlighted key information (Flevaris & Perry, 2001). Furthermore, teacher gestures in language classrooms were reported to have clear pedagogical functions, especially in the teaching of abstract concepts.

Taking the general finding that gestures help L2 learning, it is logical to assume that implicit feedback may function more effectively when used along with pedagogical gestures because gestures may enhance the saliency of target structures and lead to better noticing from learners. However, to date, interaction studies have mostly relied on verbal data and have not used a multi-modal approach to investigate this issue.

Research Questions

1. Do learners notice the linguistic target of recasts when verbal recasts involve gestures?
2. Does the use of gestures affect the effectiveness of corrective feedback?
 - 2a. Are recasts more effective in the acquisition of L2 grammar when they are presented only verbally or with gestures?
 - 2b. What is the long-term effectiveness of recasts on the acquisition of L2 grammar when they are presented only verbally versus with gestures?

Chapter 4: Methodology

Piloting

This section illustrates the procedure of piloting and the changes made to the materials as a consequence. I selected two target structures for this study: regular past tense and locative prepositions. The later section provides more information about these two structures. First, a semester before the data collection, three native speakers of English reviewed the original versions of four assessment materials (Past tense oral production test, Preposition oral production test, Past tense grammar test, and Preposition grammar test). They completed each test in the same setting in which the actual data would be collected. No major changes were made after this piloting.

Then, three Level 2 (low-intermediate) students from the English Language Center at Michigan State University reviewed the materials to verify if they would be suitable for the participants' level of proficiency. During this phase, the preposition oral production test went through major revisions. Originally, a set of two laminated illustrations in the form of a spot-the-difference task was used. Each laminated paper contained an illustration of an identical room except that seven items were placed at different locations in the two illustrations. The learners were asked to find the seven differences in the picture while circling the objects using a wet erase pen and then to describe the differences orally. One issue arose during this phase with this material because learners were able to take time to prepare their utterances; I observed some learners planning their sentences before speaking, thus, I failed to capture their spontaneous speech. The test format was changed to a PowerPoint presentation, which enabled me to control the time for which each slide was displayed and to add some distracters for the final study.

Finally, I piloted the PowerPoint version with another three Level 2 students to determine

the most appropriate duration. Three versions of the PowerPoint slides were prepared. Each version contained 12 slides with illustrations, and the duration of each slide was set for 10 seconds, 5 seconds, or 3 seconds. After the participants completed the test, I asked them how they felt about the speed of the task. All three reported that they felt the 10 second version was too long, and two learners mentioned that the 3 second version was not long enough to read the question and find the item. After reviewing their comments, I decided to use 5 seconds as the duration for each illustration.

Participants

All the participants were enrolled in ESL classes at the English Language Center of Michigan State University. The English Language Center offers ESL classes at four levels (Level 1 to Level 4 from lowest to highest) in their Intensive English Program (IEP) as well as a terminal program specifically designed for English for Academic Purposes. A total of 80 participants from seven Level 2 classrooms and three Level 3 classrooms of the IEP program agreed to participate in the study, and upon completion of all the sessions they were given extra credit as determined by the instructors of each class. Four classrooms were assigned to the Recasts + Gesture condition, another four classrooms were assigned to the Verbal Recast Only condition, and two classrooms were assigned to Control groups. The participants' home countries included Saudi Arabia (n=13), Kuwait (n=5), the United Arab Emirates (n=5), China (n=48), Korea (n=4), Japan (n=2), and Thailand (n=3). All the participants were new arrivals to the United States; it was the first semester for most of the students (n=68) or the second semester for a few (n=11). One participant had lived in the U.S. until the age of 5 but went back to Korea and remained there until the age of 18. The participants had already studied English for an average of 6.2 years (SD=3.4) in their home countries prior to attending the English Language Center.

Initially, 38 students from the Recasts + Gesture condition, 31 from Verbal Recast Only condition, and 11 from Control group participated in the study. Tables 1 and 2 show the number of eligible participants for the analysis of past tense verbs and prepositions. Eligible participants were those who did not miss more than one posttest for each target structure and who scored lower than 80% on the oral production test. This reduced the number of participants to 27 for the Recast + Gesture condition, 21 for the Verbal Recast Only condition, and 11 for the Control condition for the analysis of past tense verb acquisition. Among these 59 participants, 22 were male and 37 were female. The participants' L1s were Arabic (n=16), Chinese (n=37), Japanese (n=1), Korean (n=3), and Thai (n=2). Their average age was 19.4 years (SD=1.25).

For the acquisition of prepositions, 27 participants for the Recast + Gesture condition, 13 for the Verbal Recast Only condition, and 8 for the Control condition were included in the analysis. Out of 48 participants, 28 were male and 20 were female. The participants' L1s were Arabic (n=15), Chinese (n=29), Korean (n=2), and Thai (n=2). Their average age was 20.4 years (SD=1.88).

Table 1

Distribution of Eligible Participants for Analysis of Past Tense Verb Acquisition

Participation and Eligibility	Recast + Gesture (n)	Verbal Recast Only (n)	Control (n)
Signed up	38	31	11
Missed tests partially			
Missed more than two tests	9	10	0
Missed only one posttest	8	0	0
Missed one posttest and eligible	7	4	0
Completed all the tests			
Completed all the tests	21	17	11
Completed tests and eligible	20	17	11
Total eligible participants	27	21	11

Table 2

Distribution of Eligible Participants for Analysis of Preposition Acquisition

Participation and Eligibility	Recast + Gesture (n)	Verbal Recast Only (n)	Control (n)
Signed up	38	31	11
Missed tests partially			
Missed more than two tests	7	12	0
Missed only one posttest	10	2	1
Missed one posttest and eligible	10	2	0
Completed all the tests			
Completed all the tests	21	18	11
Completed tests and eligible	17	11	8
Total eligible participants	27	13	8

Target Structures

The selected target structures were English regular past tense verbs and locative prepositions. Both structures can be problematic for learners, they can be easily corrected via feedback, and previous studies showed that teachers actually use gestures while teaching these structures.

Several studies reported that the past tense is problematic for learners (e.g. Davies, 2006; Wang, 2009) regardless of its relatively early introduction. As reported in Ellis et al. (2006), L2 learners are familiar with the concept of the structure of the past tense but still have difficulty using it in their spontaneous production. In other words, learners may have explicit knowledge of regular past tense verbs but not implicit knowledge. During an informal interview, course instructors reported similar information.

A few studies have specifically explored how learners could learn the past tense from corrective feedback. Yang and Lyster (2006) investigated how English as a foreign language students from China learned English regular and irregular past tense verbs under three conditions: prompts, recasts, and no feedback. Students in the prompt condition improved more than those in the other two conditions in the acquisition of regular past tense verbs. However, no significant difference was found between the prompt and recast conditions in the acquisition of irregular past tense verbs. The significant impact of feedback on the acquisition of regular past tense verbs was also reported in Ellis et al. (2010). They randomly assigned low-intermediate ESL students into one of three conditions (implicit feedback, explicit feedback, and no feedback) and compared the acquisition of regular past tense verbs between the three conditions. The researchers found that learners in the explicit feedback group learned better than those in the implicit feedback group. Overall, corrective feedback, in particular prompts and explicit feedback, is helpful for the acquisition of regular past tense verbs. For the present study, I specifically selected the following verbs that take regular past tense: cook, play, kiss, watch, talk, call, and wash. The variation in the pronunciation was not the focus of this study but the feedback was provided with the appropriate pronunciation.

The second target structure was locative prepositions. Despite prepositions being another

problematic structure, studies have not been systematically analyzed to identify the extent to which feedback helps with the acquisition of prepositions except for a study by Boom (1998). Boom examined the efficacy of recasts on nine elementary-level ESL students. He asked the students to tell a story about the worst accident they had ever experienced. First, they were asked to talk with another student about the given topic. Then, they were asked to tell the same story to a researcher, and the researcher provided recasts on various linguistic targets. Finally, they were asked to tell the same story to another ESL student. Boom compared their original story to the third story and found that the recasts were effective for phonology, lexical forms, irregular past tense verbs, and prepositions, but not for articles and regular past tense verbs. This is so far the only study that has investigated the efficacy of corrective feedback on the acquisition of prepositions. For this study, I limited the target prepositions to above, under, in, on, and next to.

Materials

This intervention study included the following five stages: (1) pretests, (2) treatment sessions, (3) immediate posttests, (4) interviews, and (5) delayed posttests. I will describe the procedure in detail in the following section, but I will first present an outline of the design in Table 3 to illustrate the list of materials used in this study. The detailed procedure is presented in the next section.

Table 3

Order and List of Materials

Pretest	Treatment	Immediate posttest	Delayed posttest
• Background questionnaire • Oral production tests (Past tense, prepositions) • Grammar tests (Past tense, prepositions)	• Four communicative tasks (Past tense, prepositions)	• Stimulated Recall • Oral production tests (Past tense, prepositions) • Grammar tests (Past tense, prepositions)	• Oral production tests (Past tense, prepositions) • Grammar tests (Past tense, prepositions)

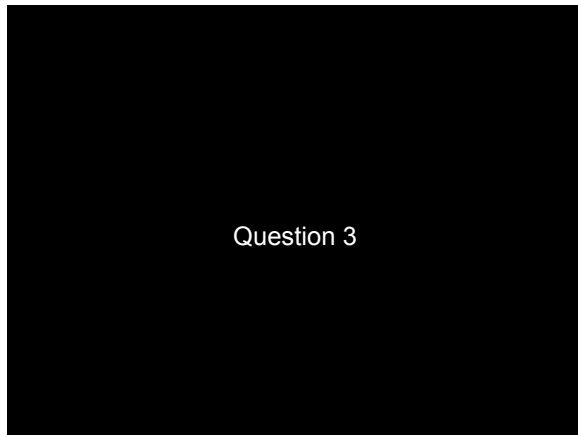
Background questionnaire. All participants completed a background questionnaire prior to the data collection. This questionnaire included questions about their gender, age, home country, first language, length of stay in the U.S., number of years they have studied English, and their English learning background. The information collected here was not used for the analysis. However, I used this to understand the overall demographics of the participants and to eliminate any participants who did not fit the requirements for this study. See Appendix A for the background questionnaire.

Assessment instruments for target structures. There were four types of assessments for each stage of the study, specifically for the pretest, posttest, and delayed posttest: two oral production tests and two grammar tests targeting regular past tense verbs and prepositions to assess participants' knowledge of target structures. The oral production tests were designed to assess learners' implicit knowledge and the use of target structures in spontaneous speech, and the grammar tests were designed to assess their explicit knowledge of the two target structures.

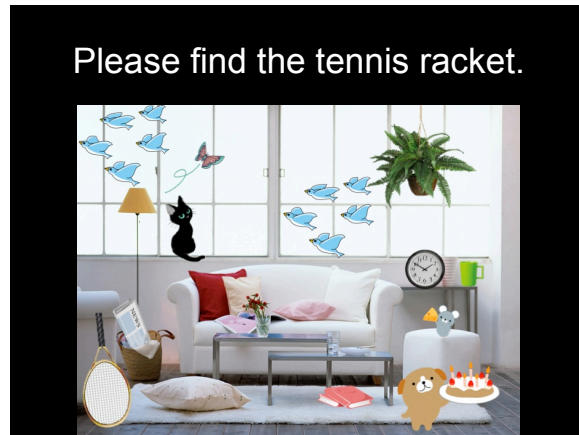
Preposition oral production test. Three versions (Prepositions A, Prepositions B, and Prepositions C) of the PowerPoint slides were developed, each of which was composed of two practice questions, eight questions, and four distracters, to be used for the oral production tests. A set of four slides was created for each question, which appeared in the format shown in Figure 1.

The prompt appearing on Slide 2 indicates which item participants needed to focus on for the study. In Slide 3, the second prompt appears and the participants were asked to verbally respond. The responses were audio recorded using a voice recorder. In order to have the participants not focus only on the locations of the items, distracter questions were also asked. Figure 2 shows how the distracters were embedded in the stimuli. Slide 3 includes questions such as “How many strawberries do you see?”, “What color are the flowers?”, “What time is it?”, and such. This oral test was audio recorded. I calculated the ratio of the correct use of prepositions in the obligatory context and used it as the score. The order of the versions was randomized. See Appendices B, C, and D for the complete versions of the preposition oral production test.

Slide 1 (3 sec)



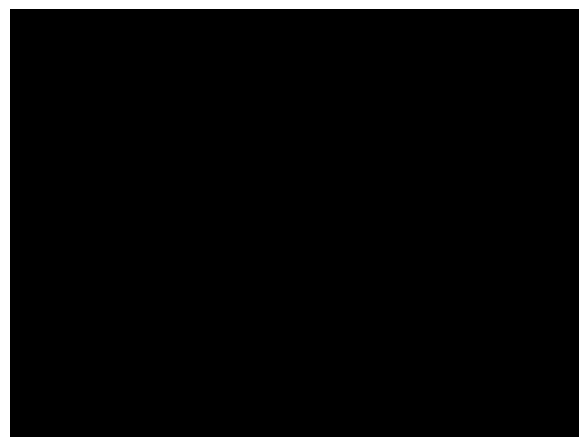
Slide 2 (5 sec)



Slide 3 (5 sec)



Slide 4 (3 sec)

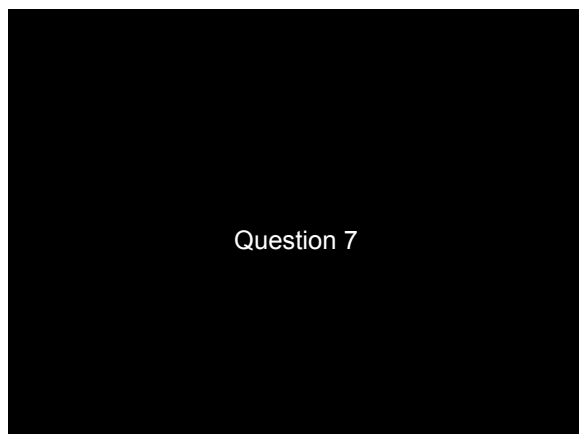


(For interpretation of the references to color in this and all other figures, the reader is referred to the electronic version of this dissertation.)

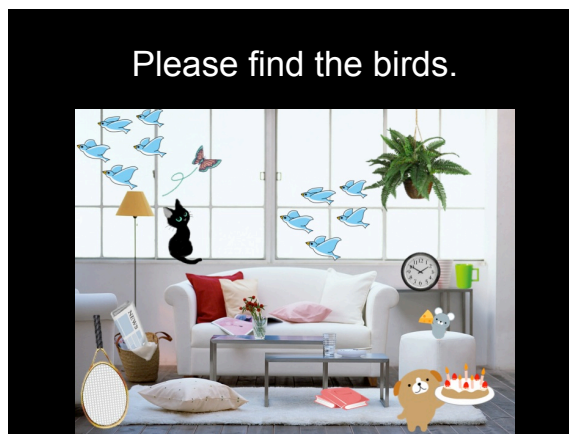
Figure 1

Timing and format of questions from preposition oral production test

Slide 1 (3 sec)



Slide 2 (5 sec)



Slide 3 (5 sec)



Slide 4 (3 sec)

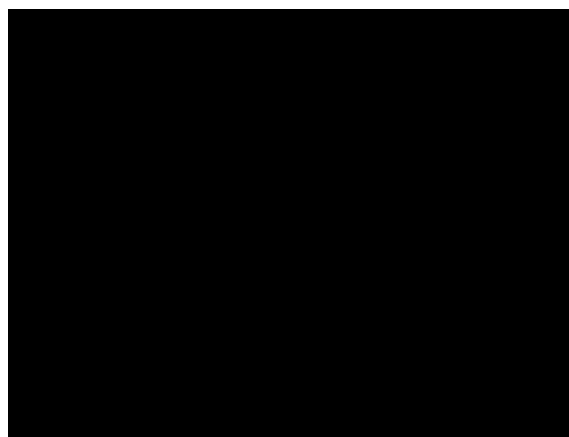


Figure 2

Timing and format of distractors from preposition oral production test

Past tense oral production test. Three versions of the past tense oral production test were created and each contained a set of seven pictures to elicit the selected regular past tense verbs. This test was composed of two slides as shown in Figure 3.

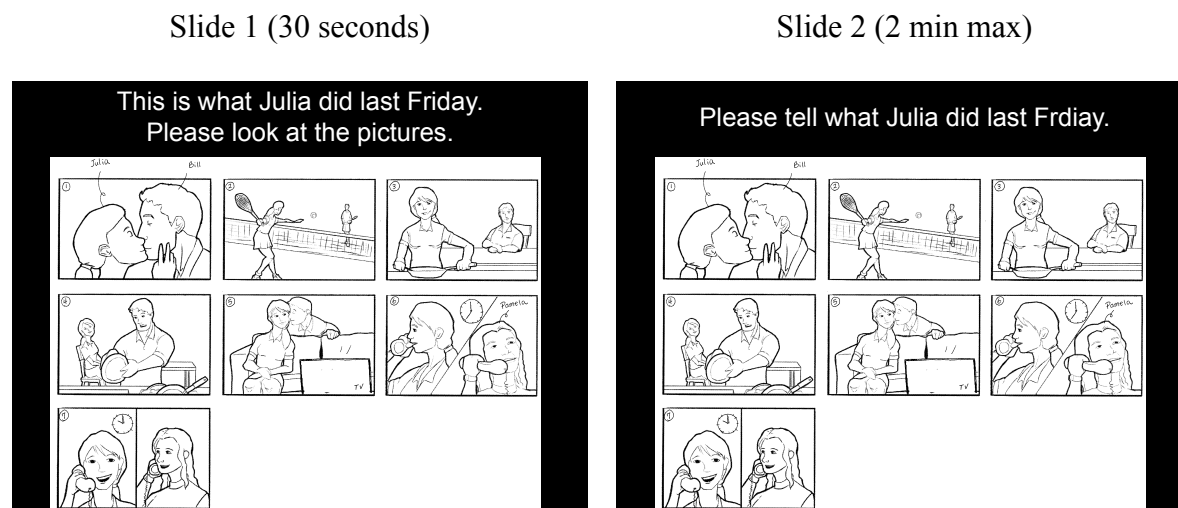


Figure 3

Timing and format of slides of past tense oral production test

The participants were presented with seven pictures that described what happened to a character last weekend. The pictures were designed to elicit all the target verbs cook, play, kiss, watch, talk, call, and wash. Participants had 30 seconds to review the story, and then they responded to the prompt, “Please tell me what happened to Julia (the name of the character) last week.” This oral test was also audio recorded using a voice recorder. The ratio of the correct use of past tense in the obligatory context was used as the score. The picture description tests with past tense A, B, and C were randomized and used as a part of a pretest, immediate posttest, and delayed posttest sequence. See Appendices E, F, and G for the complete versions of the past tense oral production test.

Past tense grammar test. This grammar test contains 20 questions and it was constructed to measure the participants’ understanding of the regular past tense verbs. There are five distracter

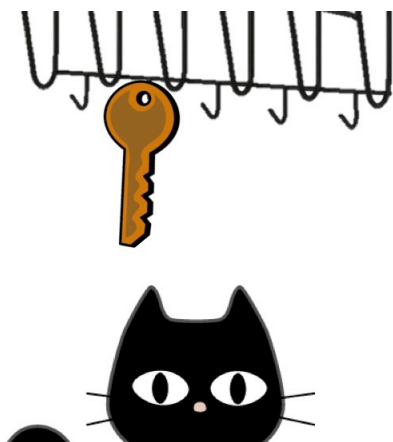
sentences (e.g. articles and preposition), ten ungrammatical sentences due to misuse of the past tense, and five grammatical sentences.

For each question, the participants judged if the sentence was grammatical. When they judged that the sentence was grammatical, they were asked to circle “correct”, and when they judged that it was ungrammatical they were asked to circle “incorrect” and write a correct sentence. The participants were allowed to spend as much time as needed to complete this test. See Appendices H, I, and J for all the versions of the past tense grammar test. An example of an ungrammatical (past tense) sentence is shown below.

Example:

Yesterday, Julia cooks Indian food for John (CORRECT / INCORRECT)

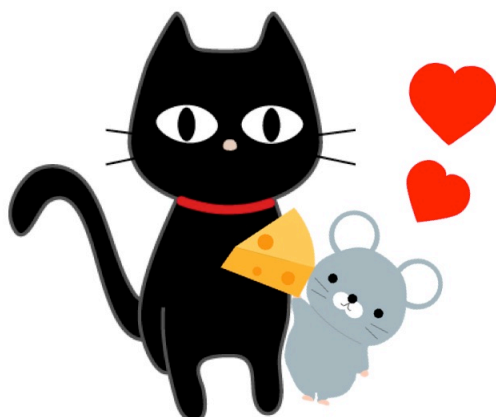
Preposition grammar test. The last section of the test was the preposition grammar test. This test was composed of 20 questions that included five distracters. The participants looked at a picture and read a sentence to determine whether the sentence was an accurate description of the picture. If the sentence was correct, they were asked to circle TRUE and if the sentence was incorrect, they were asked to circle FALSE and write a correct sentence. See Figure 4 for an example and Figure 5 for a distracter. Out of the 15 targeted items, 10 are accompanied with an incorrect description. Participants were allowed to spend as much time as needed to complete this test. See Appendices K, L, and M for the complete versions of the preposition grammar test.



The key is under the cat.
TRUE / FALSE
If false, write a correct sentence:

Figure 4

Example of preposition grammar test question



The mouse likes the cat.
TRUE / FALSE
If false, write a correct sentence:

Figure 5

Example of distractor from preposition grammar test

Communicative tasks. A total of four communicative tasks were designed for this study. Two of them were designed to elicit the regular past tense verbs, and the remaining two tasks were used to elicit prepositions. They were constructed based on the Ellis' (2003) definition of tasks – a task includes a gap and a clearly defined outcome. Learners needed to focus on meaning and on using their own linguistic resources. In particular, I used focused tasks, which are designed to promote the use of particular linguistic forms.

Past tense story telling task A. The participants were divided into pairs, and each pair received two pictures in a sequence illustrating a part of how one male character, Michael, met a female character, Erica, last Friday. There were 18 pictures in total, and each pair received a set of two consecutive pictures (Pictures 1 and 2, Pictures 3 and 4, Pictures 5 and 6, and so forth). The task was designed to elicit the aforementioned regular past tense verbs. First, I introduced some vocabulary words that might not be familiar (e.g. outlet, barista, and chef). Then, the participants described the two pictures in front of the class following the prompt, “Please describe what happened to Michael and Erica last Friday,” without showing the pictures to their classmates. I used this prompt consistently throughout the task so that the participants could respond using the past tense. After everyone finished describing their own pictures, they put the nine sets of pictures in the right order. The participants needed to negotiate the possible order of the pictures with each other until they came up with the correct order. The entire session was video recorded. This activity lasted about 25 to 30 minutes. See Appendix N for the pictures used for this task. During this task, I provided verbal recasts with and without gestures when the participants did not use the past tense when it was necessary.

Past tense story telling task B. The second task targeting the regular past tense followed a similar pattern but in a different context. The context of this communicative task was that there was a murder last Saturday and the learners played the roles of suspects in this murder case, with one learner playing the murderer. After reviewing some vocabulary words (e.g. murder, murderer, suspect, jail, and arrest), each participant was presented with a picture card that described what that character did at 9 pm last Saturday. However, one card contained the sentences “You are the killer. Make up a story so that you will not be arrested.” Each participant was asked to narrate a story of their activity on the last Saturday evening in front of the class based on the card they

received. I asked some related questions, such as, “How long did you stay?”, “What teams were playing?”, “Who won the game?” to increase opportunities of oral production. On average, three related questions were posed to each participant. The participants needed to listen to each other so that their stories matched with the other characters and to identify the murderer. However, they were not allowed to take any notes. After telling their stories, the participants asked each other questions until they found the murderer. This activity lasted about 20 minutes. See Appendix O for a complete illustration of the pictures that were used for this task.

Preposition picture description task A. The participants were divided into two groups. One group played the role of detectives and the other group played the role of ‘honest’ burglars. The following context was explained: the burglars stole the largest diamond in the world, and they need to hide it somewhere in the house before the detectives come find it. The detectives need to find the diamond using the fewest possible questions. Each group was given four minutes to prepare for the task. A laminated poster-sized print of a picture of a house was attached to the blackboard, and a picture of the house printed on letter-sized paper was given to each group. The burglar group was advised to find the most difficult place to hide the diamond, and the detective group was advised to come up with a strategy that would allow them to identify the place with the minimum number of questions. The names of the furniture were labeled to facilitate production. Then, the detectives asked Yes/No questions, such as “Is the diamond under the bed?” until they found it. To make sure that their prepositions were used correctly, the participants who were playing the role of detectives were told to point to locations using a laser pointer. I tallied the number of student questions. Once the detective team found the diamond, the teams switched roles. The group which asked fewer questions won the game. See Appendix P for an illustration of the house. The activity lasted about 30 minutes.

