Beginning ESL Learners' Noticing of Morphological and Syntactic Changes in Recasts

Sunhee Song[1]
Teachers College, Columbia University

ABSTRACT

Recasts, a type of implicit corrective feedback, are thought to be capable of drawing learners' attention to mismatches between their non-target-like items and the corresponding target forms. While a great many studies have tried to compare the effectiveness of recasts, few have attempted to determine whether learners actually notice the language forms used in the recasts. The present study has sought to bridge this gap by investigating the extent to which beginning learners actually notice the morphological and syntactic changes that occur in recasts of their non-target-like utterances in the context of dyadic oral interaction. The participants in the study, two Korean beginning learners of English, received intensive recasts of their morphological and syntactic errors over a period of four months. Learner responses were taken as the primary indication of noticing, which is viewed in this study as "what is both detected and then further activated following the allocation of attentional resources" (Robinson, 1995, p. 297). Results suggest that the learners' noticing was constrained not only by the number of changes in the recasts, but also by the linguistic domains of those changes. Issues related to the study's findings, such as working memory capacity and perceptual salience, are discussed.

INTRODUCTION

There is a growing consensus in the field of second language acquisition (SLA) that when learners attempt to attain native-like ability in a second language (L2), mere exposure to comprehensible input is not sufficient. A great deal of research has therefore examined how to make input more salient for L2 learners. Many SLA researchers, having sought ways to attract learners' attention to linguistic forms in the input and to differences between their output and the target language (TL), are now asserting that attention is a key factor enabling learners to detect a given structure. Noting that L2 learners are often overwhelmed by incoming L2 input, the researchers claim that attention serves to sort out such input. While there are still some significant theoretical differences in the views on attention and its processes (Schmidt, 1990, 1993, 1994, 2001; Simard & Wong, 2001; Tomlin & Villa, 1994), researchers have increasingly appealed to the notion of attention in SLA studies of acquisition and instruction, deeming it

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[1]Sunhee Song is a doctoral student in TESOL at Teachers College, Columbia University. Her research interests include the effectiveness of recasts and uptake in L2 learning, the relation between interaction and L2 learning, and interlanguage development. Correspondence should be sent to Sunhee Song, 111 Broad Ave, Apt. 3C, Palisades Park, NJ 07650. E-mail: ss2029@columbia.edu.

essential that learners first attend closely to the target form, before they attempt to process it.

While such instructional techniques as input flooding, input enhancement, and negative feedback have been proposed as ways to augment the accessibility of input that L2 learners might otherwise miss, much of the recent L2 research has focused on recasts. These are defined as reformulations of all or part of a learner's immediately preceding utterance, with non-target-like items replaced by the corresponding target forms, and with the focus of both interlocutors on meaning (Long, 1996; Lyster & Ranta, 1997). It has been hypothesized that recasts implicitly draw learners' attention to mismatches, provoking the learners, it is hoped, to notice and further process the attended forms. The bulk of this research has focused on the effects of recasts as measured by the relationship between the input that learners receive and their subsequent linguistic performance. Conspicuously absent from this line of research has been any exploration of the cognitive processes that learners go through as they receive recasts. Thus, in the present small-scale study, I have chosen to explore the extent to which beginning learners actually notice the morphological and syntactic changes that occur in recasts of their non-target-like utterances during oral interaction.

In the first part of this article, I provide a general overview of the various perspectives on noticing in SLA. I then explore one of the most significant factors that constrain noticing, that is, working memory, along with some of the methodological issues that arise in trying to measure it. Next, I review the research on recasts that has been conducted in both experimental and observational settings. Following this, I report on the current study and present the results, analyzing the various findings that emerge from the data. I conclude with a broader discussion of the findings, identifying factors that may be hindering beginning learners' noticing of the gap between recasts and their own interlanguage. I also give directions for future research and discuss the limitations of the study.

NOTICING

While many SLA researchers agree that some type of focus on form instruction (FonF) is necessary to draw learners' attention to the formal properties of the target language, considerable disagreement still exists about the attentional processes required for language acquisition to take place (Gass & Selinker, 1994; Gass, Svetics, & Lemelin, 2003; Schmidt, 1990, 1993, 1994, 2001; Sharwood Smith, 1991, 1993; Tomlin & Villa, 1994; VanPatten, 1990). Schmidt (1994), for example, argues that noticing, which is a conscious process, plays an indispensable role in converting input into intake, whereas Tomlin and Villa (1994) believe that detection, which may not require awareness, is the most salient aspect of language acquisition. The ensuing section is devoted to a closer analysis of these two conflicting positions.