Preposition picture description task B. For the second task, the participants were again divided into two groups. One group played the role of the owners of a special key, and the other group played the role of friends who were trying to find the key. A picture of a room with 18 different keys was printed on a poster-sized paper, laminated, and affixed to the blackboard. Each group was also given a letter-sized copy of the picture. The following setting was explained: The owners of a secret box left the key in the room, and they called their friends and asked them to find it. However, the key owners placed various other keys in the room, and their friends needed to ask about the location of the correct key using Yes/No questions (e.g. Is the key in the kitchen?). In order to make sure that their prepositions matched their intended meaning, the participants were directed to point at the keys using a laser pointer. After the proper key was found, the participants switched roles and the whole task was repeated. I counted the number of questions, and the team who could find the key with fewer questions won the game. See Appendix Q for an illustration of the room.

Verbal report session. I conducted stimulated recall sessions with nine participants to understand their perception of recasts, specifically to examine whether they recognized the corrective nature of recasts and the linguistic targets. The participants were the one who missed one of the immediate posttests but was still willing to be included in the data collection. The entire session was audio recorded. The participants watched video segments of their own in-class tasks, and they were asked to comment on their thoughts about the interaction. Stimulated recall is a tool that "...can be used to prompt participants to recall thoughts they had while performing a task or participating in an event. It is assumed that some tangible (perhaps visual or aural) reminder of an event will stimulate recall of the mental processes in operation during the event itself" (Gass & Mackey, 2000, p.17). To elicit the participants' thoughts at that time, I provided

the following prompt: Tell me what you were thinking about during this interaction. I specifically selected the segments during which I provided recasts, which made up about 75% of the total segments, and I also included 25% of segments as non-corrective interaction for distracters.

Procedure

This study used an intervention design to measure the learning outcomes resulting from the three conditions. Figure 6 shows a typical schedule for the data collection. On the day of Session 1, the participants completed the background questionnaire, pretests, and then the two grammar tests. The oral production tests were audio recorded. As mentioned earlier, there were three versions of each test to avoid a learning effect. The results obtained from one-way ANOVA revealed that there was no difference among the conditions with regards to the test results in the regular past tense grammar test $F(2, 57) = 2.272, p = .112$, the regular past tense oral production test $F(2, 57) = 1.072, p = .349$, the preposition grammar test $F(2, 45) = 2.703, p = .136$, or the preposition oral production test $F(2, 45) = .980, p = .383$.

The treatment sessions (Sessions 2 and 4), which included four communicative tasks, were conducted over two days. Each entire session was videotaped. As described earlier, the first two tasks used during Session 3 targeted regular past tense verbs and the latter two tasks during Session 4 targeted locative prepositions. When the participants did not use regular past tense verbs when it was necessary during Session 3 or used incorrect prepositions during Session 5, I provided verbal recasts with or without gestures or with no recasts according to the conditions to which they were assigned.

The immediate posttest, which was in the same format as the pretest but in a different version, was administered on the days after Session 3 and Session 5. More specifically, the past tense oral production test and the past tense grammar test were administered the day after Session

3, and the preposition oral production test and the preposition grammar test were administered the day after Session 5. On the same day, a subset of the participants participated in a stimulated recall session instead of the posttests. Egi (2008) warned that participants who have taken a posttest and then stimulated recall may not be able to provide accurate data during the stimulated recall session, and that participants who take part in stimulated recall prior to a posttest may have their posttest scores skewed. Following her argument, the participants who took part in the stimulated recall session were not included in this study for one of the target structures. For example, if a participant took part in a stimulated recall session following the regular past tense communicative tasks, I did not include their scores for the analysis of past tense acquisition, but I did include their scores for prepositions and vice versa.

Finally, the delayed posttest was administered during Session 6, about a week after the completion of Session 5. This session included the past tense oral production test, the preposition oral production test, the past tense grammar test, and the preposition grammar test. Again, the oral production tests were audio recorded.

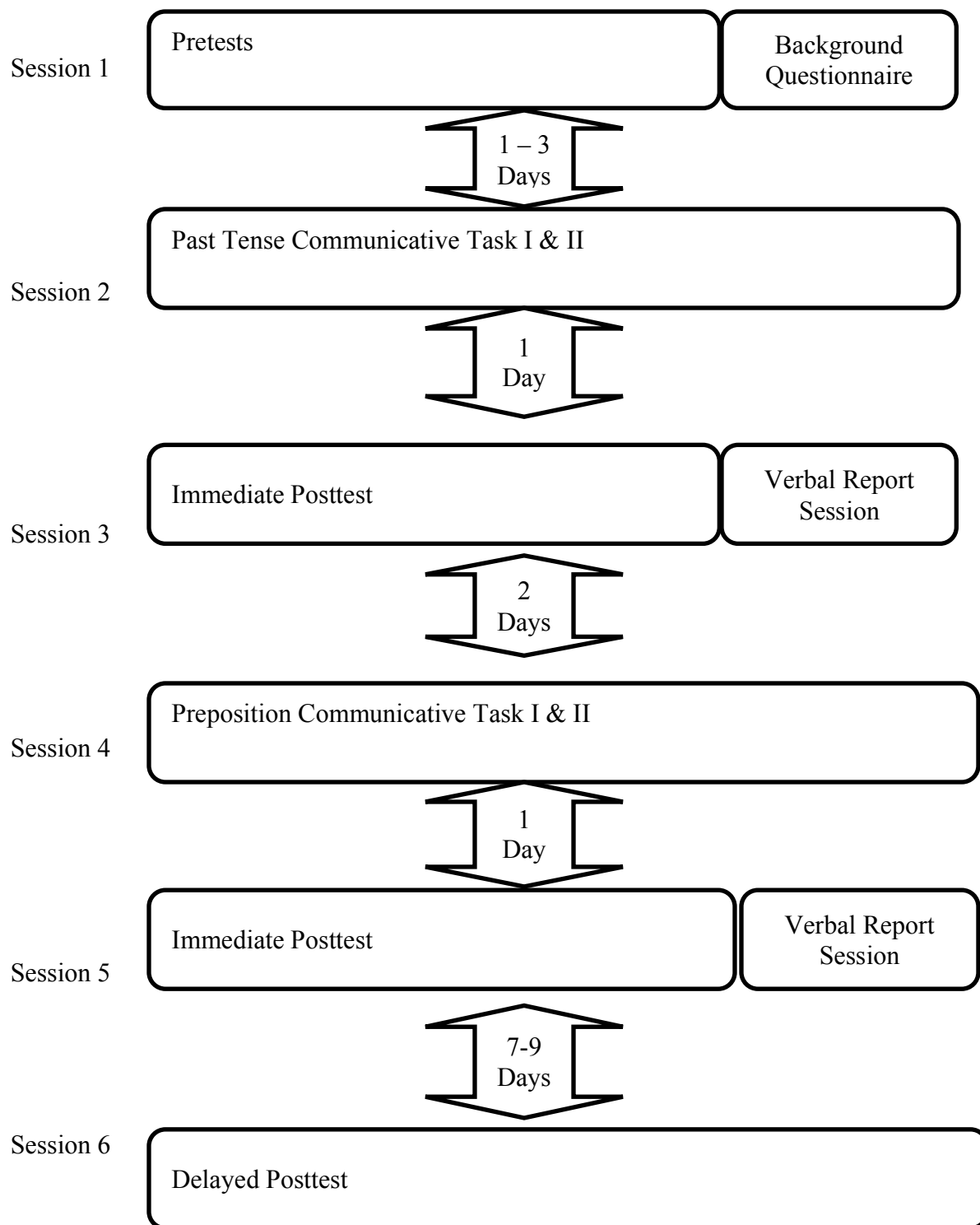


Figure 6

Illustration of procedure timeline

Description of recasts. I provided the specific type of recast according to the condition to

which the participants were assigned. Controlling the manner of the provision of recasts is crucial because the study aims to measure the effectiveness of verbal recasts with or without pedagogical gestures. For the Verbal Recast Only condition, verbal recasts were provided. Then, for the Recasts + Gesture condition, I provided recasts accompanied by pedagogical gestures. No feedback with regards to the two target structures was provided for the Control group.

The next section describes how the feedback was given in each condition. When the participants made mistakes in structures that were not targeted in this study (e.g. pronunciation), I did not provide any correction unless not doing so caused a communication breakdown or the participants asked me specific questions.

Description of recasts for regular past tense communicative tasks. Tasks A and B were designed to elicit regular past tense verbs. When the participants did not use the past tense in the obligatory context in Task 1, I provided recasts with or without gestures immediately following the participants' utterances.

Following Hudson (2011)'s description of teacher's gestures that were used to teach the concept of the past tense, I specifically used the "point back" gesture using my thumb to indicate the past. From my personal observations of various language classrooms, this point back gesture is commonly used when teaching the past tense. A specific illustration of the gesture is shown Figure 7. For the Verbal Recast Only condition, I recast only verbally, and I put my hands down next to the side of my body to avoid gesturing. The way I provided recasts is illustrated in Figure 8. For the Recasts + Gesture condition, I provided verbal recasts along with the pointing back gesture, as shown in Figure 9.

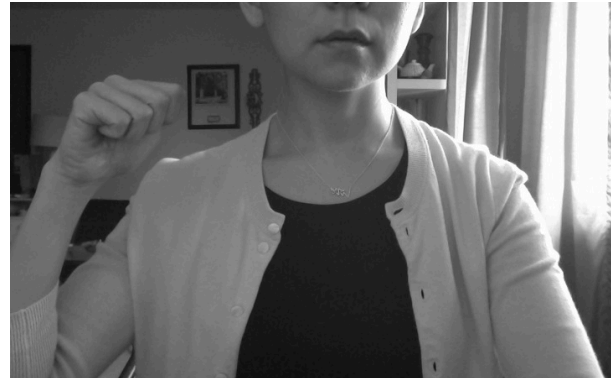


Figure 7

Past tense gesture used for past tense communicative tasks A and B

S: And he wash the car.
R: Oh, he washed the car.

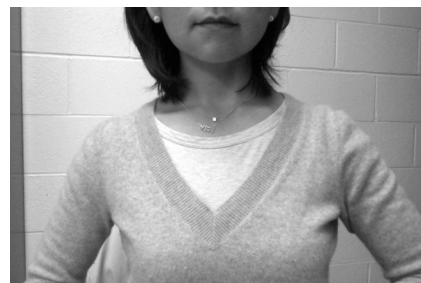


Figure 8

Example of verbal recasts used during past tense communicative tasks A and B

S: And he wash the car.
R: Oh, he washed the car.



Figure 9

Example of recasts plus gesture used during past tense communicative tasks A and B

Description of feedback for preposition communicative tasks. Tasks 3 and 4 were designed to elicit locative prepositions (on, in, under, next to, and above). I used the native English speaker's gestures for under, above, on, and next to as used to describe the locations in Tutton (2011). To my knowledge, there is no study which has addressed gestures to be used along with the preposition in, so I created my own gesture for in. The right hand was positioned to show a container, and the left hand, while pointing, moved toward the container to show the concept of containment. Figure 10 illustrates what gestures were used for each preposition.

Preposition	Illustration of gesture	
In		
On		
Above		
Under		
Next to		

Figure 10

Illustrations of gestures used in preposition communicative tasks A and B

Recasts were provided following non-target-like use of the selected prepositions. The Verbal Recast Only condition received only verbal recasts (Figure 11) and the Recasts + Gesture condition received verbal recasts accompanied by pedagogical gestures (Figure 12).

S: Is the diamond on the fireplace?
T: Is the diamond in the fireplace?



Figure 11

Example of verbal recasts provided during preposition communicative tasks A and B

Figure 12 shows how the recasts were provided along with a gesture that indicates the meanings of the correct prepositions.

S: Is the diamond on the fireplace?
T: Is the diamond in the fireplace?

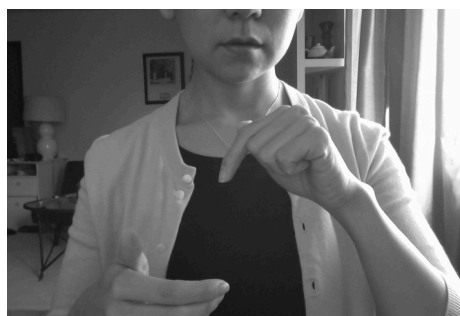


Figure 12

Example of recasts and gestures provided during preposition communicative tasks A and B

Analysis

Analysis of learner comments. Two major questions were asked in this study; the first research question explores whether students notice the corrective nature of recasts. Overall, a total of 127 recasts were provided for past tense communicative tasks and 73 recasts were provided during the preposition communicative tasks. Table 4 shows the breakdown of the frequency of recasts of each experimental condition.

Table 4

Distribution of Frequency of Recasts for Experimental Conditions

	Past Tense class average (SD)	Past tense total number of recasts	Preposition class average (SD)	Preposition total number of recasts
Verbal Recast Only (4 classes)	15.25 (4.9)	61	9.5 (3.9)	38
Recast + Gesture (4 classes)	16.5 (2.3)	66	11.75 (1.59)	35
Total	15.9 (3.7)	127	9.13 (2.64)	73

I analyzed the responses obtained from participants during the verbal report sessions. Five of them were from Classroom A (Verbal Recast Only condition) and four were from Classroom B (Recasts + Gesture condition). In Classroom A, 19 verbal recasts on the past tense and 14 verbal recasts on prepositions were provided. In classroom B, 14 and 8 recasts accompanied by gestures were provided for the past tense and prepositions, respectively. After the verbal report sessions, I listened to their comments and wrote down a key word for each comment. Examples of the key words are nervousness for a comment such as “I was worried because I had to speak in front of everyone.” and competitiveness for a comment such as “I really wanted to win. So, [I thought] don’t go that way.” Using these key words and the learners’ original comments, I conducted a content analysis to find out which topics were commonly addressed. Six categories emerged from a total of 274 comments obtained from the learners: (1) Focus on game results, (2) Effort for comprehension, (3) Do not remember, (4) Anxiety, (5) Peer evaluation, and (6) Others. I provide a description of each category along with an example below. All the examples are taken from the current data set.

(1) Focus on game results: Learner comments in this category show that the learners talked about

their competitive feelings. For the past tense tasks, the learners were trying to be the first ones to guess the correct order. For the preposition tasks, the learners were trying to help their group win the game.

Example: “I really wanted our team to win. So, I kept thinking, don’t go that way!”

(2) Effort for comprehension. The comments in this category show that the learners were trying to understand their peers’ or teachers’ utterances during the task.

Example: “I paid attention to him (the classmate) to understand what he says.”

(3) Do not remember. As the name of this category suggests, the learners were not always able to recall what they were thinking about at the time of classroom interaction.

Example: “Sorry, I don’t remember.”

(4) Anxiety. The comments categorized here indicate that the learners felt anxious during the tasks, especially when they had to speak in front of everyone.

Example: “I was worried because I had to speak in front.”

(5) Peer evaluation. The comments in this category show that the learners were evaluating their classmates’ language skills at the time of the interaction during the tasks.

Example: “Now it’s [the student’s name] speaking... Her English is very good.”

(6) Others. The rest of the comments that do not match the descriptions of the aforementioned categories.

Example: “I think I was hungry. It’s almost noon.”

Analysis of acquisition of regular past tense and locative prepositions. The second research question asks whether the learners acquire regular past tense verbs or prepositions more readily when the recasts are provided along with gestures. I compared the scores obtained from the grammar tests and oral production tests in the pretest, immediate posttest, and delayed posttest,

using repeated-measures ANOVA to identify if any of the groups performed significantly differently from the others. Before interpreting the results, Mauchly's sphericity test was used to verify whether the assumption of sphericity was violated. When it was violated, I used Greenhouse-Geisser adjusted scores. In addition, the effect size was calculated by η^2 . The results obtained from η^2 were interpreted using the guideline provided by Cohen (1988). When η^2 was around .01, it was interpreted as a small effect size, .06 as a medium effect size, and .14 and above as a large effect size. When there was a significant difference, I used Bonferroni multiple comparison to see which condition significantly differed from the others. Finally, I conducted one-way ANOVA to examine at what point (e.g. immediately or at the delayed posttest) the significant change occurred. When there was a significant difference, I again used Bonferroni's multiple comparison to identify which group differed significantly from the others. Then, I calculated Cohen's d to measure its effect size. The effect size was interpreted using the interpretation guideline in Cohen (1988). An effect size of .2 to .3 was interpreted as a small effect, around .5 as a medium effect, and above .8 as a large effect.

All the statistical analysis, except for Cohen's d was conducted using IBM SPSS Statistics Version 21. This program does not allow the inclusion of missing data when conducting repeated-measures ANOVA. In other words, if a participant had missed any part of the posttest, their data could not be included in the analysis. This resulted in a lower number of participants included in the repeated-measures ANOVA. For the analysis of the past tense, 19 of the Recasts + Gesture, 17 of the Verbal Recast Only, and 11 of the Control group were included. For the prepositions, 14 of the Recasts + Gesture, 11 of the Verbal Recast Only, and 8 of the Control group were included. However, this restriction did not apply for the one-way ANOVA, and thus all the eligible participants were included for the post-hoc analysis.

Chapter 5: Results

Response to Research Question 1: Noticing of Recasts and Gesture

The first research question examined whether there was a difference in learners' recognition of the corrective nature of recasts and the noticing of target structures when recasts were accompanied by gestures. Overall, 237 responses were obtained from the nine participants during the stimulated recall session. Based on the content analysis, five major categories were identified. The frequency and ratio of the comments for these categories are shown in Table 5. The first predominant category showed the interest of the participants in winning the task. Probably due to the competitive nature of the tasks, the majority of their comments concerned the task outcome. For example, one participant said that he really wanted to win but he was worried that the other team might guess the correct location of the key. The second category showed the efforts of learners to understand their classmates' oral production. For example, one learner said that she paid attention to a classmate who was speaking in front of the class because she saw his character's name on her card. The third category concerned the evaluation of participants by their peers. Some learners showed that they thought positively or negatively about the linguistic skills or personalities of their classmates. The fourth category showed the psychological status of participants during the task. A typical comment from this category showed how nervous a learner was when speaking in front of everyone. However, none of the comments concerned the nature of error correction. Therefore, I was not able to identify a difference in the quality of noticing between the two experimental conditions at least at the level of conscious awareness.

Table 5

Frequency of Responses in Representative Categories

	Verbal Recast Only (n = 5)	Recasts + Gesture (n=4)	Total (n=9)
Focus on the game	41 (30.4%)	39 (38.2%)	80 (33.8%)
Comprehension effort	21 (15.6%)	15 (14.7%)	36 (15.2%)
Do not remember	36 (26.7%)	26 (25.4%)	62 (26.1%)
Anxiety	8 (5.9%)	7 (6.9%)	15 (6.3%)
Peer evaluation	6 (4.4%)	3 (2.9%)	9 (3.8%)
Others	11 (8.1%)	12 (11.8%)	23 (9.7%)
Total	135 (100%)	102 (100%)	237 (100%)

Response to Research Question 2: Gesture-incorporated Recasts and L2 Development

Effect of types of recasts and explicit linguistic knowledge. The second research question asked whether the provision of recasts was overall more effective than when recasts were not provided. Table 6 shows the mean scores of the grammar test on the past tense; Figure 13 shows this visually. Because Mauchly's Test of Sphericity showed that the sphericity of the dataset was not assumed ($p = .911$), the adjusted data obtained from Greenhouse-Geisser was used for the interpretation. A repeated-measures ANOVA revealed that there was no significant time effect, $F(1.993, 87.708) = .136$, $p = .872$, no significant group effect $F(2, 44) = 1.289$, $p = .286$ and no significant interactive effect of time and group $F(3.987, 87.708) = 3.083$, $p = .686$. The effect sizes of the time effect, group effect, and interactive effect of time and group were small to medium, $\eta^2 = .003$, $\eta^2 = .055$, and $\eta^2 = .015$, respectively. Table 7 presents the results of the repeated-measures ANOVA for the past tense grammar test.

Table 6

Mean Scores of Regular Past Tense Grammar Test

	Pretest	Immediate posttest	Delayed posttest
Control (n=11)	9.82 (SD = 1.66)	9.36 (SD=1.43)	9.27 (SD=1.19)
Verbal Recast Only (n=21)	10.18 (SD = 1.38)	9.88 (SD=1.53)	10.59 (SD = 1.37)
Recast and Gesture (n=27)	10.07 (SD=1.28)	10.60 (SD=1.05)	10.07 (SD = 1.03)

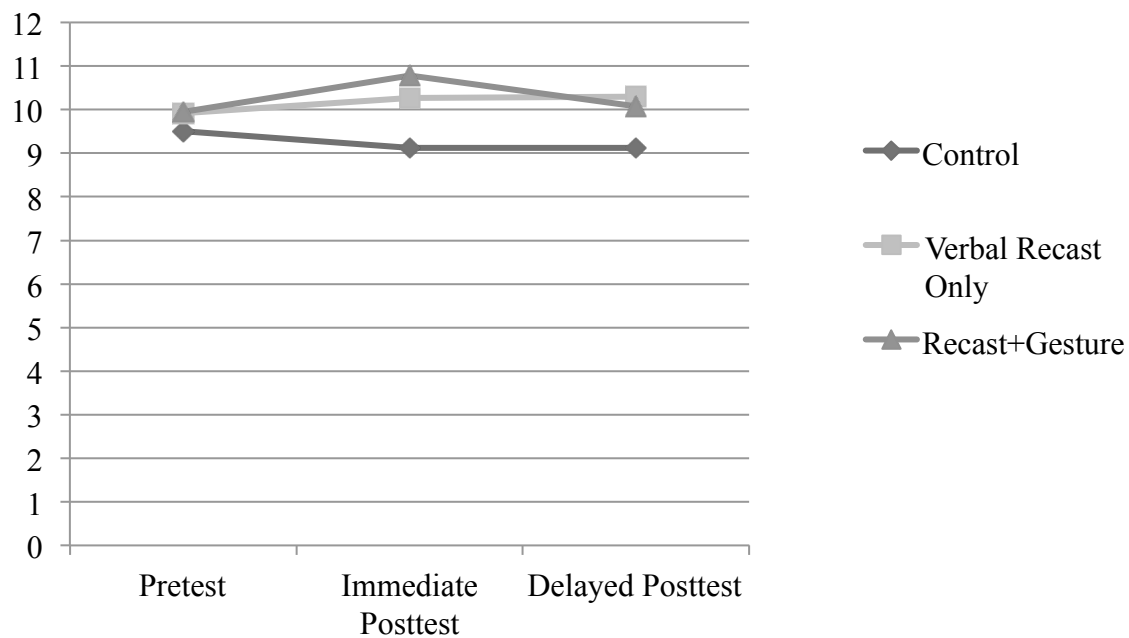


Figure 13

Mean scores of regular past tense grammar tests

Table 7

Repeated-measures ANOVA for Regular Past Tense Grammar Test

Source		df	F	p	η^2
Between subjects	Group	2	1.289	.286	.55
Within subjects	Time	1.993	.136	.872	.003
	Group X Time	3.987	3.083	.686	.015

The second part of the grammar test was about prepositions. Table 8 shows the scores of this grammar test. Again, Mauchly's test of sphericity does not assume the sphericity of the data ($p = .863$), thus, Greenhouse-Geisser's adjusted scores were used for the analysis. A repeated-measures ANOVA revealed that there was no significant time effect, $F(1.980, 59.402) = 2.368$, $p = .103$, no significant group effect $F(2, 30) = 2.529$, $p = .097$, and no significant interactive effect of time and group $F(3.960, 59.402) = .633$, $p = .639$. Their effect sizes, $\eta^2 = .073$, $\eta^2 = .144$, and $\eta^2 = .041$, respectively, were small to medium overall, except for the interactive effect of time and group. Table 9 presents the results of the repeated-measures ANOVA for the locative preposition grammar test.

Overall, the comparison of the regular past grammar test scores showed that there was no significant difference across the three conditions. Similarly, the analysis of the scores obtained from the preposition grammar test also did not show significant difference.

Table 8

Mean Scores of Preposition Grammar Test

	Pretest	Immediate posttest	Delayed posttest
Control (n=8)	9.82 (SD = 1.66)	9.36 (SD=1.43)	9.27 (SD=1.19)
Recast (n=13)	10.18 (SD = 1.38)	9.88 (SD=1.53)	10.59 (SD = 1.37)
Recast and Gesture (n=27)	10.07 (SD=1.28)	10.60 (SD=1.05)	10.07 (SD = 1.03)

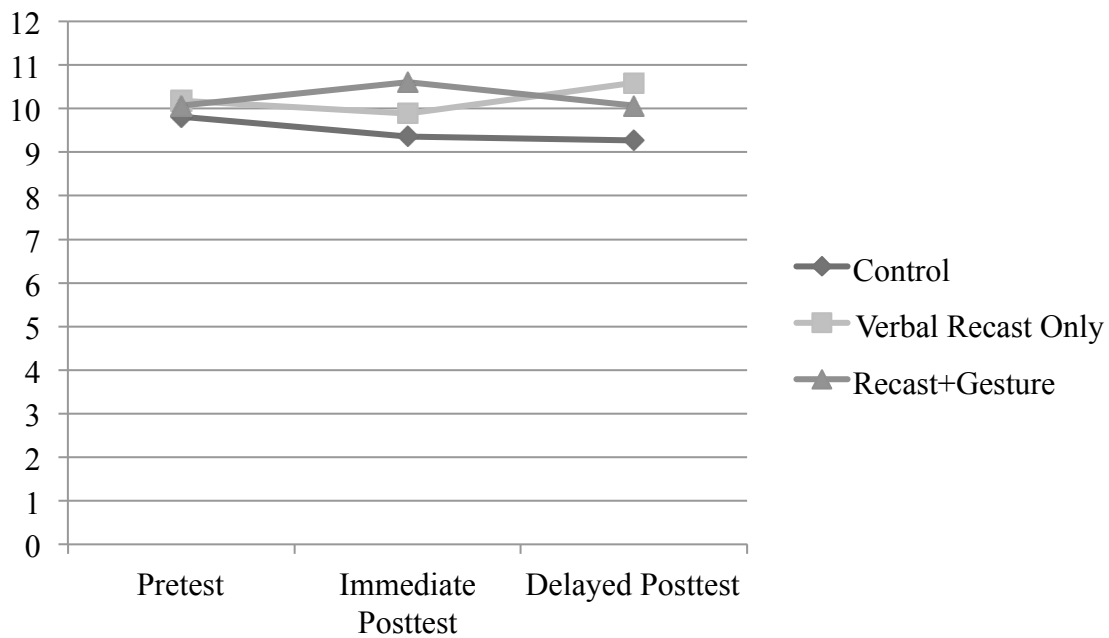


Figure 14

Mean scores of preposition grammar test

Table 9

Repeated-measures ANOVA for Preposition Grammar Test

Source		df	F	p	η^2
Between subjects	Group	2	2.529	.097	.144
Within subjects	Time	1.980	2.368	.103	.073
	Group X Time	3.960	.633	.639	.041

Effect of types of recasts on development of oral production. This analysis compares the learners' oral production test scores of the two target structures to identify whether recasts are more beneficial for L2 learning when provided with gestures. First, I compared the learners' oral production of the past tense followed by that of prepositions.

Tables 10 shows the scores obtained from the past tense oral production test, and Figure 15 shows this visually. Figure 15 illustrates that there was an overall increase from the pretest to the immediate posttest in all the conditions. Specifically, the learners in the Control and the Verbal Recast Only conditions had higher scores in the delayed posttest but not those in the Recasts + Gesture Condition. For the analysis, the scores from Greenhouse-Geisser were used because the sphericity of the data was not assumed, according to Mauchly's test of sphericity ($p = .422$). A repeated-measures ANOVA revealed that there was a significant time effect, $F(1.926, 86.670) = 7.241$, $p = .001$ with a medium effect size ($\eta^2 = .106$) indicating overall improvement. However, neither a significant group effect $F(2, 45) = .065$, $p = .937$ nor a significant interactive effect of time and group $F(3.852, 86.670) = 1.344$, $p = .261$ were found, and their effect sizes were small, $\eta^2 = .056$ and $\eta^2 = .003$, respectively. Table 11 shows the results of repeated-measures ANOVA for past tense oral production test.

Table 10

Mean Scores of Regular Past Tense Oral Production Test

	Pretest	Immediate posttest	Delayed posttest
Control (n=11)	23.47 (SD=22.51)	33.43 (SD=20.93)	36.55 (SD=33.92)
Verbal Recast Only (n=15)	23.13 (SD=21.18)	31.69 (SD = 29.04)	39.46 (SD=32.77)
Recast + Gesture (n=27)	21.40 (SD = 22.71)	40.78 (SD=27.98)	36.90 (SD=28.73)

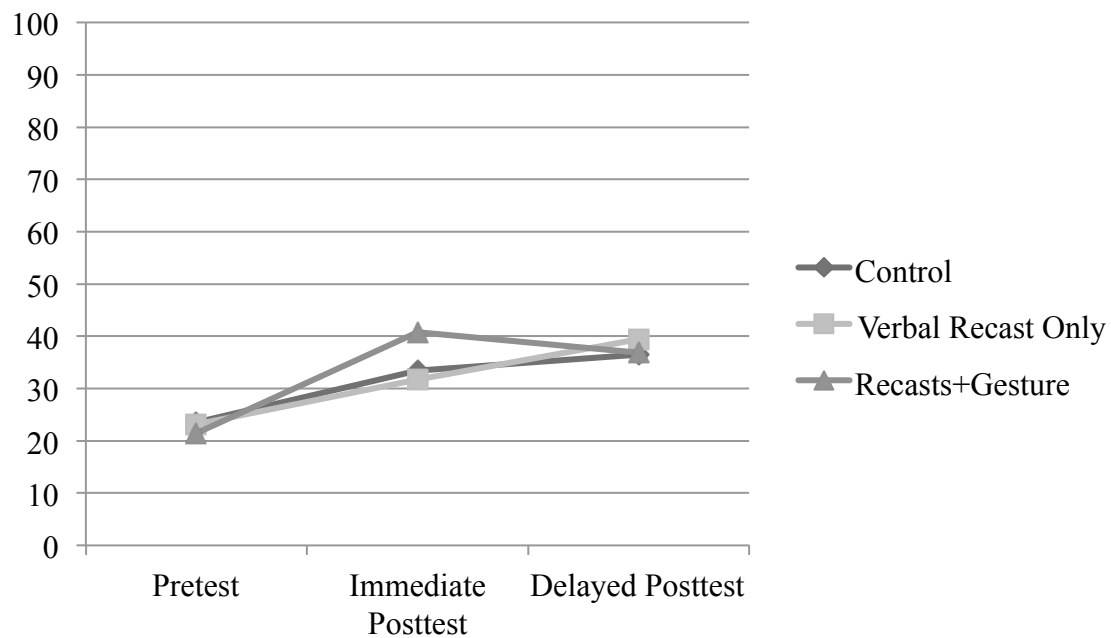


Figure 15

Mean scores of regular past tense grammar test

Table 11

Repeated-measures ANOVA for Past Tense Oral Production Test

Source		df	F	p	η^2
Between subjects	Group	2	.065	.937	.056
Within subjects	Time	1.926	7.241	.001	.106
	Group X Time	3.852	1.344	.261	.003

Table 12 shows the scores from the preposition oral production test, and Figure 16 shows this visually. Figure 16 shows that the scores of the Control condition were essentially static. Scores from the Verbal Recast Only and the Recasts + Gesture conditions improved almost equally in the immediate posttest, but the score of the Verbal Recast Only condition dropped in the delayed posttest, although the score of the Recasts + Gesture condition remained the same in the delayed posttest.

Table 12

Mean Scores of Preposition Oral Production Test

	Pretest	Immediate posttest	Delayed posttest
Control (n=8)	56.07 (SD=19.82)	59.72 (SD=17.73)	58.83 (SD=14.67)
Verbal Recast Only (n=13)	53.79 (SD = 18.67)	79.82 (SD=16.85)	69.93 (SD=20.25)
Recast + Gesture (n=27)	62.89 (SD = 12.59)	83.45 (SD=14.23)	85.25 (SD=9.25)

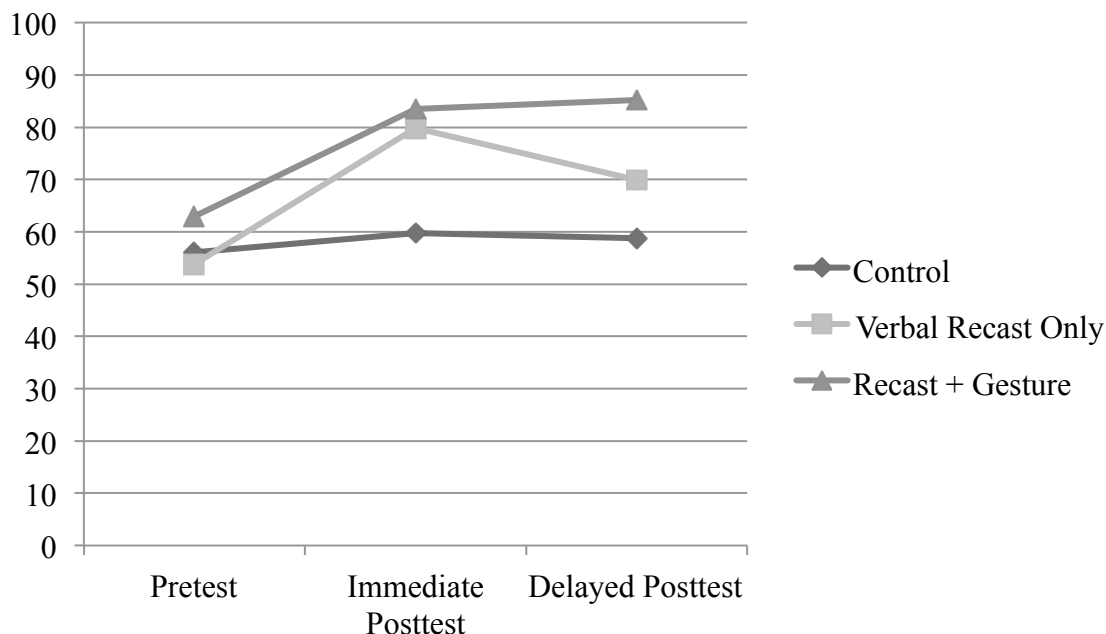


Figure 16

Mean scores of preposition oral production test

The results from the repeated-measures ANOVA were used to verify if such variation in the performances by the learners in the three conditions was significant. Since the sphericity was not assumed according to Mauchly's test of sphericity ($p=.089$), Greenhouse-Geisser's adjusted scores were used. The repeated-measures ANOVA revealed that there was a significant time effect, $F(1.765, 61.788) = 18.705$, $p = .000$, a significant group effect $F(2, 35) = 6.356$, $p = .004$, and a significant interactive effect of time and group $F(3.532, 61.788) = 3.829$, $p = .010$. Their effect sizes were consistently large as well, $\eta^2 = .346$, $\eta^2 = .266$, and $\eta^2 = .180$, respectively.

Table 13 shows the results of repeated-measures ANOVA for the preposition oral production test.

Table 13

Repeated-measures ANOVA for Preposition Oral Production Test

Source		df	F	p	η^2
Between subjects	Group	2	6.356	.004	.266
Within subjects	Time	1.765	18.705	.000	.348
	Group X Time	3.532	3.829	.10	.180

There was a significant difference across the three conditions and a large effect size. Bonferroni multiple comparisons showed that the Recasts + Gesture condition outperformed the Control condition significantly ($p = .004$). However, the differences between the Verbal Recast Only and Control conditions ($p = .253$) and the Recasts + Gesture and Verbal Recast Only conditions ($p = .277$) were not significant.

I further conducted one-way ANOVA by using the pretest scores, then the posttest scores, and finally the delayed posttest scores to assess when the learners started varying across the three conditions. The results from one-way ANOVA show that there was no significant difference in their pretest scores, $F(2, 45) = .032$, $p = .969$, and the effect size was minimal, $\eta^2 = .001$. However, there was a significant difference in the scores from the immediate posttest, $F(2, 45) = 4.947$, $p = .011$, with a strong effect size, $\eta^2 = .180$. Specifically, the Verbal Recast Only and Recasts + Gesture conditions both significantly diverged from the Control condition at the time of immediate posttest ($p = .011$ and $p = .032$ respectively). The effect on the conditions on the immediate posttest was large both in the comparison between the Control and the Verbal Recast Only conditions ($d = 1.16$) and between the Control and the Recasts + Gesture conditions ($d = 1.47$). Yet, there was no significant difference between the Verbal Recast Only and Recasts + Gesture conditions ($p = 1.00$). The effect size was also small ($d = 0.23$). Finally, the delayed posttest scores were compared. The results from one-way ANOVA show that there was a

significant difference in their delayed posttest scores, $F(2, 35) = 11.73$, $p = .000$, with a large effect size, $\eta^2 = .41$. However, there was no significant difference between the Control and the Verbal conditions ($p = .292$), although there was a medium effect size ($d = .62$). Finally, the Recasts + Gesture condition still significantly outperformed the Control condition ($p = .000$) with a large effect size ($d = 2.15$) and the Verbal Recast Only condition ($p = .015$) also with a large effect size ($d = 0.97$). I summarized these results in Figure 17.

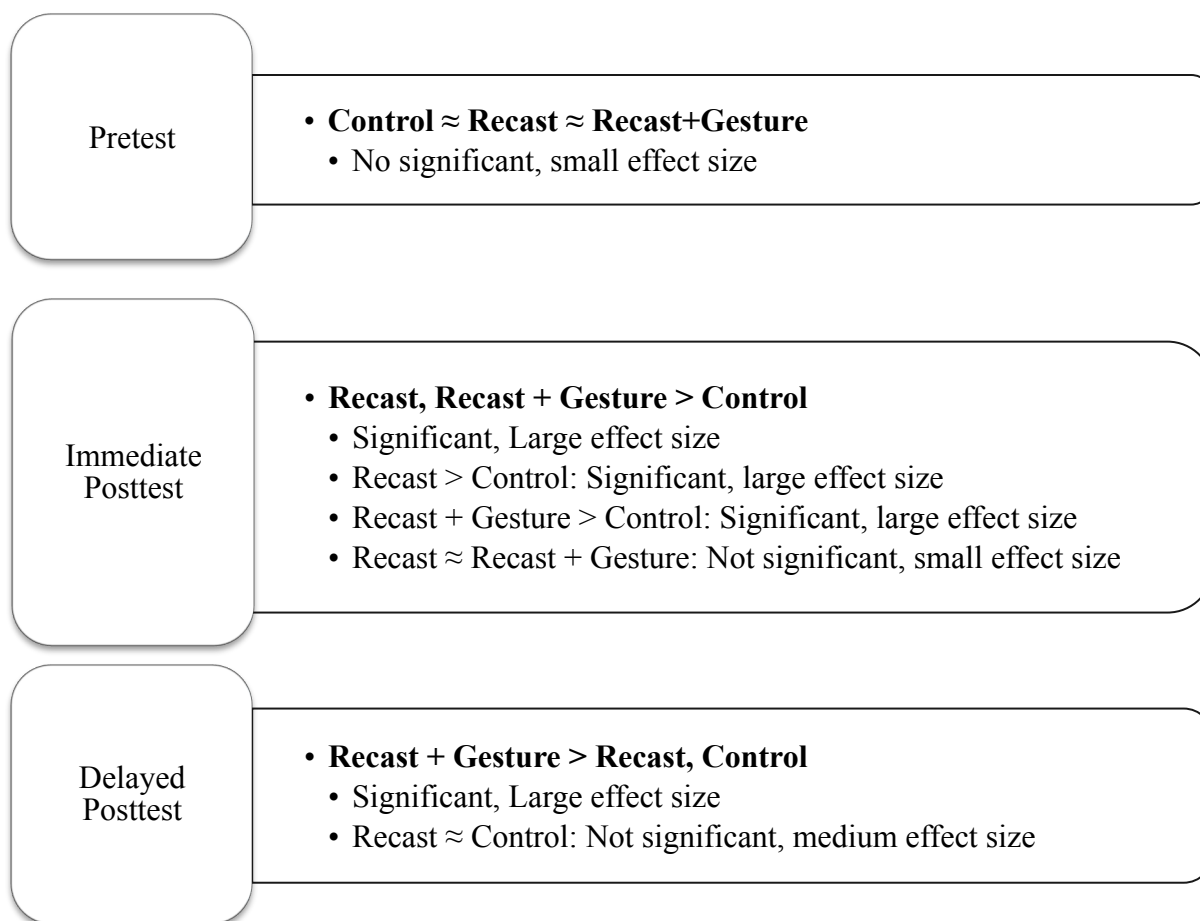


Figure 17

Summary of preposition oral production test score analysis

Summary of Results

The first research question examined whether there was a difference in the quality of

noticing when the recasts were given with or without gestures. The participants' stimulated recall comments indicate that they did not notice the corrective nature of the recasts or the linguistic targets at the level of awareness, regardless of the presence of the gestures. Instead, the majority of the comments concerned learner tasks and classroom engagement.

The second research question asked whether the recasts were effective in the acquisition of the L2 grammar when they were provided either only verbally or with gestures. The first sub-question specifically focused on the effectiveness of recasts in the immediate posttest. In terms of the explicit knowledge of learners, there was no difference between the two conditions for both target structures. The learners already had a high level of explicit knowledge of both structures prior to the data collection. As for the oral production of regular past tense verbs, there was no significant difference between these conditions. However, the analysis revealed a significant difference between the two conditions with regard to the acquisition of prepositions. The Verbal Recast Only condition outperformed the Control group in the immediate posttest, although this difference was diminished in the delayed posttest. Concerning locative preposition oral production, both the Recasts + Gesture and Verbal Recast Only conditions improved almost equally in the immediate posttest.

The second sub-question examined if there was a long-term effect for verbal recasts depending on whether the recasts were accompanied by pedagogical gestures. Again, the results revealed that there was no significant difference in the development of the explicit knowledge of learners and the oral production of regular past tense verbs. However, there was a significant difference between the Verbal Recast Only and Recasts + Gesture conditions in the delayed posttest for the preposition oral production test. Although both the Verbal Recast Only and Recasts + Gesture conditions equally improved in the immediate posttest, only the Recasts +

Gesture condition retained its improvement, surpassing the Verbal Recast Only condition.

Chapter 6: Discussion

I conducted this study to examine if gestures can be used to make the linguistic targets of recasts more salient so as to increase the noticing of learners, as well as to improve learning outcomes. The motivation for this study came from the gap between researchers' and teachers' preferred forms of corrective feedback. Some researchers argued that explicit forms of corrective feedback seemed to be more effective in general than less explicit forms, such as recasts, because the corrective nature of feedback and the linguistic targets appear to be more salient to learners, whereas teachers prefer using recasts because they are non-obtrusive and less face-threatening in the classroom. I used an intervention study to see whether linguistic targets could be made more salient by incorporating gestures during recasts, which, theoretically, may result in more frequent noticing and L2 development. The regular English past tense verbs and prepositions were the target structures, and I assessed learners' linguistic development of these structures in their explicit knowledge and their oral production.

Discussion for Research Question 1: Learner Noticing during Recasts

The results showed that the learners did not exhibit any recognition of the corrective nature of either type of recast or of noticing of the target structures. This section explores this outcome focusing on the following issues: (1) the majority of the comments concerned the task outcome, (2) no comments were made on error correction, (3) the participants were observed to have learned but without any indication of noticing, and (4) the possibility of different patterns of processing in the visual and aural modalities.

Comments about task outcome. The first research question examined if the learners exhibited different patterns of noticing when recasts involved pedagogical gestures. One of the most common ideas addressed by the learners in the comments was their attention to the tasks. I

speculate that this outcome is due to (1) the competitive characteristics of the tasks and (2) the context of the provision of feedback. In this study, student-teacher interaction happened during communicative focused tasks that had a competitive nature. During the first task targeting regular past tense verbs, the learners were paired and asked to find the correct ordering of picture cards as quickly as possible. In the second task, the learners worked individually and competed with each other to correctly identify the “murderer” in the classroom. During the two tasks that focused on locative prepositions, the learners were divided into two groups, and they were told to identify the diamond or the key using fewer questions than their opponents to win the game. Therefore, the nature of the tasks was competitive in general, and that the learners’ comments concerned the task outcomes was not surprising. This is not to say that the learners did not notice the linguistic targets at all – but it appears that how much the learners were focusing on the task was the most relevant information for the learners to report during the stimulated recall session.

Other researchers incorporated stimulated recall sessions by using interaction data obtained from communicative tasks as stimuli, yet, the previous studies did not address such comments found in this study. The examples of communicative tasks used in other studies were discussions (Carpenter, Jeon, MacGregor, & Mackey, 2006) or one-way picture description tasks and two-way spot-the-difference tasks with native speakers (Egi, 2007), all of which were communicative but may not be necessarily competitive. My intention is not to claim that the learners were more engaged in the tasks in the present study than those were in previous studies. However, learners could have been more attuned to the outcomes of the tasks because of the competitive nature of those tasks, as reflected in their comments.

The second possible way to account for this result is the context in which the recasts were provided. In this study, the recasts were provided only during the communicative tasks – in other

words, only interactions that occurred during these tasks were used as stimuli for the stimulated recall sessions. This might have specifically drawn the attention of learners to the tasks. In the studies that used stimulated recall sessions as a tool to elicit the thoughts of learners at the time of interaction, unrelated comments were usually classified as ‘Others’ and were not analyzed systematically (e.g. Mackey, et al., 2000). However, having a closer look at the data may explain why the majority of the learners’ comments concerned tasks by comparing the situations in which the interactions occurred. Some of the studies that used stimulated recall sessions obtained their initial data in regular classrooms (e.g. Egi, 2007; Kim & Han, 2007; Mackey, et al., 2000; Nabei & Swain, 2002; Oliver & Mackey, 2003; Polio, Gass, & Chapin, 2006). This, of course, does not mean that regular classrooms do not include any communicative tasks; however, using the excerpts only from the tasks might have drawn the learners’ attention specifically to the tasks. In addition, the learners knew that I had been teaching classes at the institution of data collection. Therefore, it is possible that they had perceived me as an instructor, which may have influenced the learners to comment on how well they were focused during the tasks.

No comment on error correction. The results that there was no comment on the corrective nature of recasts or about target structures, regardless of the conditions, are surprising, taking the findings from the previous studies that used stimulated recall sessions as a methodology for eliciting learner noticing during classroom interaction into account (e.g. Carpenter, et al., 2006; Egi, 2007; Kim & Han, 2007; Mackey, et al., 2000; Mackey, McDonough, Fujii, & Tatsumi, 2001; Polio, et al., 2006; Roberts, 1995). The result of this study, that the learners exhibited no sign of noticing, may have been due to the linguistic types of the target structures, which are morphosyntax for regular past tense verbs and semantics for locative prepositions, as well as the type of corrective feedback, recasts, that was involved in this study.

A few studies that investigated learner noticing using stimulated recall sessions reported relatively low rates of correct identification of target structures when feedback was given in the form of recasts. Roberts (1995), for example, showed that learners were able to identify 33% of the errors in full recasts, which were also used in the present study. Mackey et al. (2000) showed that learners did not identify the nature of negative feedback (75% of the negative feedback was recasts) when the linguistic targets concerned morphosyntax (13% in an ESL classroom and 24% in an IFL classroom). The findings of the present study are in line with those two studies in that the amount of comments on noticing (of linguistic targets) was relatively small, and non-existent in the present study. Although the researchers did not limit the studies only to those that incorporated stimulated recall sessions, some meta-analyses also reported the lack of effectiveness of corrective feedback when targeting grammatical features. Mackey and Goo (2007)'s meta-analysis showed that corrective feedback that targeted lexical features was more effective than feedback with grammatical targets. Thus, one possibility to account for this lack of comments on error correction may be because that the linguistic target of this study was grammatical. It is arguable that the acquisition of prepositions, one of the target structures of this study, may be similar to vocabulary acquisition because of the form-meaning mapping. In this study, the learners had already known the prototypical meaning of each preposition and during the tasks they appeared to have expanded the understanding of the prepositions above the most prototypical meanings. Thus, compared to learning a concrete new vocabulary words, learners might have viewed the learning prepositions less as vocabulary acquisition. Had the linguistic target been lexical that involves concrete vocabulary words such as name of furniture pieces in the illustrations, it is possible that the learners might have commented on the correction.

Possible learning without noticing. The aforementioned speculation about linguistic

targets may explain the rationale behind the lack of comments on error correction; however, it does not account for the reasons the participants of the Recasts + Gesture condition, along with those of the Verbal Recast condition, outperformed those of the Control condition, even though comments on noticing were not obtained from the two experimental conditions. This suggests that learning may have occurred without noticing of the target structures at the level of awareness, which returns to the debate over the necessity of conscious noticing for L2 learning. According to Schmidt's view, learner attention and conscious noticing are indispensable for L2 learning. He claimed that only what is being noticed in the input can be learned because the interlanguage does not change without it, and thus learner awareness, entailed by noticing, is requisite at the time of learning. Robinson (1995) further explained noticing as what is "detected and the activated [sic] as a result of the allocation of attentional resources from a central executive" (p.297). While their arguments are well-supported in the field of SLA, the results from this study do not seem to follow their claims. Instead, the results of the present study appear to be coherent according to the claim by Tomlin and Villa (1994) that a part of the noticing process, detection, may occur without consciousness but still result in learning.