Noticing in SLA

L2 learning and performance involve selecting and subsequently encoding information available in the environment. Schmidt (1990, 1993, 1994, 1995, 2001) argues that if we are to learn, we must pay attention to input and also have the momentary subjective experience of noticing it. Noticing, according to Schmidt (1994) is defined as "the registration of the occurrence of a stimulus event in conscious awareness and subsequent storage in long term memory" (p. 179)—the necessary and sufficient condition for conversion of input to intake.

Taking this view, noticing involves subjective experience and an ability to articulate that experience; if these conditions are met, intake results. Thus, in order for learning to occur, learners must attend to and notice certain language features that are relevant to the target system.

Schmidt distinguishes between two levels of awareness: awareness at the level of noticing and awareness at the level of understanding. *Noticing*, for Schmidt, entails conscious registration of an event, whereas *understanding* implies recognition of a general principle, rule, or pattern. When one looks at this distinction in light of the omission of subject pronouns in Spanish, for example, it can be seen that learners must notice that Spanish speakers sometimes omit subject pronouns, but need not notice that Spanish is a pro-drop language, for the latter involves awareness at the level of understanding (Schmidt, 1995). It is awareness at the level of noticing that Schmidt claims is crucial to language learning. Learners must consciously notice linguistic input in order for it to become intake, and this may lead to restructuring of the learner's interlanguage (IL) system. On the other hand, Schmidt regards awareness at the level of understanding as facilitating, but not necessary for L2 acquisition.

Schmidt's noticing hypothesis has been the focus of recent debate. Tomlin and Villa (1994), drawing upon their work in the field of cognitive psychology, advance a fine-grained view of attention. They describe noticing as detection within selective attention, not necessarily involving awareness. They have identified three separate yet interrelated functions involved in attention: alertness, orientation, and detection. Alertness refers to an overall "readiness to deal with incoming stimuli or data" (p. 190), whereas orientation directs attentional resources to a particular bit of information, thus facilitating detection. Detection, according to Tomlin and Villa, is "the process that selects, or engages, a particular and specific bit of information" (p. 192) and the minimally necessary aspect of acquisition through which "particular exemplars are registered in memory" (p. 193). The researchers argue that detection is the attentional level at which L2 acquisition operates, because detected information can be registered in memory dissociated from awareness.

In an attempt to reconcile Schmidt's view with Tomlin and Villa's, Robinson (1995) has defined noticing as "detection plus rehearsal in short-term memory, prior to encoding in long-term memory" (p. 296). The encoding of any stimulus in long-term memory must, according to Robinson, be preceded first by detection and then by an activation of information held in short-term memory. This emphasis on encoding and retrieval processes seems to cast Robinson as yet another proponent of the view that noticing is crucial to language acquisition. In a 2003 work, the researcher argues that noticing is "that subset of detected information that receives focal attention, enters short-term working memory, and is rehearsed" (p. 34). And yet, while Robinson does claim that noticing is "the result of rehearsal mechanisms (maintenance or elaborative rehearsal) which send (however temporarily) information in short-term to long-term memory" (pp. 655-656), and that awareness is involved in this transfer, he also, in line with Schmidt, asserts that no learning can take place without noticing.

More recently, Simard and Wong (2001) have attempted to reconceptualize attention. The researchers suggest that "instead of asking whether attention and awareness are necessary or not for SLA, it may be more fruitful for research to examine how different levels of attention and awareness may impact learning" (pp. 120-121). Simard and Wong conducted such an examination after finding that a number of variables can influence attentional demands during L2 input processing. According to the model of attention proposed by them, alertness, orientation, detection, and awareness are not separate and discrete entities, but instead interact in graded amounts depending upon the task type, linguistic items, individual differences, and other

cognitive activities, as all of these differing variables compete for processing resources. As Philp (2003) has suggested, this seems a more feasible way of conceptualizing attention; therefore noticing in this model is essentially detection accompanied by awareness.

In agreement with the interest of the current study, learners' immediate verbal response to recasts, the term noticing is taken to be detection coupled with a degree of rehearsal in short-term, or working, memory. This view closely follows Robinson's (1995) definition as "what is both detected and then further activated following the allocation of attentional resources" (p. 297). Indeed, working memory may well be one of the factors that mediate learners' noticing.

Working Memory Capacity as a Constraint on Noticing

Although much research remains to be done, a number of studies have recently addressed the issue of how individual differences in short-term, working-memory capacity impact the listening and reading comprehension processes that go on within L2 acquisition (e.g., Doughty, 2001; Hulstijn, 2001). In the field of cognitive psychology, the term *working memory* refers to the memory processes immediately involved in the simultaneous storing and processing of information in real time (McLaughlin & Heredia, 1996). Most memory researchers hold to the view that working memory is simply that part of long-term memory which currently is in a heightened state of activation, thereby serving as a site where processes can be executed and products stored. In order to process an L2, for example, a learner must first store the phonological, syntactic, semantic, and pragmatic information that has been encoded from the input of an immediate interlocutor, and must then, when planning and executing utterances, activate this information or retrieve it from long-term memory.