The results of a few empirical studies that examined the possibility of L2 learning without awareness vary to a great extent, and making a claim based on the limited number of studies is premature. In addition, the finding of the present study needs to be interpreted with caution because the study was not originally designed to specifically examine the possibility of L2 learning without awareness. Still, the results of this study are consistent with Williams (2005), in which he found that L2 learners were capable of learning form-meaning mapping of artificial English determiners without conscious attention. The researcher assigned two conditioning factors, distance (near vs. far) and animacy (animate vs. inanimate) to the determiners. The

researcher informed the learners of information about the distance condition but not about animacy. After being exposed to the sentences that contained the target determiners, the learners took tests in which they were told to choose the correct determiners. Finally, the learners attended verbal report sessions. He found that the learners were able to correctly use the articles above chance, even when they reported that they were not aware of the rules. This finding, however, was not confirmed in a replication study by Hama and Leow (2010), where they incorporated think-aloud protocol, an additional measure of noticing. They found that learners were not able to select or produce the correct determiners when they were unaware of the rules. In addition, they also found a mismatch between online think-aloud measurement of awareness and the results obtained from an exit questionnaire; awareness at different levels, such as noticing and awareness at the level of understanding, were found in the online think-aloud measure but not in the offline measures. Similarly, some information of the awareness was only found via think-aloud protocols. Taking the findings from these two studies into account, the results of the present study can be explained by the following hypothesis: (1) the learners were able to learn without awareness at the level of consciousness, as in Tomlin and Villa (1994) and Williams (2005), or (2) the learners were unable to express awareness during the post-activity stimulated recall session, as in Hama and Leow (2010). However, as I mentioned earlier, I do not claim either hypothesis based on the results of this study, as the study was not specifically designed to address this issue and because the number of previous empirical studies is fairly limited.

Noticing of visual vs. aural feedback. The results showed that the learners did not exhibit any sign of noticing in the two experimental conditions, even though the two conditions showed improvement in the acquisition of locative prepositions in the immediate posttest and the Recasts + Gesture condition maintained the improvement in the delayed posttest. To the best of

my knowledge, no study has assessed L2 learner noticing in relation to the visibility of gestures. Furthermore, no results indicating learners' noticing was collected in this study. Thus, explaining whether the difference in the learning outcomes is a result of differences in the unuttered noticing, or whether the learning outcome varied even though the learners in the two conditions did not notice, is not possible. This section attempts to account for the first speculation by relating to findings from neuroscience studies. The second possibility is addressed in the discussion for the second research question.

The findings from some recent neuroscience studies showed that human brains process verbal sentences differently when they are accompanied by meaningful gestures. Skipper, Goldin-Meadow, Nusbaum, and Small (2007) examined how co-speech gestures alter the neural response to speech, and they found that when meaningful gestures were present along with speech, listeners needed less effort to understand the contents of the speech compared to when meaningless adaptor gestures were present or when gestures were not present at all. Meaningful gestures activated the primary motor cortex, which is an area related to processing actions, as well as Broca's area, which is related to processing languages. To date, SLA studies have not addressed whether there is a variation in learners' noticing when they need more or less effort in comprehension. However, the learners in the Recasts + Gesture condition could have experienced a lack of conscious noticing because they understood the contents of the recasts with less effort to understand the information given in each feedback because of the presence of meaningful co-speech gestures. However, a separate study is needed to fully justify this argument.

Measuring noticing using stimulated recall. Notwithstanding the aforementioned exploration, speculating as to possible methodological issues that may have prevented the present study from eliciting learner comments on noticing is important. This study used stimulated recall

sessions to measure whether learners recognized the corrective nature of feedback or whether they noticed linguistic targets during the communicative activities. Although the stimulated recall protocol of this study strictly followed the recommendations of Gass and Mackey (2000), some possible methodological issues of this study need to be addressed.

First, in the present study, stimulated recall sessions were conducted completely in English, the learners' L2s, instead of in their L1s. Because of the relatively low proficiency of the participants, the learners might not have been fully able to express their thoughts (Polio & Chiu, 2007). Admittedly, conducting the stimulated recall sessions in their L1s would have prevented such issues; however, there was a methodological difficulty in conducting stimulated recall sessions in the L1s. There were five different L1s used by the learners, and having speakers of each L1 who were also well-trained to be in charge of the stimulated recall sessions during the entire period of data collection would have been logistically difficult, given that the learners' attendance for the post-treatment tests was unpredictable.

Second, this study used stimulated recall instead of other online methods to elicit noticing but it did not use other online measures because there were close to 20 learners in each class and because predicting which learner would participate in the stimulated recall sessions was not possible. Some examples of online measurements of noticing are think-aloud protocols and knocking during activities. In Philp (2003), learners were individually matched with native speakers and were instructed to recall the native speaker's previous utterances when hearing two knocking sounds. Conducting such online measures was impossible in the present study because all the communicative tasks took place in a classroom. Identifying learners who could actually recall such sentences would have been extremely difficult. Similarly, another common online measurement of noticing, think-aloud protocols, could not have been used in this study because of

the learners were engaged in the oral communicative tasks. Had the data collection method and context been different, such as via pair work, implementing additional measurements would have been. However, this study was specifically carried-out in a classroom to maintain ecological validity, thus, only stimulated recall sessions were used.

Discussion for Research Question 2 (a): Short-term Effect of Recasts with and without Gestures

The second research question was constructed to examine the efficacy of verbal recasts and verbal recasts plus gestures during the immediate posttest. The first analysis concerns the development of the use of regular past tense verbs, and the second analysis concerns locative prepositions. All three groups exhibited no difference in their explicit knowledge of the target structures on the pretest, the immediate posttest, and the delayed posttest, indicating that generally learners in all the conditions had high levels of explicit knowledge prior to the administration of the communicative tasks, which did not allow further development.

Short-term effect in the acquisition of regular past tense. The results revealed that no significant difference existed between the pretest and immediate posttest in all the conditions with regard to the regular past tense verbs. This indicates that the recasts were not beneficial for the development of the use of regular past tense verbs either with or without gestures. This section explores why such a result was obtained, focusing on the following two aspects: (1) the difficulty of learning regular past tense verbs through recasts and (2) the lack of difference in the two modes of recasts.

Difficulty in regular past tense verb acquisition through recasts. The finding showed that the recasts were not effective in development of regular past tense verbs at the time of the immediate posttest regardless of the mode of the recasts possibly because regular past tense verbs

are less easily acquired through recasts. Boom (1998) and Yang and Lyster (2010) reported that recasts were not useful for developing the use of regular past tense verbs in oral production. Boom examined whether a difference exists in the effectiveness of recasts in relation to their targets. He found that recasts were effective for phonology, lexis, irregular past tense verbs, and prepositions, but not for articles and regular past tense verbs. Yang and Lyster also reported the inefficacy of feedback in the acquisition of regular past tense verbs. The researchers compared the effectiveness of recasts and that of prompts in learner development of regular and irregular past tense verbs and found that learners who were exposed to recasts did not exhibit improvements in regular past tense verb oral production.

Regular past tense verb acquisition and feedback types. The results also showed that the learners did not exhibit development in the use of regular past tense verbs even when gestures accompanied recasts, which is thought to make the recasts more explicit. The past tense oral production scores of the pretest and immediate posttest obtained from the Verbal Recast condition and the Recasts + Gesture condition were compared, and the results showed that the performance did not differ significantly from each other. This finding, that the development of regular past tense verb acquisition was not facilitated regardless of the feedback type, is consistent with McDonough (2007), who also reported that learners benefited neither from metalinguistic feedback nor recasts in the acquisition of the past tense. In other words, however salient the linguistic targets were, learners were not able to benefit from corrective feedback in terms of past tense acquisition. Erlam and Loewen (2010), who compared the effectiveness of different types of feedback on a different target structure also found the similar results. They examined the effectiveness of implicit and explicit feedback on French noun-adjective agreement. Fifty learners from French as a foreign language classes participated in the study. The learners engaged in four

communicative tasks that were designed to elicit a target structure. Each session involved four to seven learners, and a researcher provided either implicit or explicit feedback. Their analysis of the learners' pretest and posttest scores showed that no significant difference existed between the two feedback modes. These findings indicate that regular past tense verbs and some other possible structures are less likely to benefit from corrective feedback regardless of its explicitness. However, replication studies are needed to determine what structures are least likely to be improved through corrective feedback.

However, for some studies, these findings (including this study's) contradict the findings of Doughty and Varela (1998), Han (2002), and Sheen (2007), who reported on the facilitative role of recasts on past tense acquisition. The types of recasts and the setting of the treatment sessions used in the studies may explain this discrepancy. As opposed to the traditional recasts used in this study, Doughty and Varela provided corrective recasts, which are a combination of repetition and recasting. As the name suggests, corrective recasts highlight their corrective nature, which might have motivated the learners' noticing of target structures and learning outcomes as compared to traditional recasts. In addition, the treatment sessions in Han's and Sheen's studies were conducted with individual learners and not in a classroom setting as in the aforementioned studies. A few studies illustrated that learners benefited from corrective feedback more when the feedback was directed to them in contrast to when the feedback was directed to other students (e.g. Mackey et al., 2006). Therefore, the learners of the studies that used one-on-one settings as opposed to regular classrooms could have been more alert to researchers' recasts because they were always directed to individual participants. The discrepancy in the studies' findings suggests that the explicitness and the effectiveness of recasts may be greatly influenced by the contexts of the tasks. In other words, overall, recasts that target English regular past tense verbs do not seem

to be effective when used in regular classrooms, and the manipulation of recasts, such as with corrective recasts, seems to be necessary to make them more effective.

The other possibility to improve the effectiveness of the acquisition of regular past tense verbs is to use prompts instead of recasts. In Ellis et al. (2006) and Yang and Lyster (2010), learners developed their oral production of regular past tense verbs when metalinguistic feedback or prompts were used instead of recasts. Although this study did not include metalinguistic feedback or prompts as a form of corrective feedback, comparing the findings to identify the reason behind the discrepancy is important. Prompts provide negative evidence but teachers or researchers do not provide correct answers and learners are encouraged to self-repair their mistakes. Specifically, the researchers provided metalinguistic feedback that explained learner errors without mentioning the correct answer in Ellis et al. Overall, corrective feedback facilitated the acquisition of regular past tense verbs if learners were given the opportunity for self-repair along with the more explicit form of feedback.

Short-term effect in the acquisition of locative prepositions. The results of this study revealed that both the Verbal Recast Only and Recasts + Gesture conditions significantly surpassed the Control condition in the immediate posttest. Unlike the past tense, not many interaction studies specifically explored the acquisition of English locative prepositions. This section accounts for these results with regard to (1) the explicitness of recasts specifically used during the locative preposition communicative tasks in the Verbal Recast Only condition and (2) the explicitness of the feedback and L2 learning.

Explicitness of recasts in Verbal Recast Only condition. The first finding is that recasts were effective with regard to the acquisition of locative prepositions, which seems to have resulted from the fact that the recasts in the Verbal Recast Only condition were not necessarily

implicit. Comparing these findings with other recast studies, this result partially coincides with those recast studies that illustrated the positive effect of recasts on L2 learning (e.g. Han, 2002; Mackey & Philp, 1998; Nassaji, 1998, 2009), especially when the recasts targeted only specific grammatical features. The researchers in these studies selected specific target structures in order to implement their pretest-posttest designs. For instance, Han (2002) examined L2 learner development of tense consistency in two conditions, a recast group and a non-recast group. The learners in the recast conditioned surpassed those in the non-recast group in both written and oral performance following the treatment sessions. Mackey and Philp, who investigated the development of question formation, reported the similar findings as well. Even though the target structures varied in these studies, the recasts were solely provided on preselected target structures. It is possible that targeting one structure would have made that target structure more salient in the recasts. This, arguably, made the recasts more explicit and resulted in better learning outcomes.

Explicitness of corrective feedback and L2 learning. The result of this study also revealed that both the Verbal Recast Only and the Recasts + Gesture conditions equally improved in the use of locative prepositions in the immediate posttests, significantly diverging from the control group. In other words, regardless of the possible explicitness of the recasts, the learners exhibited development in the use of locative prepositions.

Although previous studies selected different target structures, this result, that both experimental groups developed equally, coincides with some studies that examined the effectiveness of different types of feedback on L2 development (e.g. Loewen & Nabei, 2007; Yang and Lyster, 2010). Loewen and Nabei investigated the development of question formation following metalinguistic feedback and recasts. Their findings showed no significant difference between the two conditions. A part of the results from Yang and Lyster also exhibited a similar

pattern. In their study, they examined the development of regular and irregular past tense verbs following treatment sessions that included either recasts or prompts. They found that the participants equally developed the use of irregular past tense verbs regardless of the conditions.

However, I believe that if the nature of recasts indeed varied by the presence of gestures, the findings of the aforementioned studies, including those of this study, contradict the results reported in the meta-analysis. Li (2010) analyzed 33 published feedback studies and examined the overall effect of implicitness and explicitness of corrective feedback on L2 learning. He found that explicit feedback, such as metalinguistic feedback, was more effective than implicit feedback, such as recasts. I believe the discrepancy between the results of this study and that of the meta-analysis may be accounted for by how the communicative tasks were situated in this study. The communicative tasks were specifically designed to elicit locative prepositions, and the recasts were provided only when the learners had issues with the target structures. Loewen and Nabei (2007) also argued the variability of the explicitness of verbal recasts depending on the context of the interaction. Although the form of the recast used in the Verbal Recast condition may appear implicit when viewed out of context, it might have functioned more explicitly because no other feedback was provided with regard to other mistakes. As Loewen and Philp (2006) and Sheen (2006) mentioned, the more explicit recasts are, the more beneficial they may become. In the present study, the learners may have been naturally attending to the correct use of prepositions, thus resulting in better L2 learning. Thus, the characteristics of the tasks and the way recasts were provided may have resulted in equal development in the use of locative prepositions in the immediate posttest by the learners in the two experimental conditions.

Different learning outcomes between regular past tense verbs and locative prepositions. As a response to the research question, I examined learner development in the use

of two target structures in two experimental conditions. The results revealed that the learners in both conditions did not exhibit an improvement in the immediate posttest with regard to regular past tense verbs; however, both equally showed improvement in the use of locative prepositions. This section explores the reasons different learning patterns may have been observed between the two target structures. I speculate that there are three possible factors that might have resulted in better learning outcomes for locative prepositions than for regular past tense verbs: (1) differences in the learning patterns (item-based learning for the locative prepositions and rule-based learning for regular past tense verbs), (2) differences in the task characteristics, and (3) different levels of task engagement.

The first speculation to account for this difference is the learnability of target structures via corrective feedback. As I mentioned in the previous section, some structures appear to be more easily learned through corrective feedback than others. Previous studies illustrated that irregular past tense verbs, comparatives, and prepositions tend to benefit more from corrective feedback but not regular past tense verbs (Boom, 1998; Ellis, 2007; Yang & Lyser, 2010). Yang and Lyser reported that recasts were not beneficial in the acquisition of regular past tense verbs but were for irregular past tense verbs, and that prompts facilitated the acquisition of both structures. They argued that the difference resulted from the difference in the learning patterns that involved the two target structures – regular past tense verb acquisition involved rule-based learning and irregular past tense verb acquisition involved item-based learning. Drawing on Skehan's model of a dual-model system (1998), Yang and Lyser speculated that learners find accessing rule-based systems more difficult and that learners were only able to do so following prompts where they were required to apply rules in actual production. In contrast, irregular past tense verbs were stored in an exemplar-based system, which does not require internal

computation, resulting in easier retrieval than regular past tense verbs. This argument seems to justify the difference in the learning outcomes observed in this study. Locative prepositions may have been learned as item-based learning, thus resulting in better development in the immediate posttest. However, regular past tense verbs may have been stored as a rule-based system, not allowing learners to access them during communicative tasks.

Second, task essentialness, which requires learners to use the target structures during tasks, needs to be addressed to understand why recasts resulted in the development of the use of locative prepositions but not regular past tense verbs. During the communicative tasks targeting regular past tense verbs, recasts were only given to indicate the missing past tense – in other words, the presence or lack of past tense did not result in communication breakdowns and learners were able to complete the tasks without using the target structure. On the contrary, the communicative tasks of locative prepositions required learners to produce the correct preposition among various options to complete the task. The same form of recasts was used for all the communicative tasks; however, the differences in the nature of the tasks may have more strongly encouraged the learners to produce the correct form during the communicative tasks targeting locative prepositions than those targeting regular past tense verbs. I frequently observed learners negotiating the meaning of locative prepositions while they were selecting the locations to hide the diamond, selecting one key from many keys in the room, and preparing the questions for the other team. For instance, one learner decided to hide the diamond by attaching it on the inside of the lampshade. She suggested, “Let’s hide the diamond inside the lamp” but it confused the other learners because some interpreted it as inside the light bulb or some other parts of the floor lamp. This communication breakdown allowed them to further negotiate the meaning of the prepositions such as “in the lampshade not inside the light bulb,” “on the lampshade but inside,”

and so on while gesturing the shape of the lamp and the location of the diamond for clarification.

Extending the difference in the task characteristics, the learners also appeared to have responded differently during the tasks. This was not the major focus of this research study and thus it has not been analyzed systematically, but I observed the difference in the level of learner engagement in the tasks. As mentioned earlier, all the communicative tasks of this study involved some competitive features. During the first regular past tense verb task, the learners were told to work in pairs, to describe the assigned pictures, and to identify the correct order of the pictures. During the second regular past tense verb task, the learners were again asked to describe the pictures but they were told to find the ‘murderer’ in the class. Overall, the learners appeared to have participated more actively in the second task than in the first one. In terms of the locative preposition tasks, the learners were split into two groups, and they were asked to find the diamond in the first task and then the key in the second task by asking questions to the other group. Again, the learners seemed to have been greatly engaged in these tasks. In fact, some classrooms showed strong competitiveness during these tasks, arguing about ‘unfair’ locations the opposing team had selected, requesting to do the locative preposition tasks one more time, or negotiating the meaning of prepositions among themselves while preparing questions to ask. These were not observed systematically, but it is logical to speculate that the different levels of learner engagement in the tasks may have resulted in different learning outcomes for the two target structures.

Discussion for Research Question 2 (b): Long-term Effect of Recasts with and without Gestures

The final research question explored the long-term effect of verbal recasts with and without pedagogical gestures. The delayed posttest scores were compared for the two target structures. In terms of the grammar test, no significant difference existed between the two

conditions for either structure due to the learners' high scores even at the time of the pretest. As mentioned earlier, the learners had a high level of explicit knowledge at the time of the pretest, which did not allow for further development.

Long-term effect on acquisition of regular past tense verbs. A difference was not found between the two experimental conditions in the delayed posttest with regard to regular past tense verb oral production. Neither condition exhibited significant development in the use of regular past tense verbs – in fact, they did not differ from the control condition, which did not receive any feedback. Again, this finding is consistent with Yang and Lyster (2010), in which the recast condition showed no improvement in the acquisition of regular past tense verbs in either the immediate or delayed posttests.

Long-term effect on acquisition of locative prepositions. With regard to the use of locative prepositions, the analysis revealed that both the Verbal Recast and Recasts + Gesture conditions developed equally from the pretest to the immediate posttest, significantly outperforming the Control condition. Interestingly, a divergence was observed between the two experimental conditions in the analysis of their delayed posttest scores. The learners from the Recasts + Gesture condition retained their development throughout the delayed posttest. However, the development of the Verbal Recast Only condition diminished after the immediate posttest.

Long-term effect of implicit feedback. The finding that the learners who received an arguably more explicit form of recast, Recasts + Gesture, outperformed the Verbal Recast Only condition in the delayed posttest partially coincides with the findings from the meta-analysis that illustrated the overall better effectiveness of explicit feedback (Li, 2010; Mackey & Goo, 2007).

The second finding, that learners who received recasts only verbally did not maintain the development in the delayed posttest contradicts the findings from the meta-analyses (Li, 2010;

Mackey and Goo, 2007). The researchers in both studies reported that recasts provided a long-lasting effect on L2 learning. In this study, however, verbal recasts did not follow this pattern. A possible speculation is that the recasts used in the previous studies may have naturally incorporated gestures, resulting in better performance in the delayed posttests. Indeed, Hudson's (2010) classroom research showed that language teachers do commonly use gestures while teaching grammar. However, the non-verbal information was not provided in these previous studies, thus, it is not possible to confirm this speculation. Not limited to the presence or absence of gestures, other variables need to be considered with regard to the explicitness of recasts, as Loewen and Philp (2006) reported. It is not surprising that the recasts in the studies in the aforementioned meta-analysis incorporated corrective cues, such as intonation and stress, whereas in this study verbal recasts were provided without such cues to make the data of the experimental conditions comparable to each other. Overall, to account for the difference between the results of this study and that of the meta-analyses, the researchers and instructors of the studies may have used gestures while recasting that might have enhanced the explicitness of recasts, even though this is not to say that all structures are amenable to gestures. That may have allowed for better learning outcomes.

Relationship between memory and seeing gestures. In terms of the difference in the long-term effect of the two experimental conditions, this discrepancy may be due to the fact that looking at gestures may have impacted the learners' memory retention, as it has been reported in Allen (1995), Cohen and Otterbein (1992), Feyereisen (1998), and Tellier (2008). Specifically, Allen's and Tellier's studies reported that the teacher's gestures and students' action of gesturing improved memorization of L2 sentences and vocabulary, respectively. Tellier, for instance, taught French vocabulary to adolescents under two conditions. In one, the adolescents learned the

vocabulary through flashcards with illustrations of the meanings of words. In the second condition, they viewed the instructor's gestures instead of flashcards. She found that the adolescents in the gesture condition significantly outperformed those in the flashcard condition with regard to the memorization of target vocabulary. The impact of gesture on memorization was certainly not the main focus of this study. Yet, the gestures that the learners viewed in the Recasts + Gesture condition may have resulted in longer retention of the target structures. Previous studies indicated that gestures were helpful for the memorization of vocabulary and sentences, which all follow item-based learning – thus, meaning-bearing locative prepositions may be acquired in a similar manner as learning new vocabulary.

Studies in the field of psychology compared the difference in memorization using verbal input and visual input and found that visual input resulted in better memory retention than verbal input. This might account for the result that the Recasts + Gesture condition outperformed the Verbal Recast Only condition in the delayed posttest. Cohen, Horowitz, and Wolfe (2009) examined whether participants were able to recognize new and old items in the form of sound stimuli and visual stimuli. A total of 100 participants were exposed to a variety of sound clips from three different categories: complex auditory scenes, isolated auditory objects, and music. Then, the participants determined whether an item was new or old. After this, they also took part in an old/new identification task using images instead of sounds. The researchers found that the participants performed significantly better in the task that involved images than in the task that involved any sound type. This finding indicates that auditory memory is systematically inferior to visual memory. Extending the facilitative role of visual input in memorization, some researchers examined how multimodality promoted learning. Dual Coding Theory proposed by Clark and Paivio (1991) argues that integrating verbal and non-verbal modalities reinforces learning because

learners are left with more traces in the memory system after coding the information through different modalities. In short, in this study, learners in the Recasts + Gesture condition surpassed those in the Verbal Recast Only condition in the delayed posttest of locative prepositions because they had processed recasts both aurally and visually. This appears to have helped them better retain the information of recasts and resulted in better learning outcomes than those who were only exposed to verbal recasts. Although this is my speculation, I assume that the learners did not receive the similar benefits with regards to the regular past tense because the gestures used for the recasts targeting past tense were less meaningful than the ones used for the recasts used for locative preposition.

Conclusions

This study was designed to examine whether pedagogical gestures used during recasts enhanced the saliency of recasts and whether they lead to learners' better noticing and L2 learning outcomes, specifically with regard to the two target structures, English regular past tense verbs and locative prepositions. The learners engaged in four communicative tasks targeting the two target structures and took two types of tests: grammar tests and oral production tests. A subset of the learners participated in stimulated recall sessions to measure their noticing of the target structures.

First, I investigated whether the learners noticed the linguistic targets of the recasts when the verbal recasts involved gestures. The majority of comments from learners concerned task outcomes, and there were no comments on error correction or linguistic targets. I speculate that the context of the stimuli used during the stimulated recall session, task characteristics, and linguistic targets may have affected this outcome. To be specific, the stimuli for the stimulated recall session were obtained only from the interactions during the communicative tasks, although

previous studies that used stimulated recall sessions used the whole of regular classroom interactions as stimuli instead. This might have biased the learners to pay specific attention to task outcomes. In addition, the tasks used in this study seem to have involved competition, as opposed to those in other studies. Finally, the linguistic target of this study falls under the category of morphosyntax, which is less likely to be noticed than other categories, such as vocabulary. These factors may have resulted in the lack of learner noticing comments.