According to Cowan (1999), the information that is at the focus of a learner's attention, and possibly all activated information, can result in new links between concurrent or consecutive activated elements. These links can, in turn, form new composites that are entered into long-term memory (e.g., in learning new words or remembering new episodes). Robinson (2003) argues that before the newly detected information can be encoded in long-term memory, the information must first enter the area of focal attention and, hence, short-term working memory, where rehearsal processes operate. Noticing and the higher level of awareness are made possible, he believes, by those rehearsal mechanisms which send information from short-term to long-term memory. It is these rehearsal processes that constrain what can be verbalized.

Working memory is thought by some to be limited in both capacity and duration (Baddeley, 1990; Cowan, 1995), and hence to necessarily constrain the development of complex cognitive tasks. Engle, Kane, and Tuholski (1999) have proposed that "working memory capacity reflects the ability to apply activation to memory representations, to either bring them into focus or maintain them in focus, particularly in the face of interference or distraction" (p. 104). Thus, working memory capacity will be different for each individual as he or she processes a variety of tasks. Furthermore, since there are clear limitations to the amount of information one can attend to, as well as the amount of information that can be maintained in working memory, it is widely acknowledged that the constructs of working memory, attention, and consciousness are interrelated.

McLaughlin and Heredia (1996), assuming that the carrying out of complex tasks requires a greater amount of controlled and automatic processing than that of less complex tasks, also expect that more working memory capacity will be required at the attention-demanding initial phase, until subtasks have become automatic and thus require only a scant working-

memory load. In L2 learning, working memory seems to be related to an individual's degree of familiarity with the relevant knowledge structures or linguistic representations, which in turn is impacted by his or her developmental level.

SLA researchers have also posited that working memory duration is affected by the amount of time data are rehearsed. Cowan (1988, 1999) has argued that short-term phonological storage, achieved through processes of rehearsal, allows input to remain in working memory for subsequent comparison, and that "the repetition of sequences in working memory results in consolidation of long-term representations of this sequence information" (1988, p. 113). Auditory memory, however, is known to retain input for only a limited time; thus, a lengthy input that may overload the time limit of phonological storage will be difficult to preserve in working memory in precisely the form given. Therefore, the length of a negative feedback instance (e.g., recast) in oral interaction can be one of the factors affecting retention in working memory, thus constraining noticing.

Methodological Issues in the Measurement of Noticing

While many researchers believe that noticing plays a prominent role in L2 acquisition, until recently, most studies have not paid sufficient heed to the role played by attention in L2 learning. Notably, there is a paucity of research that looks deeply into learners' noticing of conversational modifications in oral interaction. Philp (2003) has noted that this is due to the difficulty of operationalizing the internal processes of noticing during oral interaction. Most researchers have granted that the ability to measure learner awareness is contingent upon what can be reported and recently, work has begun to gather concurrent data on L2 learners' noticing of feedback by employing off-line verbal report measures, such as diary entries and questionnaire responses (Alanen, 1995; Izumi & Bigelow, 2000; Robinson, 1995; White, 1998); immediate or stimulated recalls (Mackey, Gass, & McDonough, 2000; Philp, 2003); and such on-line measures as think-aloud protocols (Alanen, 1995: Jourdenais, Ota, Stauffer, Boyson, & Doughty, 1995; Leow, 1997, 2000; Leow, Egi, Nuevo, & Tsai, 2003; Leow & Morgan-Short, 2004; Rosa & O'Neil, 1999).

In order to determine whether learners recognize feedback and, if so, whether they recognize it in the expected manner, Mackey and Oliver (2002) used stimulated recalls. A video showing the learners' task-based interactions was stopped at particular points and the learners were asked to recall what they were thinking at the time. Through such stimulated recalls, Mackey and Oliver found that the learners correctly perceived a much higher proportion of lexical and phonological feedback than morphological or syntactic feedback. Even though stimulated recall is not an on-line measure, these researchers found it to be a very effective way of gauging learners' perception of interactional feedback, as it requires verbal articulation of noticed feedback and hence entails detection and further processing of input. Philp (1998, 2003) also used an immediate-stimulated-recall technique to assess whether learners had noticed the relevant properties of orally delivered recasts. During a dyadic NS-NNS interaction, the NS prompted recall via a signal immediately following the provision of a recast. In her study, Philp operationalized noticing as accurate repetition of the recast utterance.