Interestingly, even without learner comments on noticing, the two experimental conditions exhibited some development in the acquisition of locative prepositions. Two possible reasons for this were explored. The first is that learning may have taken place without noticing at the level of conscious awareness. This argument, however, needs to be interpreted with caution because this study was not designed to investigate this specific issue. The second speculation was about methodological issues with stimulated recall, such as conducting stimulated recall in learners' L2s despite the learners' relatively low proficiency. In addition, a high level of awareness appears to have been needed to verbalize their noticing. Learners may have experienced noticing during the tasks but did not comment on it during the stimulated recall session because of a relatively low level of awareness.

The second research question explored whether the presence of gestures affected the short-term and long-term effectiveness of recasts. Overall, there was no difference in the learners' level of explicit knowledge in all the conditions for the two target structures. Their levels were high prior to the treatment sessions.

In terms of regular past tense verbs, no significant difference existed among the three conditions. Some linguistic structures, such as regular past tense verbs, appear to be less likely to be learned from recasts (e.g. Boom, 1998; Ellis, 2007; McDonough, 2007; Yang & Lyster, 2010),

and to enhance the effectiveness of the recasts it seems necessary to be in a setting where the learners can pay better attention (e.g. one-to-one sessions) or to promote the corrective nature of recasts and provide opportunities for self-correction by using corrective recasts (Doughty & Varela, 1998) and prompts (Yang & Lyster, 2010).

With regard to locative prepositions, the Verbal Recast Only and Recasts + Gesture conditions surpassed the Control condition in the immediate posttest. The verbal recasts may have been effective in this study because the recasts were only provided for the target structures. Other studies that reported the benefits of recasts also had specific target structures of focus (e.g. Han, 2002), and therefore the explicitness of the recasts might have contributed to their effectiveness.

The equal development of the two conditions in the production of locative prepositions in the immediate posttest coincides with previous studies that addressed the lack of difference in learning outcomes between the feedback types (e.g. Loewen & Nabei, 2007), although the meta-analysis showed the stronger effectiveness of explicit feedback (Li, 2010). In this study, the possible explicitness of the Verbal Recast Only condition seems to have been influenced by the occasions of recasts, that is, the recasts were provided only for the target structures, and this may have made the recasts of the Verbal Recast Only condition as explicit as those in the Recasts + Gesture condition.

With reference to the difference in the development of the two target structures, the difference in the learning pattern and the task characteristics may have resulted from the difference in the learning pattern. Regular past tense verbs follow rule-based learning, which makes items less easily retrievable online than locative prepositions, which follow item-based learning. In addition, the learners appeared to have been more engaged in the tasks that targeted locative prepositions. These factors may have resulted in better learning of locative prepositions

than regular past tense verbs.

Finally, the research question explored the long-term effect of recasts with and without gestures. Again, no difference was found between the two experimental conditions and the control condition in the production of regular past tense verbs. However, as to the production of locative prepositions, the learner from the Recasts + Gesture condition retained their improvement in the delayed posttest, while the development of the Verbal Recast Only condition that was observed in the immediate posttest diminished by the time of the delayed posttest. Meta-analyses have shown that explicit feedback tends to function better than implicit feedback on immediate posttests and short-delayed posttests (Li, 2010; Mackey & Goo, 2007). If recasts accompanied by gestures were indeed more explicit than verbal recasts, this result follows the same pattern. To account for the stronger effectiveness of the Recasts + Gesture condition, the impact of seeing gestures on memory and the lack of semantic labor during processing were considered. Tellier (2008) and Allen (1995) found that seeing gestures during vocabulary or expression lessons helped with the memorization of target words and phrases. It was also found that the part of the brain that is responsible for processing languages had less labor because another part of the brain that was triggered by seeing actions was also activated when seeing co-speech gestures. Thus, the learners who saw the gestures could have had more cognitive capacity when they saw recasts accompanied by gestures and thus had better retention of the contents of the feedback than those who did not.

Implications

This study examined whether incorporating gestures during recasts promoted learner noticing and their learning outcomes. Extensive research of classroom interaction, notably that of corrective feedback, has been conducted in the field of SLA, but the majority of the studies have relied only on verbal data for their analyses. The results of this study indicated that recasts

accompanied by gestures resulted in a long-term learning effect on some grammatical features. I propose that interaction studies need to take the impact of nonverbal features into consideration for more in-depth analysis.

Second, the findings from this study imply that recasts, especially when used with pedagogical gestures, can be helpful for teaching spatial relationships, such as prepositions. Previous studies analyzed the efficacy of corrective feedback in relation to linguistic structures (e.g. grammar, vocabulary, pronunciation, and semantic structures). While such categorization of linguistic targets brought insights for seeing what can be learned more effectively from corrective feedback, I suggest that a finer analysis within the categories of “grammar” or “morphosyntax” is needed for more extensive analyses.

Pedagogically, the findings from this study suggest that gestures have the potential for enhancing the long-term effectiveness of recasts on some linguistic structures. One aspect focused on in teacher preparatory programs is how to provide corrective feedback in language classrooms. Training on provision of feedback may need to include the topic of the effective use of gestures. I also recommend that language teachers use consistent gestures in their classrooms because learners will be able to determine the meaning of gestures easily. If the meanings of gestures are transparent to learners, I believe that the use of such gestures will promote learner attention and noticing of target structures.

Limitations

The present study showed how learners were able to benefit from recasts when gestures were incorporated, especially when teaching locative prepositions. However, that does not mean that this study was perfectly executed.

The first concerns issues with the use of stimulated recall sessions because of the low

proficiency level of learners, which might have limited their comments in their L2s. Although reactivity might be an issue, conducting an interview with the participants specifically addressing their perception of recasts may allow learners to highlight their thoughts on error correction. In addition, although this is rather anecdotal, I observed that some students repeated the gestures used in recasts for both structures, which seems to happen frequently in language classrooms (e.g. Smotrova & Lantolf, 2013). This was not analyzed systematically; however, this may indicate that the learners did notice the corrective nature of feedback and the target structures during interactions, even though they did not address this during stimulated recall sessions. If so, a lack of comments during stimulated recall sessions may not represent a complete lack of noticing. Echoing Goo and Mackey (2013) who recommended incorporating triangulated approaches to the feedback research, I suggest that researchers combine multiple noticing measurements, stimulated recall sessions, and online measurement as Philp (2003) to fully capture learner noticing. Furthermore, since I conducted the current project as an intervention study, qualitative analysis, such as discourse analysis, was not included. Further qualitative analysis of learner-instructor interactions, such as the verbal and gestural uptake of learners, may serve as an additional method to assess learner noticing.

The second is about recasts, which were only provided for the target structures. The communicative tasks were designed to elicit the target structures, and the recasts were provided only when the learners made mistakes with them. There were other linguistic errors that occurred during the interactions; however, they were not corrected. Providing recasts only to the specific structures may have enhanced the explicitness of the recasts more than those recasts used in language classrooms, in which, assumedly, the recasts would target various structures. For better ecological validity, corrective feedback should be given that is not limited to the target structures.

The third concerns the difference in the task characteristics created for the two target structures because it may have impacted the results of this study. During the regular past tense verb tasks, the learners were recasted to use regular past tense verbs for correct utterances; however, the lack of use of regular past tense verbs did not necessarily cause any communication breakdown because all the events narrated in the tasks took place in the ‘past’ time frame. On the other hand, the learners had to choose the correct prepositions to complete the locative preposition tasks. The learners might have exhibited better improvement in the production of regular past tense verbs, had they been required to choose the correct tense among many to complete the task.

The fourth concerns the lack of a long-delayed posttest. The time frame used for delayed posttests varies greatly depending on the studies. In this study, the delayed posttest was administered 7 to 9 days after the completion of the treatment sessions. However, as mentioned in Li (2010), the timing of the delayed posttest appears to affect the assessment of learning outcomes. Because of logistic difficulties, this study only included one delayed posttest, but the administering of an additional delayed posttest after a month may have provided more information on the long-term effectiveness of feedback.

Finally, learners’ perception of gestures was not assessed in this study. In this study, I did not assess whether the learners knew the intended meaning of pedagogical gestures. Because of the diverse backgrounds of the learners, some learners may have interpreted the meanings of gestures differently from what was intended. If a longitudinal study will be conducted, introducing the meaning of the gestures and using the relevant gestures constantly during class would be an ideal way to avoid this issue.

Future Directions and Implications

This study examined the development of learners in the acquisition of regular past tense

verbs and locative prepositions. It was found that recasts, when used along with gestures, were helpful when teaching locative prepositions but not when teaching regular past tense verbs. Along with Yang and Lyster (2010), I speculated that this may have been due to the different learning patterns, item-based learning for locative prepositions and rule-based learning for regular past tense verbs. However, the conclusion that the effectiveness of recasts relates to the learning patterns used is based on a limited number of studies. More intervention studies involving various linguistic targets are needed to see what linguistic elements benefit from recasts with or without gestures and to examine whether the learning system is a crucial factor.

This study indicated that pedagogical gestures when used along with recasts were helpful for learning some grammar structures. Previous interaction studies illustrated that the targets of corrective feedback are not limited to grammatical structures; they also targeted vocabulary and pronunciation. In addition, observational studies reported that gestures were used for teaching pronunciation in language classrooms (e.g. Hudson, 2011; Tellier, 2006). Therefore, conducting an intervention gestural study in the Interactionist framework with regard to the acquisition of pronunciation would be worthwhile to fully understand the interactive effect of gestures and corrective feedback in other linguistic domains.

Another aspect that needs further attention is the impact of individual and contextual differences. In the present study, due to the level of the selected target structures, all the participants were selected from a low-intermediate classroom from an ESL institution in the U.S. However, other variables such as the level of proficiency of learners and their cultural backgrounds may impact L2 learning. For instance, exploring the impact of levels of proficiency and their attention to gestures during corrective feedback is worthwhile. Learners from different cultures may look at different body parts of their instructors (e.g. making an eye contact or not).

Examining if learners from specific cultural background benefit more than others with regard to their comprehension of gestures and the learnability of the meaning of classroom gestures will be informative. These empirical questions need to be answered by conducting more empirical studies on gesture and L2 learning.

Pedagogically, the findings of this study suggest the importance of incorporating pedagogical gestures while providing recasts, especially when the target of the feedback follows item-based learning. However, prior to such implementation, systematic analysis of pedagogical gestures used in a language classroom is necessary. Then, during teacher preparatory courses, prospective language teachers are informed about corrective feedback, however only in the verbal modality. Researchers in the field of SLA, along with language teachers, must explore teaching from a multi-modal perspective to further explore effective language teaching.

APPENDICES

APPENDIX A: Background Questionnaire

Name _____

Level _____ Section _____

Gender Male / Female

Age _____ years old

First Language _____

Country of Origin _____

Q1. How long have you been studying English? _____ year(s) _____ month(s)

Q2. How old were you when you came to the U.S.? _____ years old.

Q3. Have you lived in the U.S. or other English speaking countries **before** attending the English Language Center? Yes / No

Q3 a. If yes, how long?

Country	Age	Length (years)

Q4. Where have you studied English so far?

Country	School/Institution	Length (years)

Q5. What other languages do you speak? _____

Q6. How long have you been studying at the English Language Center?

_____ year(s) _____ month

APPENDIX B: Preposition Oral Production Test A

Slide 1	Slide 2
Do not touch the computer	Practice Session
Slide 3	Slide 4
Question 1	Please find a coffee pot.  A living room scene with a grey sofa, a dark wood coffee table, and a side table. On the sofa is a black cat, a yellow box, and a fruit basket. On the coffee table is a vase of pink flowers, a clock, and a small picture. On the side table is a coffee pot. A water bottle is on the floor next to the coffee table. A pair of shoes is on the floor next to the side table. A bookshelf is in the background.

Figure 18

Preposition oral production test A

Figure 18 (Cont'd)

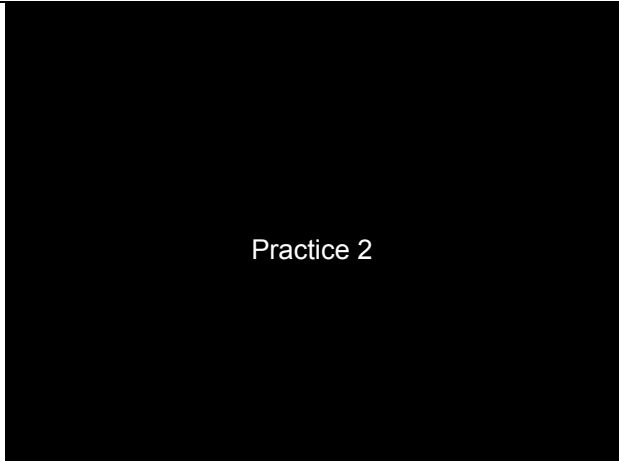
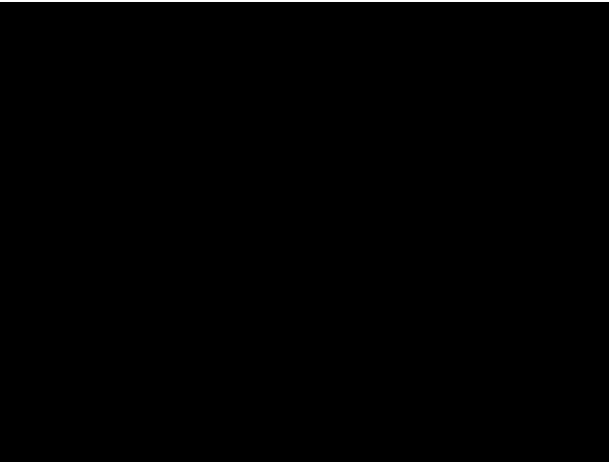
Slide 5 Where is the coffee pot? 	Slide 6 
Slide 7 Practice 2 	Slide 8 Please find the water bottles. 
Slide 9 How many water bottles do you see? 	Slide 10 

Figure 18 (Cont'd)

Slide 11	Slide 12
Please wait. Do not touch your computer.	Question 1
Slide 13	Slide 14
Please find the newspaper. 	Where is the newspaper? 
Slide 15	Slide 16
	Question 2

Figure 18 (Cont'd)

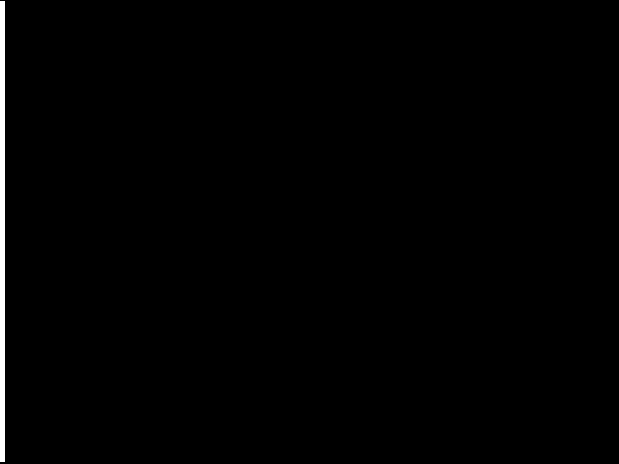
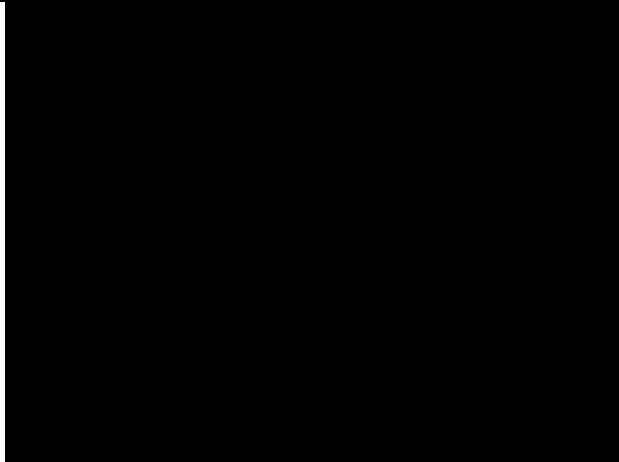
Slide 17 Please find the bears. 	Slide 18 How many bears do you see? 
Slide 19 	Slide 20 Question 3
Slide 23 	Slide 24 Question 4

Figure 18 (Cont'd)

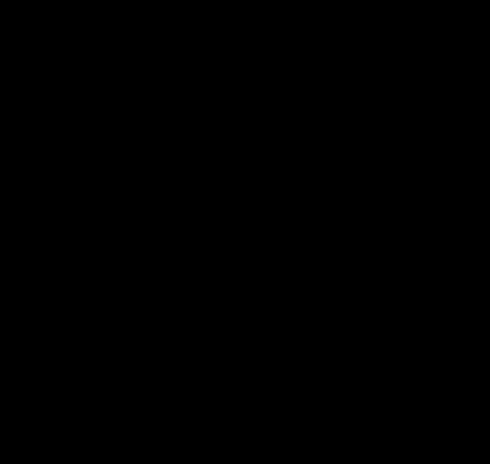
Slide 25 Please find the photo frame. 	Slide 26 Where is the photo frame? 
Slide 27 	Slide 28 Question 5
Slide 29 Please find the fruit basket. 	Slide 30 What fruits do you see? 

Figure 18 (Cont'd)

Slide 31	Slide 32
	Question 6
Slide 33	Slide 34
Please find the cat. 	Where is the cat? 
Slide 35	Slide 36
	Question 7

Figure 18 (Cont'd)

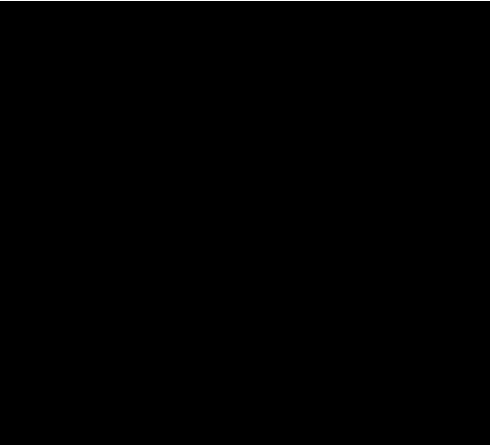
Slide 37 Please find the coffee pot. 	Slide 38 Where is the coffee pot? 
Slide 39 	Slide 40 Question 8
Slide 41 Please find the clock. 	Slide 42 What time is it? 

Figure 18 (Cont'd)

Slide 43	Slide 44
	Question 9
Slide 45	Slide 46
Please find the flowers. 	Where are the flowers? 
Slide 47	Slide 48
	Question 10

Figure 18 (Cont'd)

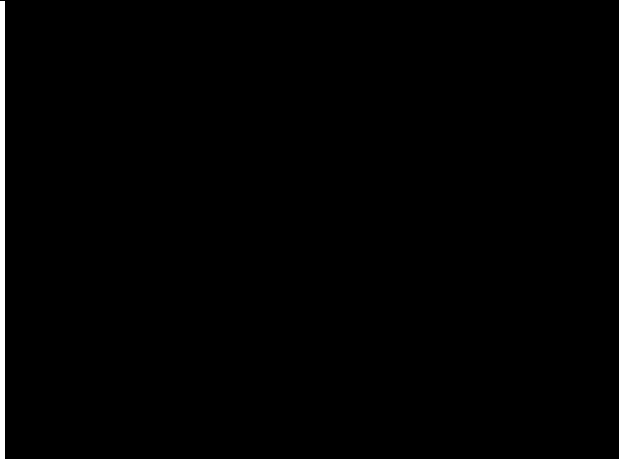
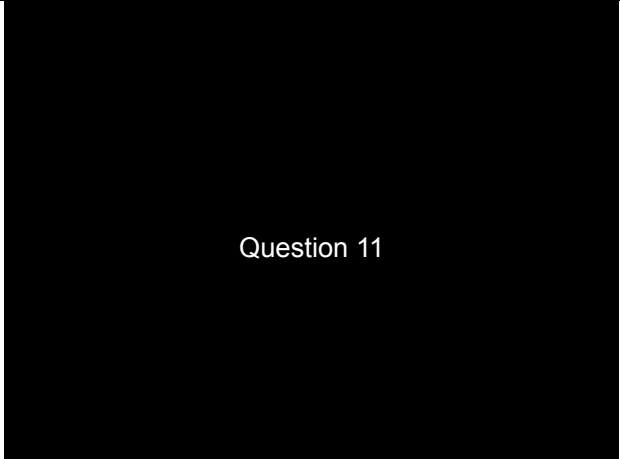
Slide 49 Please find the packages. 	Slide 50 How many packages do you see? 
Slide 51 	Slide 52 Question 11 
Slide 53 Please find the shoes. 	Slide 54 Where are the shoes? 

Figure 18 (Cont'd)

Slide 55	Slide 56
	Question 12
Slide 57	Slide 58
Please find the bag. 	Where is the bag? 
Slide 59	Slide 60
	Please wait. Do not touch your computer.

APPENDIX C: Preposition Oral Production Test B

Slide 1	Slide 2
Do not touch the computer	Practice Session
Slide 3	Slide 4
Question 1	Please find the books. 

Figure 19

Preposition oral production test B

Figure 19 (Cont'd)

Slide 5 How many books do you see? 	Slide 6
Slide 7 Practice 2	Slide 8 Please find the guitar. 
Slide 9 Where is the guitar? 	Slide 10

Figure 19 (Cont'd)

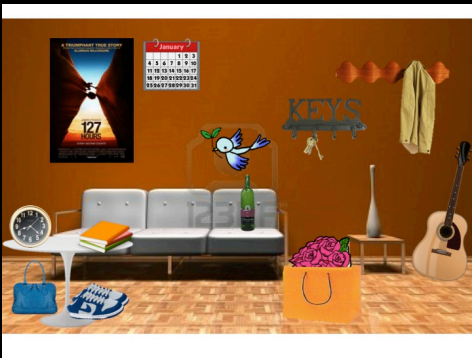
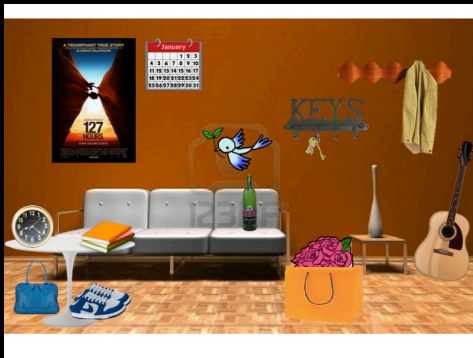
Slide 11 Click space bar to continue.	Slide 12 Question 1
Slide 13 Please find the bird. 	Slide 14 Where is the bird? 
Slide 15	Slide 16 Question 2

Figure 19 (Cont'd)

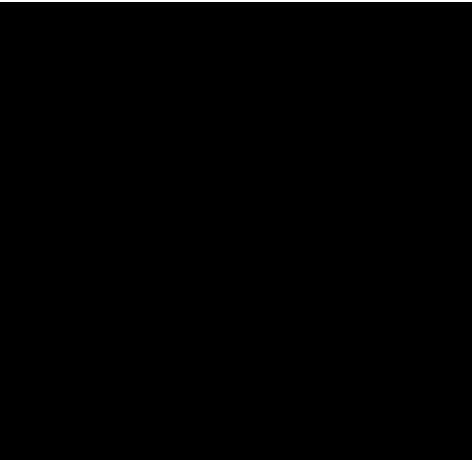
Slide 17 Please find the poster. 	Slide 18 What is the title of the movie? 
Slide 19 	Slide 20 Question 3
Slide 21 Please find the flowers. 	Slide 22 Where are the flowers? 