Some studies have utilized on-line measures to assess noticing (Alanen, 1995; Izumi, 1999; Jourdenais, 1998; Jourdenais et al., 1995; Leow, 1997, 2000; Leow et al., 2003). These techniques are considered superior to off-line measures in that they allow more direct access to learners' ongoing internal processes and minimize possible memory loss. For example, Leow et

al. (2003) employed think-aloud protocols to determine the benefits of textual enhancement. In their study, participants were asked to think aloud while reading a passage. Immediately after the reading, the participants were given the recognition (intake) task, followed by the comprehension task. While the researchers found no significant benefit of textual enhancement over unenhanced input, they did, interestingly enough, unearth further empirical evidence of a significant correlation between reported noticing of targeted forms and learner intake; the think-aloud protocol data revealed that an average of 55% of the target forms were noticed. That is, learners demonstrating greater noticing and awareness during the on-line protocols also demonstrated greater intake and gain, on the targeted form that is enhanced and perceptually salient. Taking into account the benefits and limitations of the variety of methods, the present study employs an on-line measure to report learner noticing, that is, immediate learner response to verbal feedback.

Many recent studies, working within FonF contexts and seeking to gauge the effectiveness of various types of corrective feedback, have focused on learner responses to feedback, known as *uptake*. Uptake is generally defined as a student's response to information about a linguistic form that the student has produced incorrectly. Although lack of uptake does not necessarily mean absence of noticing, there are theoretical reasons for assuming that uptake indicates that a particular linguistic form has been noticed (Loewen, 2004). Uptake represents a type of *pushed output* (Swain, 1995, 2000). Pushed output can engage learners in syntactic rather than semantic processing, which, in turn, has been argued to allow learners to notice the gap between their non-target output and the correct L2 form (Swain, 1995). Thus, uptake may be an effective way of assessing noticing, although no technique can be assumed to measure the act of noticing with complete accuracy.

Considering the role played by verbal output in noticing and in L2 learning in general, Izumi (2002) has suggested, and the current study also assumes, that learner responses to recasts can facilitate learners' acquisition of complex grammatical forms in at least three ways. Learner responses to recasts are said to facilitate: (1) detection of the formal elements in recasts during production processing; (2) integrative processing of the target structure; and (3) noticing of the mismatch between one's IL form and the TL model which is fostered by whichever juxtaposition of two versions best highlights a particular difference between the two uses of the form.

RECASTS

Much recent research has been conducted to test Long's (1996) Interaction Hypothesis, which states that the negative feedback elicited via negotiated interaction helps to induce the noticing of some forms. According to the recent review of the role played by input and interaction in SLA, before interaction can affect the learners' interlanguage, learners must first notice the gap between their IL and the TL forms (Gass, 1997; Gass & Varonis, 1994). Thus SLA research has broached several possible ways of promoting learner noticing via frequency of input, form-focused instruction, and so on. It has also sought to discover how interaction and its various features bring about L2 development. A number of strategies have been suggested as helping learners to notice discrepancies between the IL and the TL (Carroll & Swain, 1993; Doughty & Varela, 1998; Mackey & Philp, 1998; Long, Inagaki, & Ortega, 1998; Spada & Lightbown, 1993; White, 1991; White, Spada, Lightbown, & Ranta, 1991). Recasting is one of the techniques that researchers advocate to draw learners' attention to linguistic forms without impeding the flow of discourse in the communicative L2 classroom (Long, 1996).

Several researchers have defined recasts as reformulations of all or part of a learner's immediately preceding utterance, with non-target-like items replaced by the corresponding target forms and both interlocutors focused on meaning (Long, 1996; Long et al., 1998; Lyster & Ranta, 1997; Mackey & Philp, 1998). The interlocutor's utterance contrasts with the learner's erroneous utterance, presumably rendering the recast perceptually salient (Leeman, 2003) and allowing the learner to compare the two forms. Recasts are an appealing focus-on-form technique because of the relative unobtrusiveness of this type of pedagogical intervention into the communicative activity (Long & Robinson, 1998). Nonetheless, despite the fact that a number of L2 studies have directly and indirectly assessed the effectiveness of recasts, their usefulness as a form of corrective feedback remains in doubt.

Recasts have been found to occur frequently in L2 classrooms. Indeed, some descriptive studies (Doughty, 1994; Lyster, 1998; Lyster & Ranta, 1997) have discovered that, in the context of classroom interactions, teachers' recasts occurred at much higher rates than other types of response to learners' erroneous utterances such as elicitation, clarification request, metalinguistic feedback, explicit correction, and repetition. Yet some researchers are still skeptical about their corrective effect, since certain findings show that their remedial intention is often ambiguous to the student. Indeed, Lyster and Ranta (1997) found that recasts were the type of negative feedback least likely to lead to learner uptake, which was defined as a learner's incorporation of teacher feedback in the turn immediately following it. Lyster (1998) suggested that the corrective function of recasts may not be sufficiently salient to trigger learners' awareness since recasts are shaped in accordance with not only the syntactic, but also the semantic content of a learner's utterance. Moreover, the frequent use of recasts in content- and communication-based L2 classrooms, especially since they usually are accompanied by signs of approval, is thought to make it difficult for learners to recognize recasts as the corrected forms of their own utterances.