Figure 19 (Cont'd)

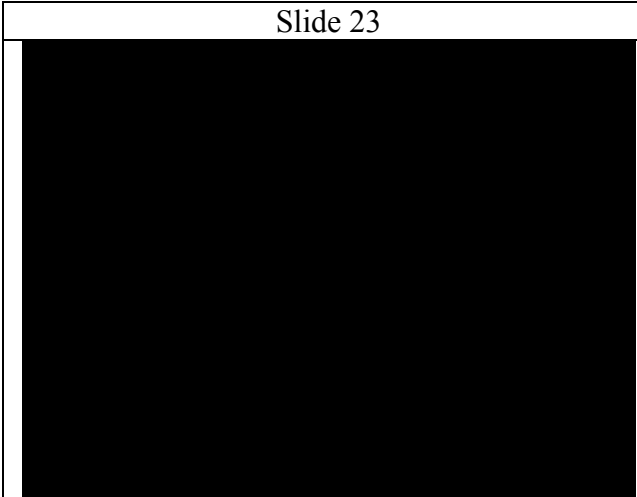
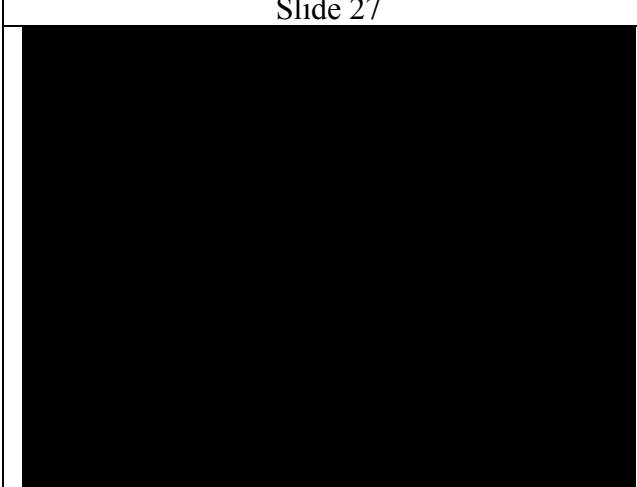
Slide 23 	Slide 24 Question 4
Slide 25 Please find the shoes. 	Slide 26 Where are the shoes? 
Slide 27 	Slide 28 Question 5

Figure 19 (Cont'd)

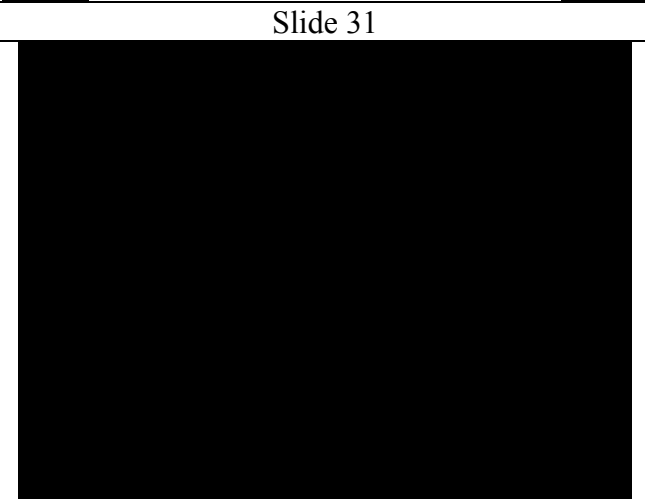
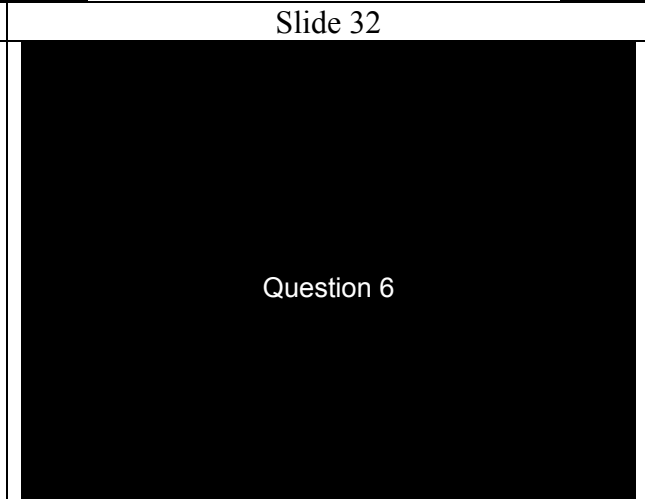
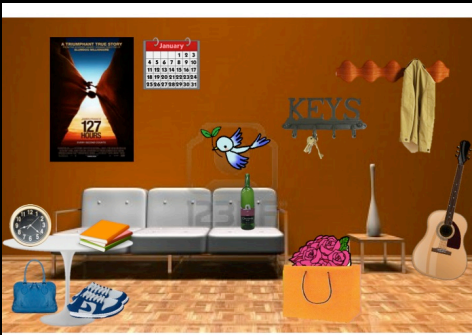
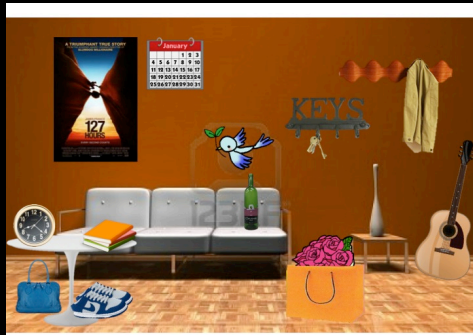
Slide 29 Please find the jacket. 	Slide 30 What color is the jacket? 
Slide 31 	Slide 32 Question 6 
Slide 33 Please find the guitar. 	Slide 34 Where is the guitar? 

Figure 19 (Cont'd)

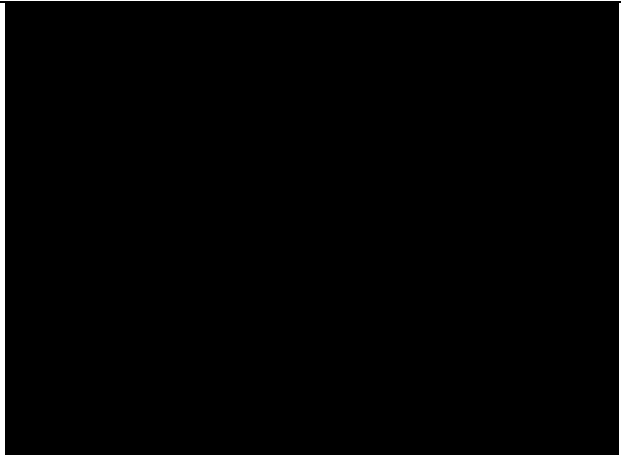
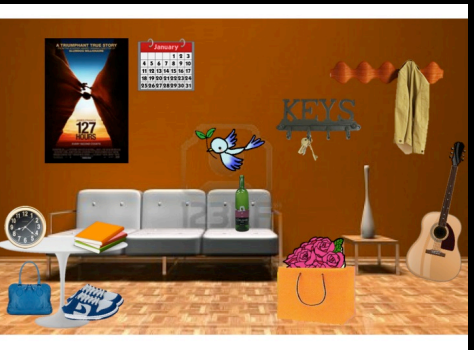
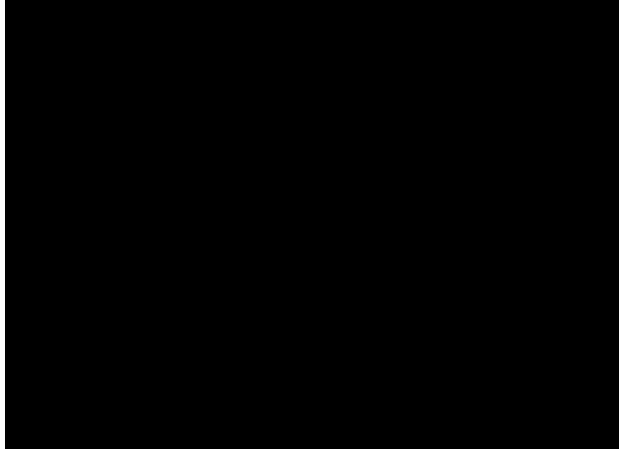
Slide 35 	Slide 36 Question 7
Slide 37 Please find the calendar. 	Slide 38 Which month is it? 
Slide 39 	Slide 40 Question 8

Figure 19 (Cont'd)

Slide 41 Please find the bag. 	Slide 42 Where is the bag? 
Slide 43	Slide 44 Question 9
Slide 45 Please find books. 	Slide 46 Where are the books? 

Figure 19 (Cont'd)

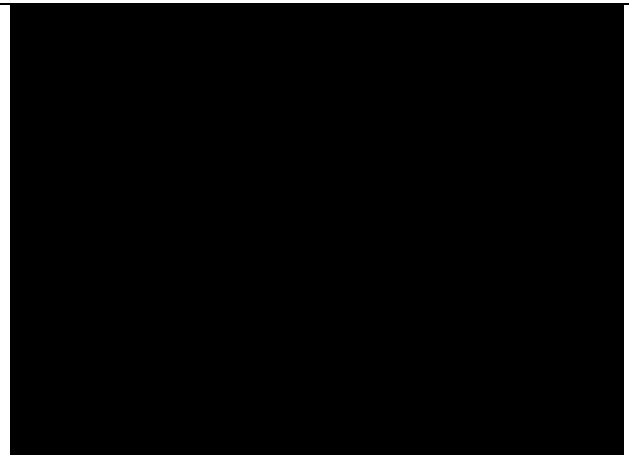
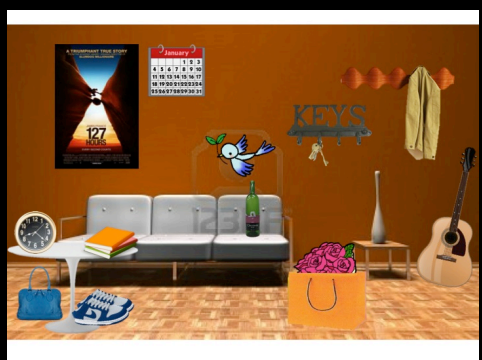
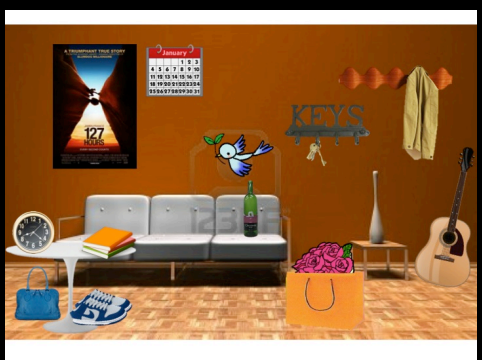
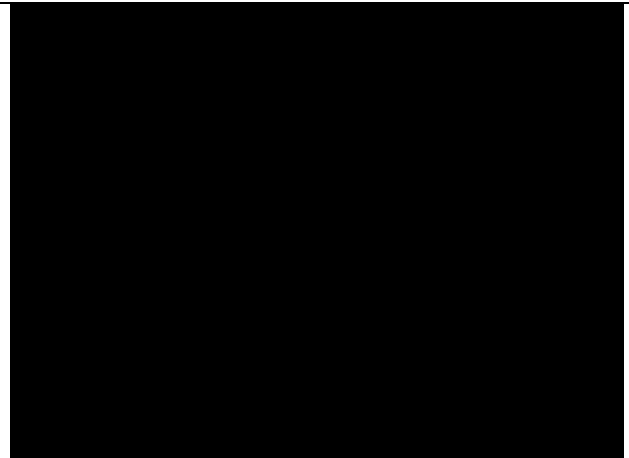
Slide 47 	Slide 48 Question 10
Slide 49 Please find the keys. 	Slide 50 How many keys do you see? 
Slide 51 	Slide 52 Question 11

Figure 19 (Cont'd)

Slide 53 Please find the clock.  A virtual room scene with a brown wall. On the left, a poster for '127 HOURS' and a calendar for January 2nd are on the wall. A white three-seater sofa is in the center. On a small white table to the left of the sofa sits a round analog clock, a stack of books, and a blue bag. A green bottle is on the sofa. To the right of the sofa, a guitar is leaning against a small wooden table. A bird is flying near the sofa. A yellow bag with pink flowers is on the floor.	Slide 54 Where is the clock?  A virtual room scene identical to Slide 53, showing a clock on a table in a virtual room.
Slide 55	Slide 56 Question 12
Slide 57 Please find the bottle.  A virtual room scene identical to Slide 53, showing a bottle on a sofa in a virtual room.	Slide 58 Where is the bottle?  A virtual room scene identical to Slide 53, showing a bottle on a sofa in a virtual room.

Figure 19 (Cont'd)

Slide 59	Slide 60
	Please wait. Do not touch your computer.

APPENDIX D: Preposition Oral Production Test C

Slide 1	Slide 2
Please wait. Do not touch your computer.	Practice Session
Slide 3	Slide 4
Question 1	Please find the tennis rackets. 
Slide 5	Slide 6
How many tennis rackets do you see? 	

Figure 20

Preposition oral production test C

Figure 20 (Cont'd)

Slide 7	Slide 8
Practice 2	Please find the books. 
Slide 9	Slide 10
Where are the books? 	
Slide 11	Slide 12
Please wait. Do not touch your computer.	Question 1

Figure 20 (Cont'd)

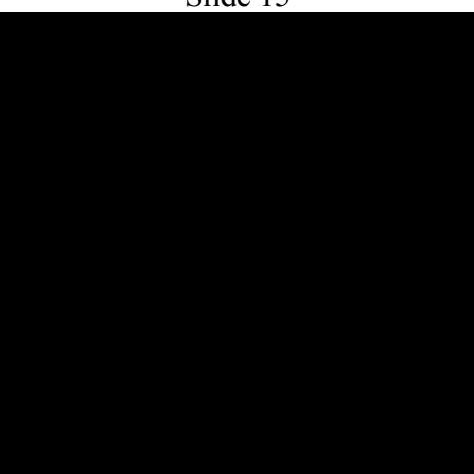
Slide 13 Please find the butterfly.  A living room scene with a white sofa, a black cat, a potted plant, and a butterfly. The butterfly is a small, colorful insect with orange and black wings, flying near the top left of the scene.	Slide 14 Where is the butterfly?  A living room scene with a white sofa, a black cat, a potted plant, and a butterfly. The butterfly is a small, colorful insect with orange and black wings, flying near the top left of the scene.
Slide 15  A living room scene with a white sofa, a black cat, a potted plant, and a butterfly. The butterfly is a small, colorful insect with orange and black wings, flying near the top left of the scene.	Slide 16 Question 2
Slide 17 Please find the cake.  A living room scene with a white sofa, a black cat, a potted plant, and a cake. The cake is a small, round cake with white frosting and red strawberries, sitting on a table in the foreground.	Slide 18 How many strawberries do you see?  A living room scene with a white sofa, a black cat, a potted plant, and a cake. The cake is a small, round cake with white frosting and red strawberries, sitting on a table in the foreground.

Figure 20 (Cont'd)

Slide 19	Slide 20
	Question 3
Slide 21	Slide 22
Please find the tennis racket. 	Where is the tennis racket? 
Slide 23	Slide 24
	Question 4

Figure 20 (Cont'd)

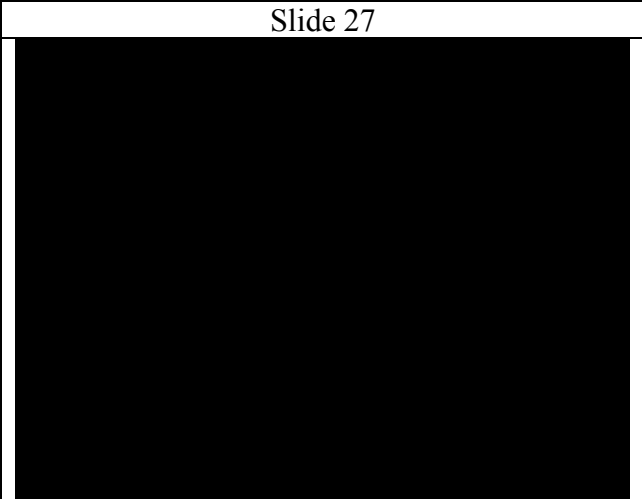
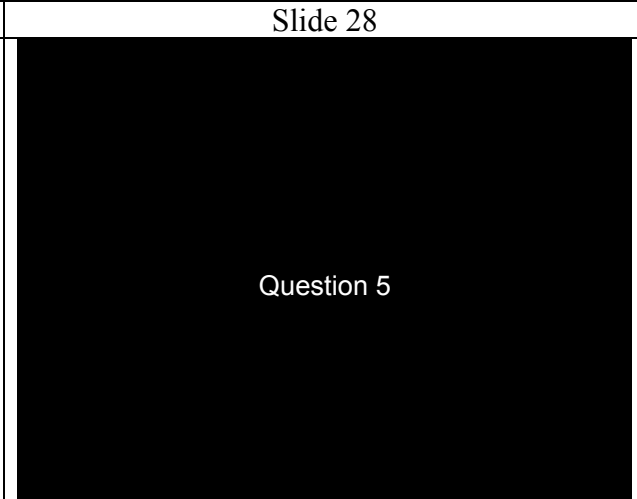
Slide 25 Please find the plant. 	Slide 26 Where is the plant? 
Slide 27 	Slide 28 Question 5 
Slide 29 Please find the flowers. 	Slide 30 What color are the flowers? 

Figure 20 (Cont'd)

Slide 31	Slide 32
	Question 6
Slide 33	Slide 34
Please find the books. 	Where are the books? 
Slide 35	Slide 36
	Question 7

Figure 20 (Cont'd)

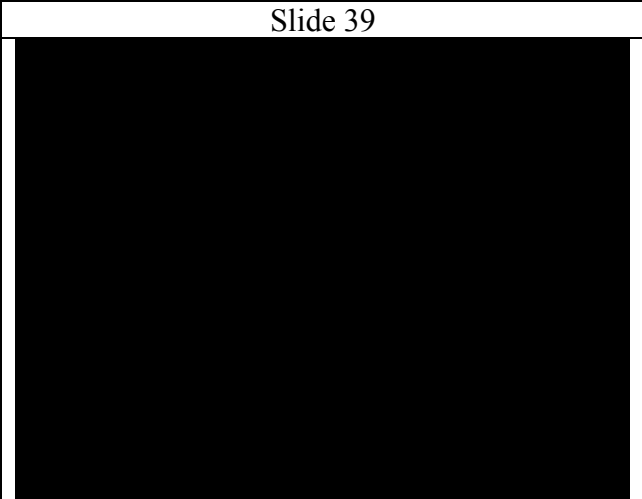
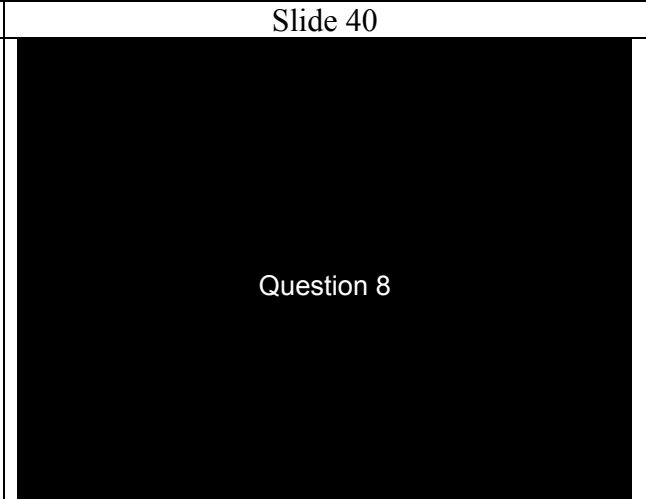
Slide 37 Please find the birds. 	Slide 38 How many birds do you see? 
Slide 39 	Slide 40 Question 8 
Slide 41 Please find the coffee cup. 	Slide 42 Where is the coffee cup? 

Figure 20 (Cont'd)

Slide 43	Slide 44
	Question 9
Slide 45	Slide 46
Please find the cat. 	Where is the cat? 
Slide 47	Slide 48
	Question 10

Figure 20 (Cont'd)

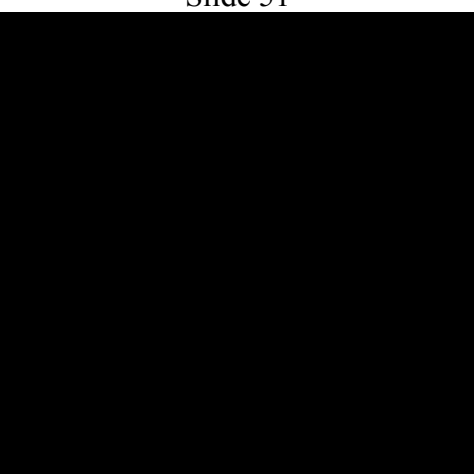
Slide 49 Please find the clock. 	Slide 50 What time is it? 
Slide 51 	Slide 52 Question 11
Slide 53 Please find the newspaper. 	Slide 54 Where is the newspaper? 

Figure 20 (Cont'd)

Slide 55	Slide 56
	Question 12
Slide 57	Slide 58
Please find the mouse. 	Where is the mouse? 
Slide 59	Slide 60
	Please wait. Do not touch your computer.

APPENDIX E: Past Tense Oral Production Test A

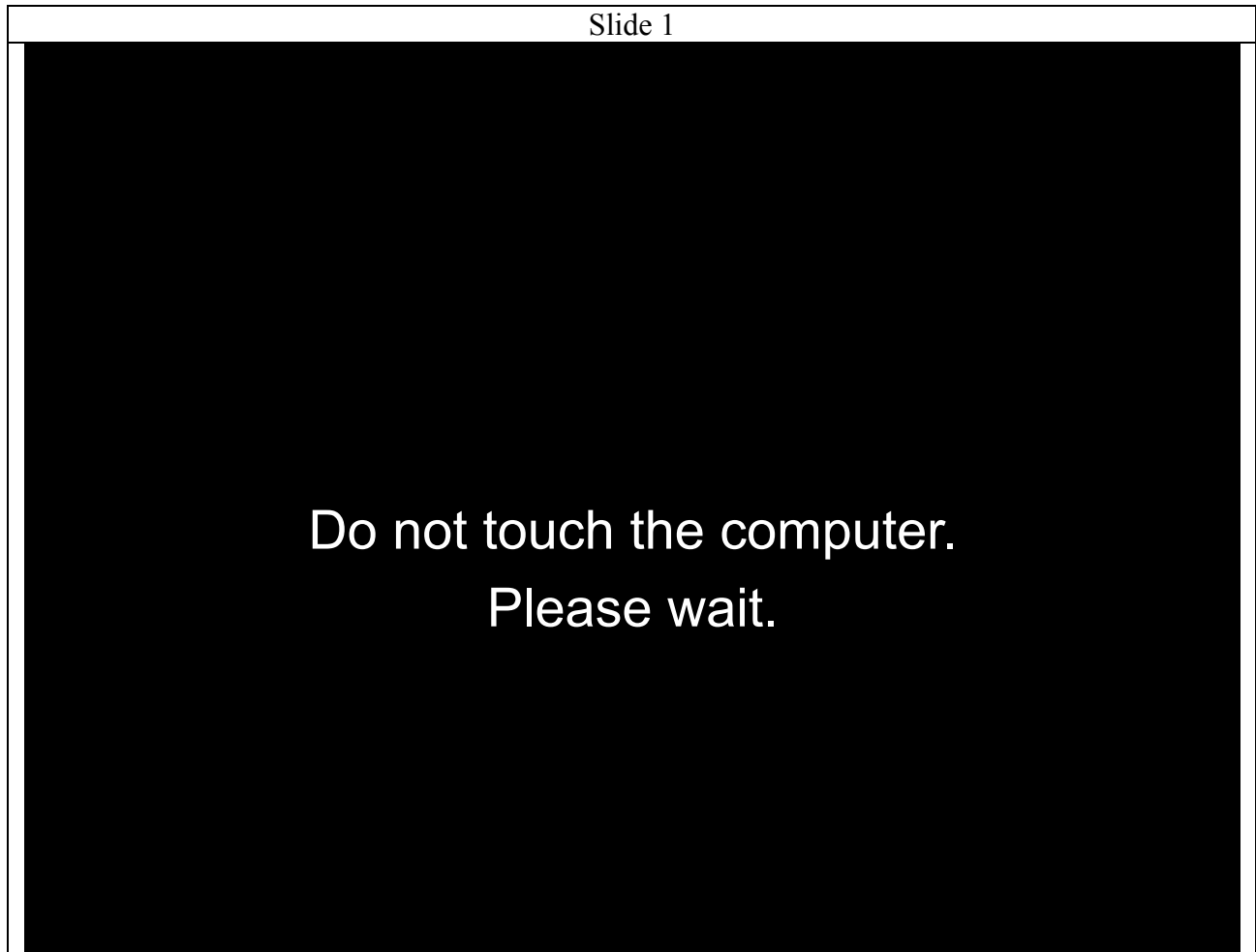


Figure 21

Past Tense oral production test A

Figure 21 (Cont'd)

Slide 2

This is what Jim did last Sunday.
Please look at the pictures.



Figure 21 (Cont'd)

Slide 3

Please tell what Jim did last Saturday.