Also problematic is whether learners' ability to repair their errors immediately after recasts is a trustworthy indicator of the recast effectiveness. Learners may fail to respond to recasts because of conversational constraints when, for example, their interlocutors do not provide them with the opportunity to repair their utterances (Oliver, 1995). Thus, gauging the effectiveness of recasts assessed solely on learners' immediate behaviors seems questionable. It would seem important, at this stage of research, to examine whether any observable behavior can clarify whether the feedback is perceived as correction. The present study attempts to shed light on this question.

Some of the laboratory studies have demonstrated that recasts in the form of negative feedback have a positive impact within narrow domains of: (1) a particular language, (2) a specific linguistic feature being focused on, and (3) learners' developmental level (Han, 2002; Leeman, 2003; Long et al., 1998; Mackey, 1999; Mackey & Philp, 1998; Philp, 2003). Long et al. (1998), for instance, have suggested that when it comes to short-term changes in a specific linguistic feature, recasts are more effective than positive models. Indeed, their study provided limited evidence for short term benefits from recasts as L2 learners of Spanish who received recasts involving adverb placement in Spanish performed significantly better than learners who received positive models only. Furthering the understanding of recast effectiveness with regard to specific linguistic features, Leeman (2003) showed that recasts of number agreement in Spanish proved more successful than recasts of gender agreement, apparently owing to the former's more semantically transparent and phonetically substantial characteristics.

Mackey and Philp (1998), working with participants at varying learning levels, compared the learners who received interactionally modified input with those who received intensive

recasts. In terms of an increased production of targeted higher-level morphosyntactic forms, Mackey and Philp's results suggest that intensive recasts are more beneficial for higher-ability than for lower-ability learners.

In addition to conducting studies that try to assess the effectiveness of recasts under tightly controlled conditions, some researchers, mindful of the many studies showing that recasts are less noticeable to learners compared with other types of feedback, have also investigated various ways in which recasts can be made more beneficial. For example, the researchers have sought to combine recasts with additional cues that may help learners to recognize the recasts as a form of feedback on error. In Doughty and Varela's (1998) study investigating the effects of corrective recasts of the past-tense forms used by young L2 learners of English, recasts were delivered with a rising intonation so as to draw the learners' attention to the problematic form. The researchers found that such repetitions, in tandem with vocal emphasis, improved the accuracy and frequency of use of the target form, as well as learners' overall developmental progress. To eliminate much of the ambiguity swirling around the function of recasts, Doughty (2003) has suggested using *focused* recasts that are consistent and intensive, addressing fewer targets, and adding an intonational focus. When Ellis, Basturkmen, and Loewen (2001) observed classes that received a focus-on-formS type of instruction prior to communicative activities, they found that recasts used during interaction resulted in a high amount of uptake. This finding raises the possibility that such focused lessons help learners to attend to form during later communicative learning, making recasts more effective.

Recasts and Noticing

A new approach to examining the relationship between recasts and learner noticing, one that evaluates recasts in terms of learners' cognitive processes, has recently been adopted by the SLA researchers. Working within this new approach, Mackey et al. (2000) studied the relationship between feedback and learner perception as a preliminary step in evaluating recasts in the context of learners' cognitive activities. According to the results of their study that used ESL data, the errors corrected by the interviewers were primarily morphosyntactic (47%) or phonological (41.5%), with limited lexical feedback (10.5%). However, the study also found that the recasts of morphosyntactic errors were less accurately perceived by the learners than the recasts of lexical and phonological errors, despite the fact that the recasts of morphosyntactic errors constituted the most frequent type of feedback provided. Mackey et al. concluded that the learners were relatively accurate in their perceptions of lexical and phonological feedback, but not so in the case of morphosyntactic feedback. The researchers further concluded that the lack of learner uptake was caused by the learners' inaccurate perceptions.

Similarly, Philp (2003) conducted a laboratory study designed to determine whether learners notice native speakers' reformulations of IL grammar in the context of dyadic interactions. Working on oral communication tasks with 33 adult ESL learners, Philp tried to prompt accurate immediate recall by knocking twice on the table to draw attention to each recast. According to this study, higher proficiency learners are more likely to notice recasts than lower proficiency learners, and short recasts, especially those involving changes in morphology rather than in syntax, are more easily noticed.