Figure 21 (Cont'd)



APPENDIX F: Past Tense Oral Production Test B

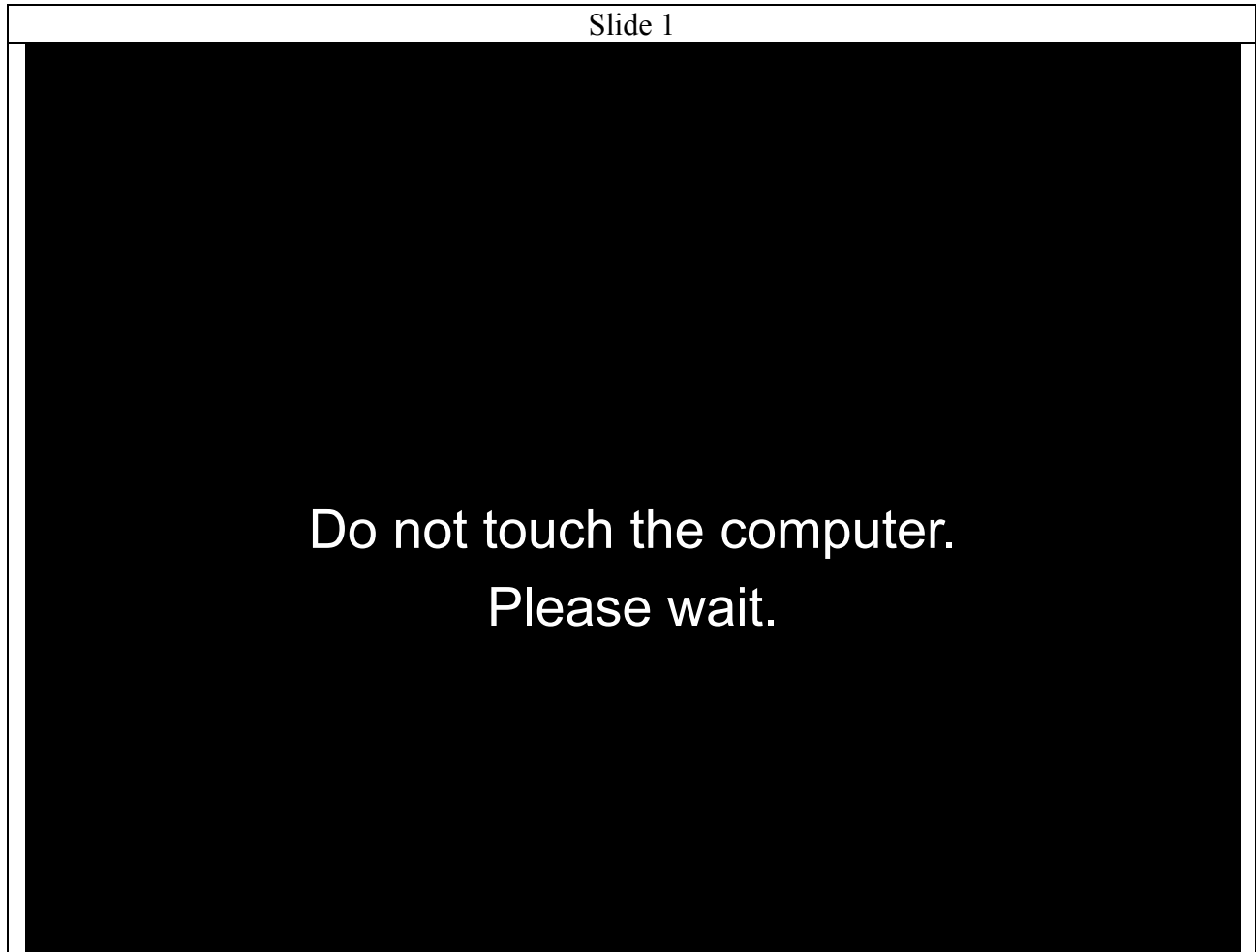


Figure 22

Past tense oral production test B

Figure 22 (Cont'd)

Slide 2

This is what Sara did last Saturday.
Please look at the pictures.



Figure 22 (Cont'd)

Slide 3

Please tell what she did last Saturday

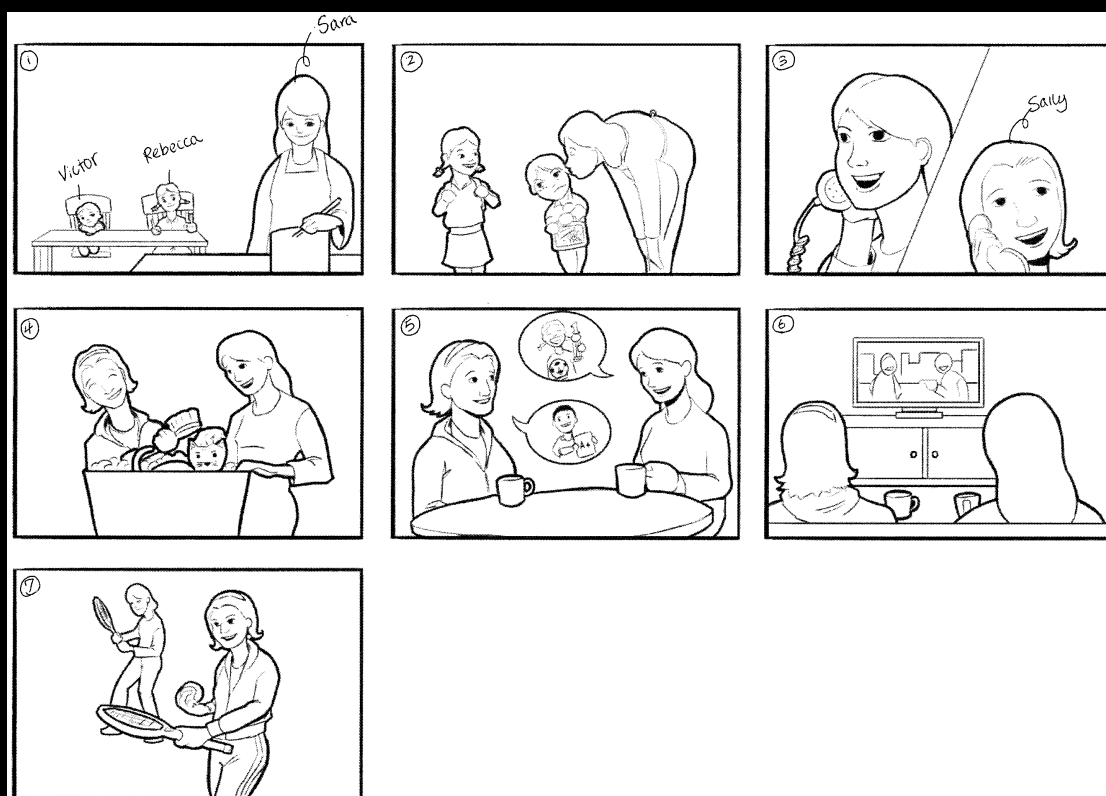


Figure 22 (Cont'd)



APPENDIX G: Past Tense Oral Production Test C

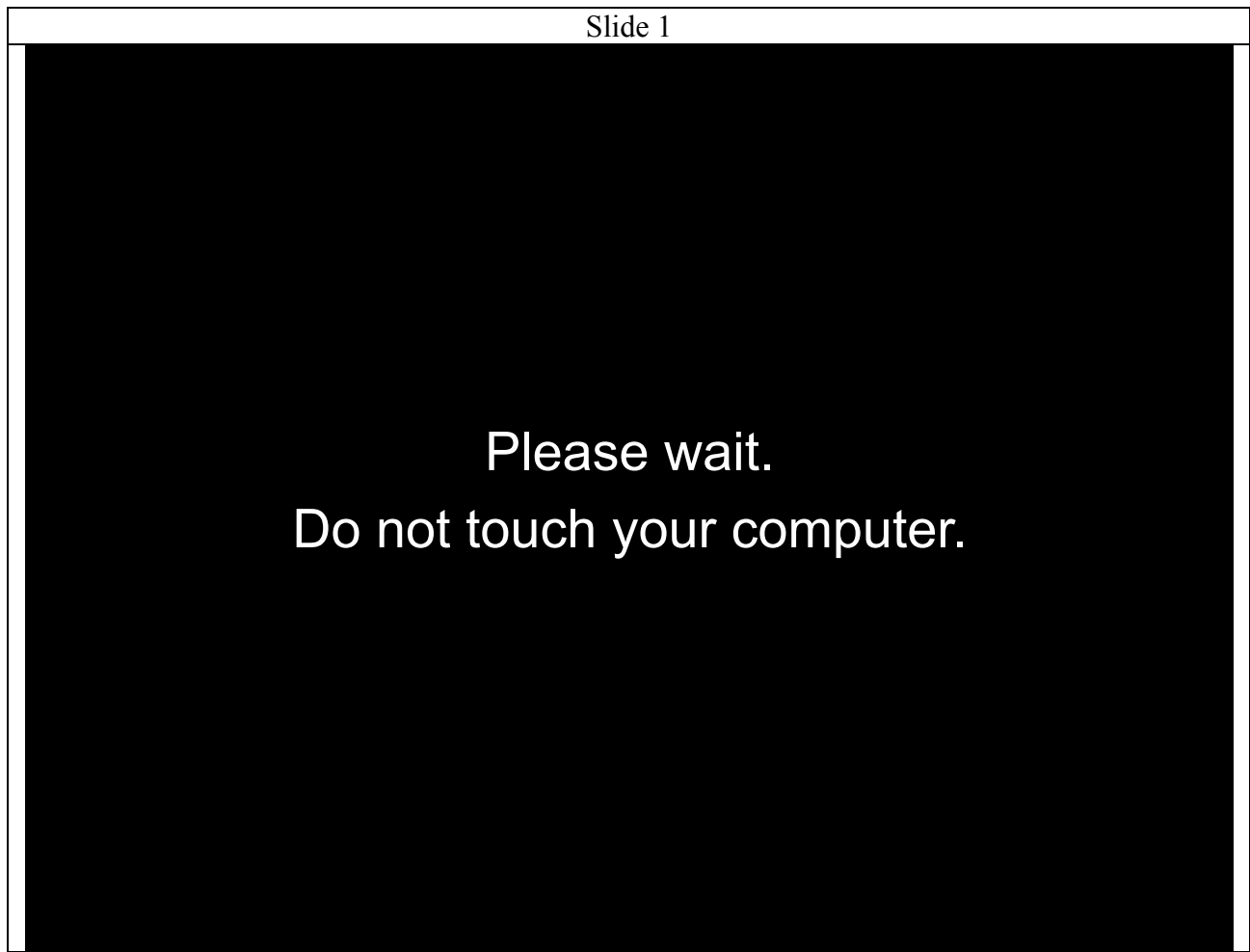


Figure 23

Past tense oral production test C

Figure 23 (Cont'd)

Slide 2

This is what Julia did last Friday.
Please look at the pictures.



Figure 23 (Cont'd)

Slide 3

Please tell what Julia did last Friday.



Figure 23 (Cont'd)



APPENDIX H: Past Tense Grammar Test A

Directions: Read the sentences. If the sentence is correct, circle CORRECT. If not, choose INCORRECT, and correct the sentences.

1. I went swimming before class tomorrow. (CORRECT / INCORRECT)
2. Jessica visited Egypt two years ago. (CORRECT / INCORRECT)
3. Three years ago, Mark will live in Washington D.C. (CORRECT / INCORRECT)
4. Last spring, Susan paints the wall orange. (CORRECT / INCORRECT)
5. Next summer Jose had returned to Venezuela. (CORRECT / INCORRECT)
6. Dominic played the guitar until very late last night. (CORRECT / INCORRECT)
7. Two years ago, Michael opens a coffee shop in East Lansing. (CORRECT / INCORRECT)
8. Julia cooks Indian food last Friday. (CORRECT / INCORRECT)
9. In two weeks, Calvin will become a high school student. (CORRECT / INCORRECT)
10. Last year, Erica joined the discussion group. (CORRECT / INCORRECT)
11. Sara watches a 6-hour Italian movie with her friend last week. (CORRECT / INCORRECT)
12. Last spring break, Josh learns how to play golf. (CORRECT / INCORRECT)
13. Richard is not here. He has taught in Singapore right now. (CORRECT / INCORRECT)
14. Amy talked to her sister for 2 hours last night. (CORRECT / INCORRECT)
15. Jennifer talks with her husband about spring vacation three days ago.

(CORRECT / INCORRECT)

16. Last night, Luke kisses Pamela before she went home. (CORRECT / INCORRECT)

17. Next summer, Kim is going to take a cooking course in Paris. (CORRECT / INCORRECT)

18. In 1930, my grandmother met my grandfather for the first time in New York City.

(CORRECT / INCORRECT)

19. My friends and I plan my friend's wedding last month. (CORRECT / INCORRECT)

20. Matthew watches the fireworks with his family yesterday around 10 pm.

(CORRECT / INCORRECT)

APPENDIX I: Past Tense Grammar Test B

Directions: Read the sentences. If the sentence is correct, circle CORRECT. If not, choose INCORRECT, and correct the sentences.

1. Erica likes to go shopping with her friends on Sundays.
(CORRECT / INCORRECT)
2. Jessica started her piano lessons when she was three.
(CORRECT / INCORRECT)
3. Last year, Mark visits Guggenheim Museum in New York.
(CORRECT / INCORRECT)
4. Yesterday, Susan cooks Italian food for her friends.
(CORRECT / INCORRECT)
5. Next month, I goes to Chicago with my family.
(CORRECT / INCORRECT)
6. Dominic walked by the river early yesterday morning.
(CORRECT / INCORRECT)
7. Last year, Michael receives a laptop on his birthday.
(CORRECT / INCORRECT)
8. Julia plants some tulips two months ago.
(CORRECT / INCORRECT)
9. In two weeks, Calvin will move to Boston.
(CORRECT / INCORRECT)
10. Last year, Erica arrived in Lansing.
(CORRECT / INCORRECT)
11. Two weeks ago, Sara cleans her house with her husband.
(CORRECT / INCORRECT)
12. Last summer, Josh bakes 100 cupcakes.
(CORRECT / INCORRECT)
13. Richard said, "I do not like cold drinks."
(CORRECT / INCORRECT)
14. Amy called her sister at 10 pm yesterday.
(CORRECT / INCORRECT)
15. Jennifer plays tennis with her husband last night at MSU.
(CORRECT / INCORRECT)
16. Last night, Luke paints his son's room blue.
(CORRECT / INCORRECT)
17. After graduation, Mr. Kim wants to teach English in Korea.
(CORRECT / INCORRECT)

18. Jim washed his dog with his children yesterday afternoon because the dog was dirty.

(CORRECT / INCORRECT)

19. Three days ago, my friends and I plan our next trip.

(CORRECT / INCORRECT)

20. Last Monday, Matthew creates a piece of art with his wife.

(CORRECT / INCORRECT)

APPENDIX J: Past Tense Grammar Test C

Directions: Read the sentences. If the sentence is correct, circle CORRECT. If not, choose INCORRECT, and correct the sentences.

1. Erica tried to make a wedding cake for her sister. (CORRECT / INCORRECT)
2. Jessica waited for her friend for three hours yesterday. (CORRECT / INCORRECT)
3. Last year, Mark proposes to Alexis at a beautiful restaurant in Michigan.
(CORRECT / INCORRECT)
4. Yesterday, Susan learns how to make croissants. (CORRECT / INCORRECT)
5. Next month, I travels to Washington D.C. with my parents.
(CORRECT / INCORRECT)
6. Dominic cleaned his room very late yesterday. (CORRECT / INCORRECT)
7. Last month, Michael listens to Spanish music. (CORRECT / INCORRECT)
8. Julia talks to her Indian friend for many hours yesterday.
(CORRECT / INCORRECT)
9. In five years, Calvin will become the CEO of his father's company.
(CORRECT / INCORRECT)
10. Yesterday, Erica danced with his friends until midnight. (CORRECT / INCORRECT)
11. Two years ago, Sara travels to Central America. (CORRECT / INCORRECT)
12. Last Monday, Josh watched a musical with his son. (CORRECT / INCORRECT)
13. Richard thinks that his students are not do well. (CORRECT / INCORRECT)
14. Amy looked for her kitten everywhere in her house last night.
(CORRECT / INCORRECT)

15. Jennifer's husband cook Italian food for her last night. (CORRECT / INCORRECT)
16. Yesterday afternoon, Luke walked around Lake Lansing with his son.
(CORRECT / INCORRECT)
17. My dog always ask me to take him out for a walk. (CORRECT / INCORRECT)
18. Jim checked his mailbox and he saw a letter from his sister.
(CORRECT / INCORRECT)
19. Three years ago, my friend opens a restaurant near MSU.
(CORRECT / INCORRECT)
20. Bill decides to come to the U.S. to study five years ago.
(CORRECT / INCORRECT)

APPENDIX K: Preposition Grammar Test A

Directions: Read the sentences. If the sentence matches the picture, circle TRUE. If not, choose FALSE, and correct the sentence so that it matches the picture.

Example:

	The cat is listening to the music. TRUE / FALSE If false, write a correct sentence: The cat is talking on the phone.
---	---

	1. The cat is on the table. TRUE / FALSE If false, write a correct sentence:
---	--

Figure 24

Preposition grammar test A

Figure 24 (Cont'd)

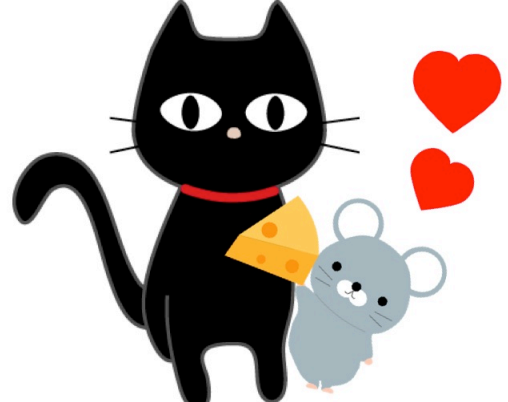
	2. The cat is sleeping. TRUE / FALSE If false, write a correct sentence:
	3. The cat is in the suitcase. TRUE / FALSE If false, write a correct sentence:
	4. The mouse likes the cat. TRUE / FALSE If false, write a correct sentence:

Figure 24 (Cont'd)

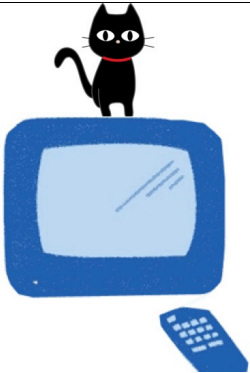
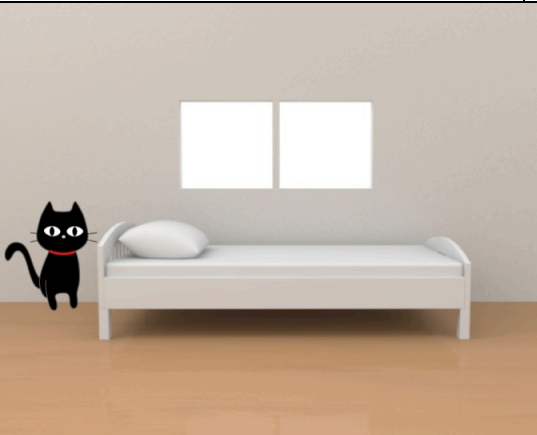
	5. The cat is above the chair. TRUE / FALSE If false, write a correct sentence:
	6. The cat is next to the TV. TRUE / FALSE If false, write a correct sentence:
	7. The cat is on the bed. TRUE / FALSE If false, write a correct sentence:

Figure 24 (Cont'd)

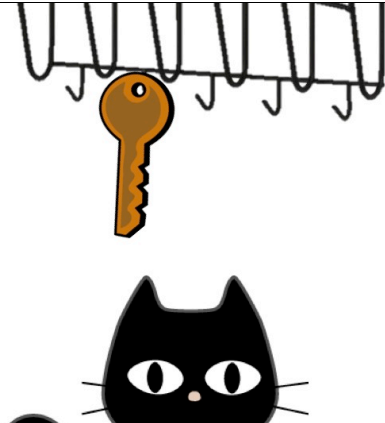
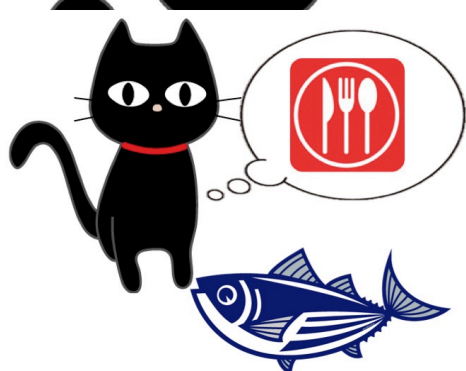
	8. The key is under the cat. TRUE / FALSE If false, write a correct sentence:
	9. The cat wants to eat the fish. TRUE / FALSE If false, write a correct sentence:
	10. The cat is in the bag. TRUE / FALSE If false, write a correct sentence:

Figure 24 (Cont'd)

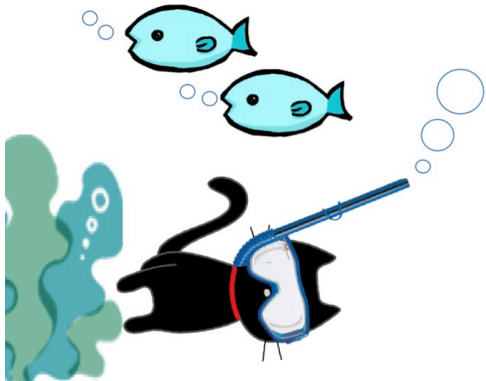
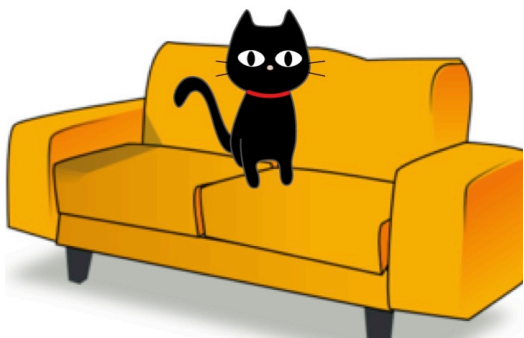
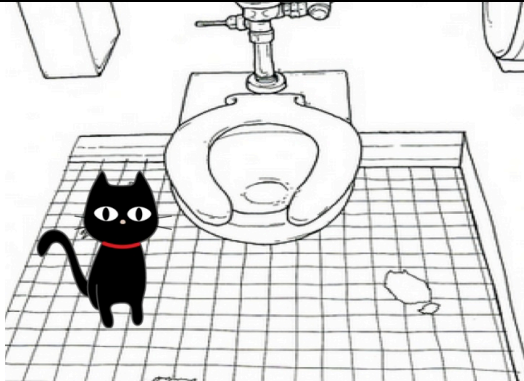
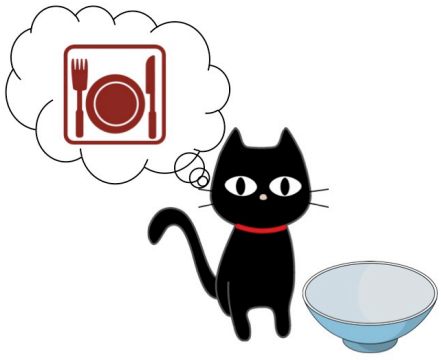
	11. The cat is swimming under the fish. TRUE / FALSE If false, write a correct sentence:
	12. The cat is under the sofa. TRUE / FALSE If false, write a correct sentence:
	13. The cat is under the bathroom. TRUE / FALSE If false, write a correct sentence:
	14. The cat is waiting for his food. TRUE / FALSE If false, write a correct sentence:

Figure 24 (Cont'd)

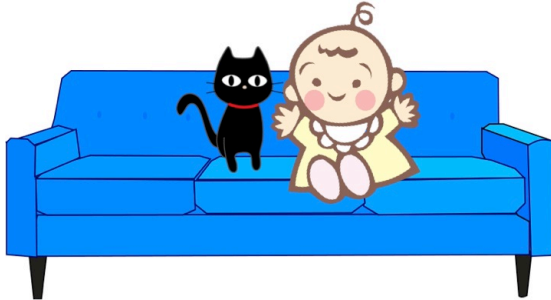
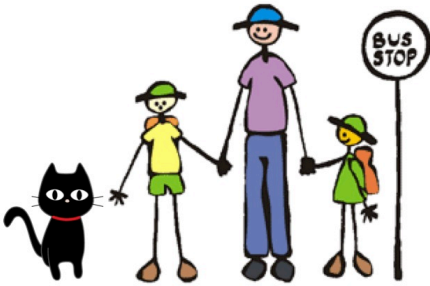
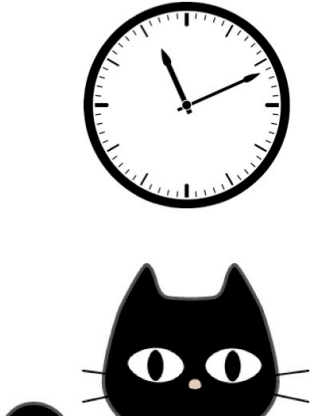
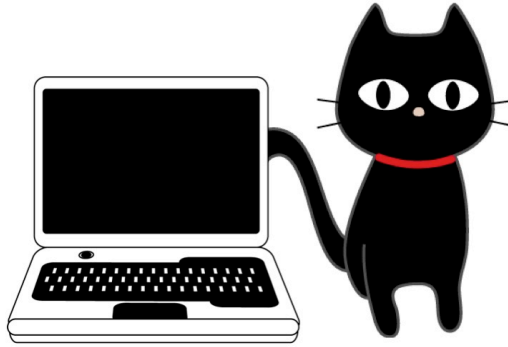
	15. The baby is next to the cat. TRUE / FALSE If false, write a correct sentence:
	16. The cat is sitting under the pillow. TRUE / FALSE If false, write a correct sentence:
	17. The cat is waiting for the bus. TRUE / FALSE If false, write a correct sentence:

Figure 24 (Cont'd)

	18. The clock is above the cat. TRUE / FALSE If false, write a correct sentence:
	19. The cat is on the computer. TRUE / FALSE If false, write a correct sentence:
	20. The books are under the cat. TRUE / FALSE If false, write a correct sentence:

APPENDIX L: Preposition Grammar Test B

Directions: Read the sentences. If the sentence matches the picture, circle TRUE. If not, choose FALSE, and correct the sentence so that it matches the picture.

Example:

	The cat is listening to the music. TRUE / FALSE If false, write a correct sentence: The cat is talking on the phone.
---	---

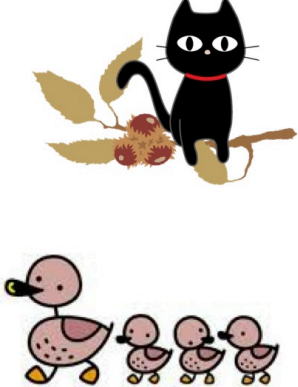
	1. The cat is above the ducks. TRUE / FALSE If false, write a correct sentence:
---	---

Figure 25

Preposition grammar test B

Figure 25 (Cont'd)

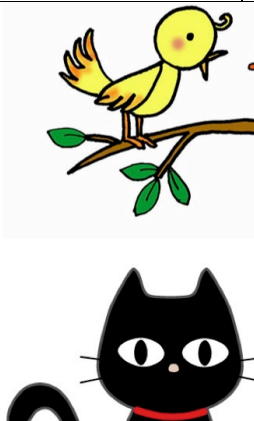
	2. The cat is on the piano. TRUE / FALSE If false, write a correct sentence:
	3. The cat is happy. TRUE / FALSE If false, write a correct sentence:
	4. The bird is in the cat. TRUE / FALSE If false, write a correct sentence:

Figure 25 (Cont'd)

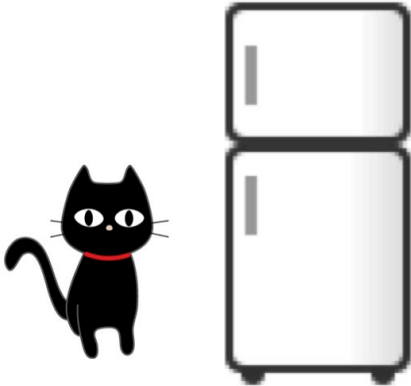
	5. The cat is under the table. TRUE / FALSE If false, write a correct sentence:
	6. The cat is above the refrigerator. TRUE / FALSE If false, write a correct sentence:
	7. The cat is next to the bookshelf. TRUE / FALSE If false, write a correct sentence:

Figure 25 (Cont'd)

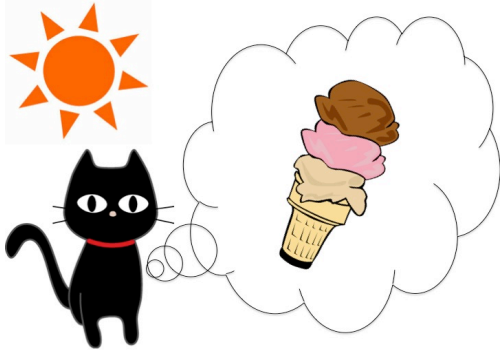
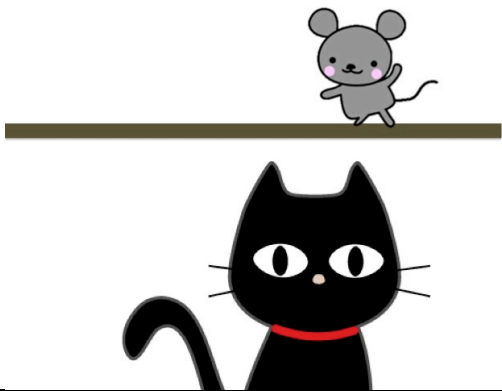
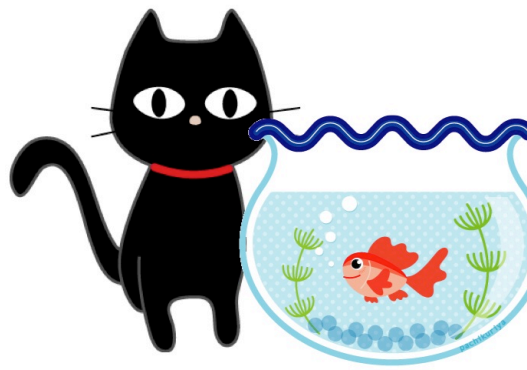
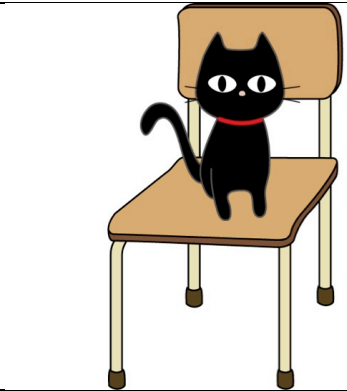
	8. The cat wants hot coffee. TRUE / FALSE If false, write a correct sentence:
	9. The cat is under the mouse. TRUE / FALSE If false, write a correct sentence:
	10. The cat is on the fish bowl. TRUE / FALSE If false, write a correct sentence:
	11. The cat is under the chair. TRUE / FALSE If false, write a correct sentence:

Figure 25 (Cont'd)

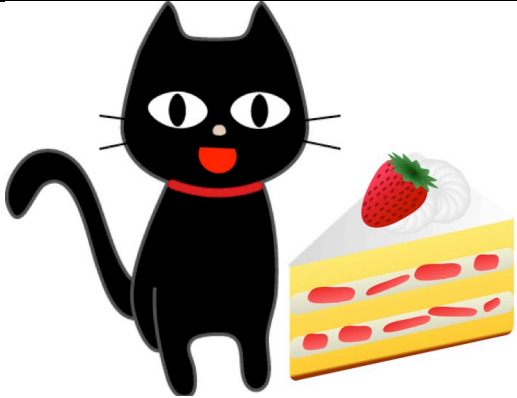
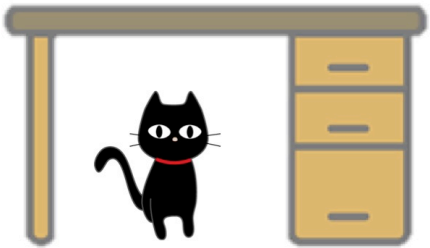
	12. The cat does not like cake. TRUE / FALSE If false, write a correct sentence:
	13. The cat is on the boat. TRUE / FALSE If false, write a correct sentence:
	14. The cat is under the mug. TRUE / FALSE If false, write a correct sentence:
	15. The cat is next to the desk. TRUE / FALSE If false, write a correct sentence:

Figure 25 (Cont'd)

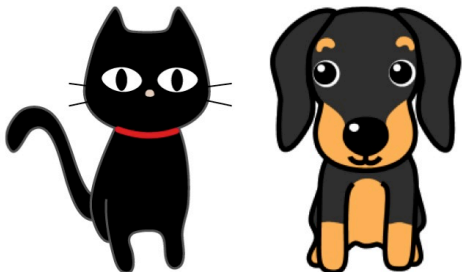
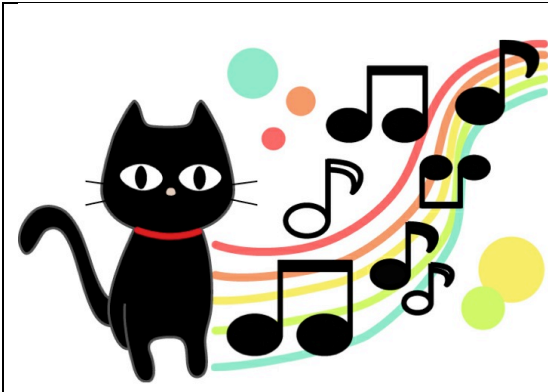
	16. The cat is next to the dog. TRUE / FALSE If false, write a correct sentence:
	17. The cat is on the basket. TRUE / FALSE If false, write a correct sentence:
	18. The cat is feeling sad. TRUE / FALSE If false, write a correct sentence:
 	19. The calendar is next to the cat. TRUE / FALSE If false, write a correct sentence:

Figure 25 (Cont'd)

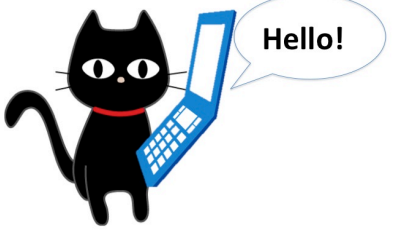
	20. The cat is listening to music. TRUE / FALSE If false, write a correct sentence:
---	---

APPENDIX M: Preposition Grammar Test C

Directions: Read the sentences. If the meaning of the sentences matches the picture, circle TRUE.

If not, choose FALSE, and correct the sentences so to match the picture.

Example:

	The cat is listening to the music. TRUE / FALSE If false, write a correct sentence: The cat is talking on the phone.
---	---

	1. The cat does not like a rainy day. TRUE / FALSE If false, write a correct sentence:
---	--

Figure 26

Preposition grammar test C

Figure 26 (Cont'd)

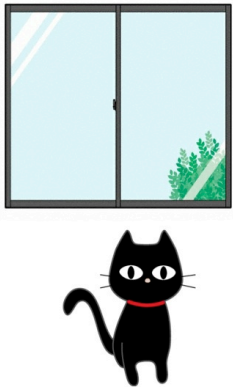
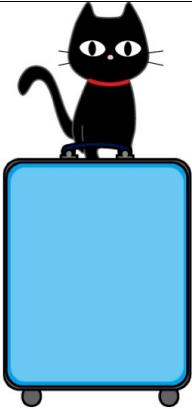
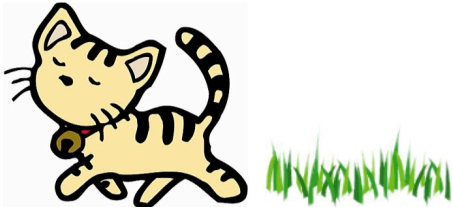
	2. The cat is above the phone. TRUE / FALSE If false, write a correct sentence:
	3. The cat is under the window. TRUE / FALSE If false, write a correct sentence:
	4. The cat is in the suitcase. TRUE / FALSE If false, write a correct sentence:
	5. The cat is jumping. TRUE / FALSE If false, write a correct sentence:

Figure 26 (Cont'd)

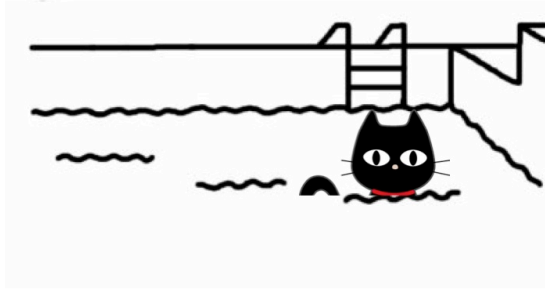
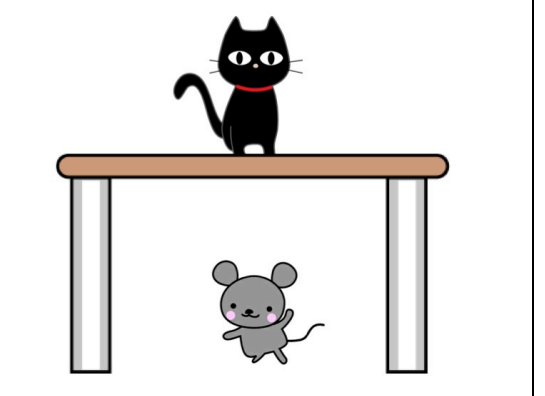
	6. The cat is above the swimming pool. TRUE / FALSE If false, write a correct sentence:
	7. The cat is in the tree. TRUE / FALSE If false, write a correct sentence:
	8. The cat is above the mouse. TRUE / FALSE If false, write a correct sentence:
	9. The cat is in the flower vase. TRUE / FALSE If false, write a correct sentence:

Figure 26 (Cont'd)

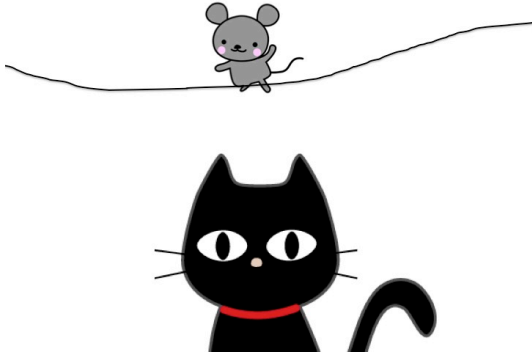
	10. The cat is reading a newspaper. TRUE / FALSE If false, write a correct sentence:
	11. The cat is next to the mouse. TRUE / FALSE If false, write a correct sentence:
	12. The cat is on the car. TRUE / FALSE If false, write a correct sentence:

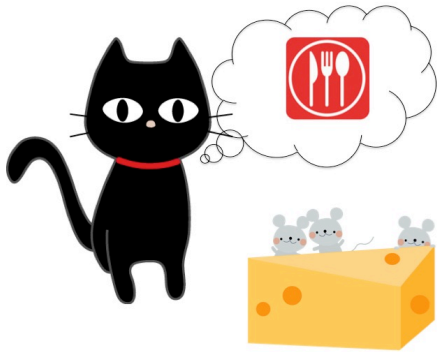
Figure 26 (Cont'd)



13. The monkey is in the cat.

TRUE / FALSE

If false, write a correct sentence:



14. The cat is hungry.

TRUE / FALSE

If false, write a correct sentence:



15. The cat is under the bathtub.

TRUE / FALSE

If false, write a correct sentence:

Figure 26 (Cont'd)

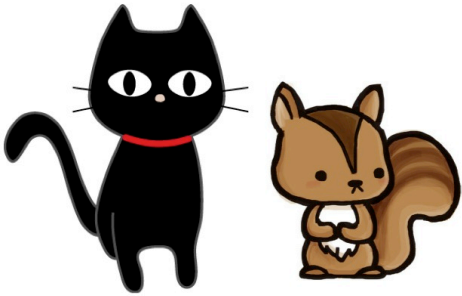
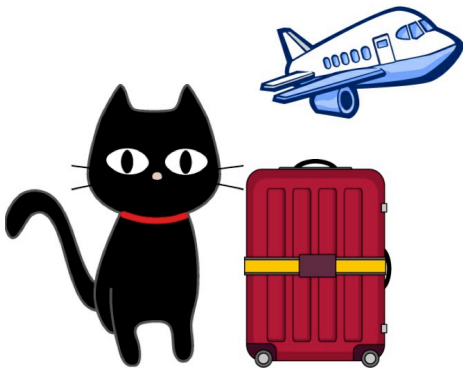
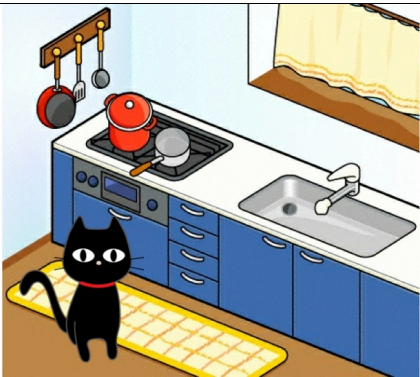
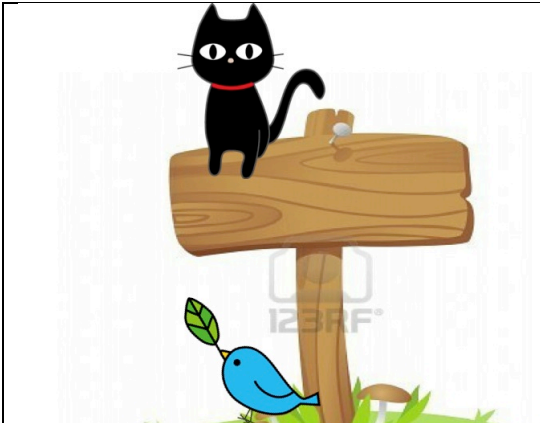
	16. The cat is next to the squirrel. TRUE / FALSE If false, write a correct sentence:
	17. The cat is next to the house. TRUE / FALSE If false, write a correct sentence:
	18. The cat is traveling TRUE / FALSE If false, write a correct sentence:
	19. The cat is in the kitchen. TRUE / FALSE If false, write a correct sentence:

Figure 26 (Cont'd)

 A black cat with a red collar is sitting on a horizontal wooden post. A blue bird is on the ground next to the vertical post. The background is a light green forest.	20. The cat is next to the bird. TRUE / FALSE If false, write a correct sentence:
---	---

APPENDIX N: Regular Past Tense Communicative Task A



Figure 27

Regular past tense communicative task A

APPENDIX O: Regular Past Tense Communicative Task B

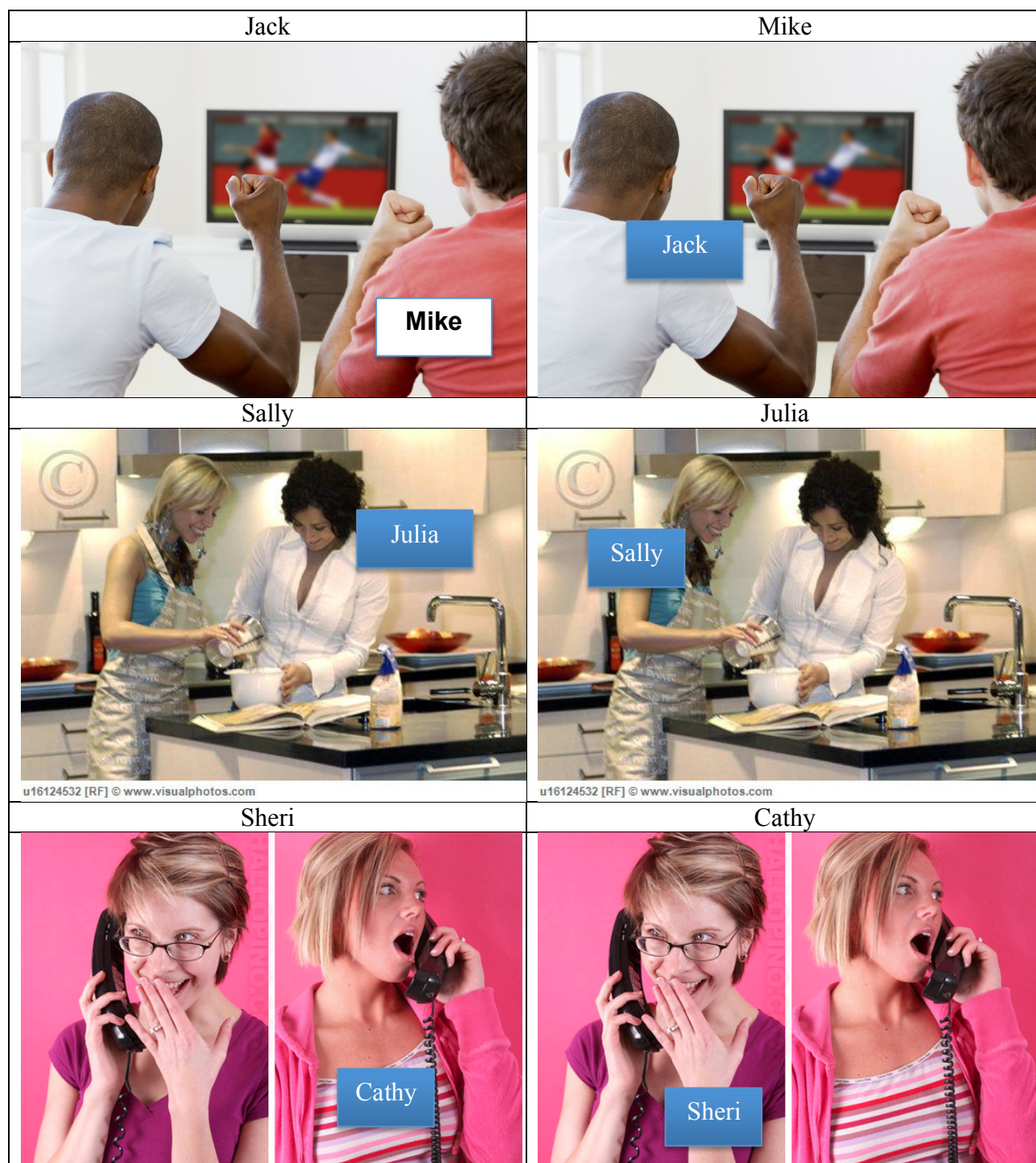


Figure 28

Regular past tense communicative task B

Figure 28 (Cont'd)



Figure 28 (Cont'd)



APPENDIX P: Preposition Communicative Task A

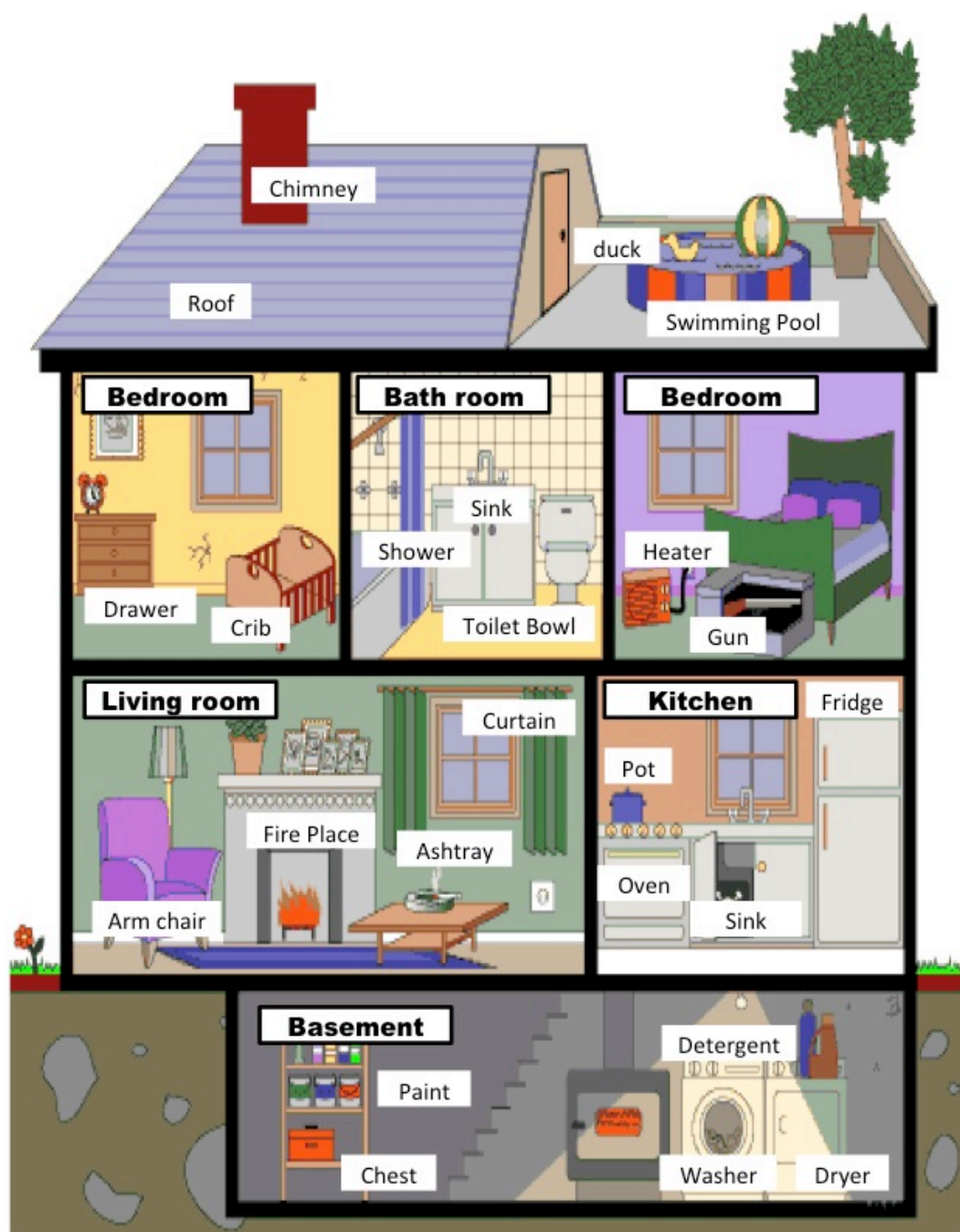


Figure 29

Preposition communicative task A

APPENDIX Q: Preposition Communicative Task B



Figure 30

Preposition communicative task B

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