The present study is a variation of Philp's (2003) study of noticing, in that it, too, seeks to determine the extent to which learners accurately notice recasts of both morphological and syntactic types. Unlike Philp's study, however, the present study uses learner responses as a

direct measure of the noticing of changes in recasts. Another difference is that the learners in the present study were at a beginning level of L2 development, in contrast to the advanced learners participating in Philp's study.

THE PRESENT STUDY

Motivation for the Study

While a great many studies have investigated the relationships among error types, feedback types, learner uptake, and interlanguage development, few have sought to determine whether learners actually notice the language forms used in the recasts employed by their interlocutors. Thus this study takes a new step by investigating the extent to which beginning learners accurately notice the morphological and syntactic changes in recasts.

In this study, I seek to identify specific structures that appear problematic in the learners' output, but can be remedied by recasts. I thus heed Long's (2007) suggestion: "Knowing which classes of problematic target language features can be addressed successfully via implicit negative feedback, and which, if any, require more explicit treatment would be both theoretically important, because it could help explain how recasts work, and pedagogically useful" (p. 110). In sum, this study intends to determine whether it is possible to accurately predict the differential effects of recasts based on the linguistic features they entail.

Research Questions

The present study sought to answer the following question: To what extent do beginning learners accurately notice the morphological and syntactic changes in recasts? Noticing of recasts, the dependent variable, was operationalized as the learner's accurate response to a recast immediately following its delivery. On the basis of this research question, I have formulated the following three corollary questions:
1. Does the number of changes in the recasts affect the learners' degree of success in their immediate responses?
2. Do the linguistic features found in recasts affect the degree of success in the learners' responses?
3. To what extent do beginning learners notice specific linguistic items modified in the recasts?

Methodology

Operationalizations

In keeping with previous studies (Doughty, 1994; Lyster & Ranta, 1997), *recasts* were operationalized as responses to an utterance made by the learner that contains one or more non-target-like forms. The interlocutor – in this case, the researcher – rephrased the learners' utterances by changing one or more ungrammatical forms while preserving the utterances' central meaning. Recasts were provided immediately after the learners' grammatical errors were detected. In this study, the term *response* refers to a learners' utterance immediately following a

recast. The learners' degree of success in noticing the reformulation in a recast was measured based on their ability to verbally report on it following Leow (1997). The term *noticing*, based on Robinson (1995), refers to detection coupled with rehearsal in short-term memory. Thus, the learners' attempts to incorporate changes delivered through recasts were coded as cases of noticing the recasts.

Participants

Two Korean adult males participated in this study. At the time of the study (December 2003 – March 2004), Learner 1 was 34 years old, and had been living in the United States for almost four and a half years. Learner 2 was 31, and had been in the U.S. for seven years. Although the learners did not know each other, they shared some similarities. Neither had ever enrolled in any language program during their stay in the U.S., and their knowledge of English was limited to words and phrases. Both lived and usually socialized with Korean native speakers, and worked in Korean companies, where they interacted almost exclusively with their same-language colleagues. Thus, when the tutoring session first began, they were both assessed as beginning learners of English.

Target Structures

No target structures were chosen prior to the study. Instead, recasts were provided in response to the learners' most common errors during the sessions, without focusing on any particular lexical, phonological, syntactic, or morphological features. The decision was made to provide the learners with recasts on the basis of their own production because of the unconstrained nature of this spontaneous type of recast. The study does, however, focus on only two linguistic domains: morphology and syntax. Therefore, it needs to be noted that the two learners had not only previously encountered most of the morphological and syntactic forms that this study focused on, but were also able to display, in their native language, metalinguistic knowledge with regard to those features.

Data Collection

Learner 1 participated in 15 50-minute sessions over a period of four months, while Learner 2 participated in 7 sessions of the same length. To facilitate learners' production of output, picture-description tasks requiring that the learners described them and answered questions were used. During the tasks, I attempted to recast any utterance containing an error. Although, in keeping with the stated goal of this study, recasts were the only pedagogical tool used to address grammatical problems that arose in the oral interaction, stimulated recall was also employed at times as a way of corroborating an observation. All of the sessions were audio-recorded, and later transcribed.

Both grammatical and ungrammatical responses were analyzed in order to assess the learners' difficulty and/or ability to notice, as well as to reconstruct grammatical forms that have been recast by the interlocutor. It should be noted, however, that I did not give the learners any sort of prompt or signal to elicit a recast as a response.

Data Analysis

Data were transcribed and coded according to the learners' initial utterances, recasts, and responses to recasts. The learners' responses were categorized as "successful," "unsuccessful," and "no response." To assess the degree of difference between the learner's initial utterance and the recast, I counted the number of changes made in the recast. I then analyzed the data in terms of the morphological and syntactic aberrations corrected through the recasts. I also compared the learners' successful and unsuccessful responses to the recasts in terms of specific morphological and syntactic items. The ensuing descriptions give the details on the coding categories for each analysis.

The learner's responses: Successful, unsuccessful, and no response. The learner's responses to the recasts were placed in three categories: successful, unsuccessful, and no response. A successful response occurred when the learner accurately restructured his initial utterance based on the recast; an unsuccessful response meant the learner attempted to incorporate a recast but structured it inaccurately, and no response signified that the learner failed to respond in any way to a recast. I employed stimulated recall to discriminate between the learners' imitation of my utterance and a restructuring of their initial utterance, especially when a recast targeted a single error.

The number of changes in the recasts. In assessing the learners' responses, I also considered the number of changes that I made in my recasts of the initial utterance. For example, recasting "*Jackson is now travel*" as *"Jackson is now traveling"* involves one change (to the present progressive marker *–ing*), whereas recasting *"Why New York you going to?"* as *"Why are you going to New York?"* involves two changes (one of inversion, by inserting an auxiliary, and one of word order). I coded recasts as "simple" or "complex," with complex recasts signifying those that required two or more linguistic changes.

Linguistic domains: Morphological and syntactic modifications. I also analyzed each learner's response to a recast to see whether the learner had noticed and used any syntactic or morphological changes provided to him. Morphological changes generally entailed the addition of affixes before or after base morphemes and were one of three types: (a) inflectional affixes, which signal grammatical relationships (e.g., past tense, 3rd-person singular, progressive *-ing*, and plurality marking); (b) class-changing derivational affixes, which form new words by altering the grammatical class (e.g., happy $\rightarrow$ happiness); and (c) class-maintaining derivational affixes, which form new words without changing the grammatical class (e.g., happy $\rightarrow$ unhappy). Syntactic changes involved word order, negation, and the omission or use of such major items as subject, verb, object, or auxiliary.

Noticing of syntactic domains occurred when a learner's response to a recast represented a modification of either the original trigger utterance or my reformulation; unnoticed morphological domains meant the learner responded inaccurately and made no modification to the original presentation. Here are examples of both ("R" indicates the researcher; "L1" indicates Learner 1):

(1)   L1:   A cashier name John.
           R: The cashier's name is John.   Recast

L1:   A <u>cashier name</u> <u>*is*</u> John. (Episode #154)   <u>Unnoticed morphology</u>/ *noticed syntax*

I employed a coding scheme for each recast episode that assigned a particular value to each coding category. This system made it possible to determine which characteristics of recasts best predict the dependent variables of noticing and of successful uptake. Table 1 details the coding scheme for the dependent and independent variables, and indicates the value assigned to each coding category.

TABLE 1
Coding Scheme of the Dependent and Independent Variables

	Value	
Variables	0	1
Linguistic Domain: Morphology	Noticed	Unnoticed
Linguistic Domain: Syntax	Noticed	Unnoticed
Type of Recasts	Simple	Complex
Learner Response to Recast	Successful Response	Unsuccessful Response

RESULTS

The types of recasts provided depended entirely on the production of non-target-like forms by each learner, although only instance of morphological and syntactical errors were included in the present study. Overall, the two learners received a total of 295 recasts of their syntactic and morphological errors, across all sessions; this translated into 207 recasts for Learner 1, and 88 recasts for Learner 2. As illustrated in Table 2, Learner 1 received 90 recasts that entailed only one change of form and 117 recasts that contained multiple changes in morphology and/or syntax. Learner 2 received a comparatively smaller number of recasts: 32 simple ones and 56 complex ones. It is apparent that both learners were presented more frequently with recasts containing multiple changes, and that more recasts were produced in the syntactic domain, regardless of the number of changes that the recasts contained. It is important to note, however, that since Learner 1 received more consistent recasts of his ill-formed utterances, and since the analysis of data drawn from Learner 2 showed a result similar to that deduced from the data of Learner 1, the following analysis focuses mainly on the data from Learner 1.

The Relation between the Number of Changes in the Recasts and Learner Noticing

Given that the present study focuses on the effects that (a) the number of changes made in the recasts and (b) the linguistic domains in which the changes were made had on learners' noticing, I deemed it essential to include the data presented in Tables 2 and 3. Table 2 shows that

90 out of the 207 recasts of Learner 1's utterances contained only one correction of a morphological or syntactic error; Table 3 reveals a significant difference in the success rates of response to recasts having only one change and to recasts having two or more changes ($r = .623$, $p = 0.01$).

TABLE 2
Recasts Provided to the Learners

	Simple Recasts		Complex Recasts
	With a Morphological Change (N)	With a Syntactical Change (N)	With Morphological and/or Syntactical Changes (N)
Learner 1	22	68	117 (57M+208S)
Learner 2	9	23	56 (22M+77S)

Note. N = Total number of recasts provided to each learner; M = Number of morphological changes included in a complex recast; S = Number of syntactic changes made in a complex recast.

TABLE 3
### Number of Changes Contained in Recasts and their Impact on Learner Noticing

Number of Changes	Successful Response	Unsuccessful Response	No Response
Simple (N = 90)	87%	12%	1%
Complex (N = 117)	64%	34%	2%

Note. N = Total number of recasts in each category

These data demonstrate that learners responded to recasts containing two or more changes much less successfully than to those containing only a single change. This would seem to indicate that the more a recast differs from the original utterance, the more likely the learner is to fail to notice all its features.

As shown in Figure 1, 87% of simple recasts led to successful learner responses, whereas only 64% of complex recasts did so. One can also see very few instances of No Response: only 4 out of 207.

FIGURE 1
Number of Changes and Learner Noticing
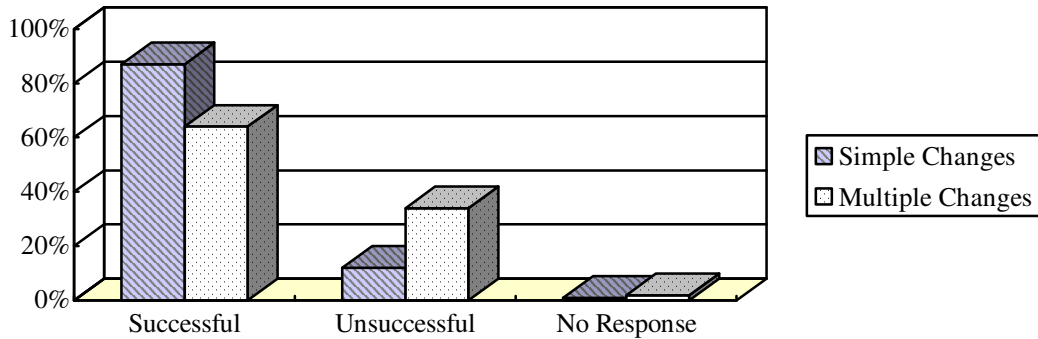
A closer look at three of those instances reveals a few interesting patterns:

(2)   L1:   John need milk.
        R: John need<u>s</u> milk.   Recast
        L1:   Mother is now computer working. (Episode #151)

(3)   R: What is John doing?
        L1:   John hand hold tennis racket.
        R: John <u>is</u> hold<u>ing a</u> tennis racket in his hand. Recast
        L1:   uh? (Episode #153)

(4)   L1:   Where is subway ticket?
        R: Where <u>can I buy a</u> subway ticket?   Recast
        L1:   ….. (Episode #176)

Two distinct reasons for why the learner failed to respond to the recasts are disclosed when the episodes are analyzed qualitatively. In (2), the learner first seemed to ignore the recast; he later said, in the stimulated recall, that he did not realize the teacher had added a 3rd person singular –s to the main verb. In (3) and (4), the learner seemed to be overwhelmed by the extent of changes, both morphological and syntactical, contained in the recast, and hence appeared unable to incorporate them. He later explained that he noticed that the recast was quite different from his original utterance, but was unable to include those changes in his own utterances.

The Relation between Learner Noticing and the Linguistic Domains in Recasts

In order to answer the second subsidiary research question (Do the linguistic features found in recasts affect the degree of success in the learner's responses?), the linguistic domains of the changes in the recasts were investigated as a possible constraint on noticing. When these were examined in relation to the degree of success of learner noticing regardless of the complexity of the recasts, some significant correlations were found (as seen in Table 4). A significant positive correlation was found between the syntactic domains of the changes in the recasts and learner noticing ($r = .414$, $p = .01$), whereas there was a significant negative

correlation between the morphological features and learner noticing ($r = -.227$, $p = .01$).

TABLE 4
Correlations between Learner Noticing and Linguistic Domains (N=207)

|	Success	Morphology	Syntax
Success	1.000	-.227**	.414**
Morphology	-.227**	1.000	-.248**
Syntax	.414**	-.248**	1.000

** $p < .01$.

As shown in Table 5, the correlation between the linguistic domains of the changes in the recasts and the learners' successful noticing were stronger when the recasts were complex. Simple recasts containing one change in a morphological form were noticed by the learners 67% of the time, with the figure rising to 91% when the change was syntactic. In the case of complex recasts, the learners successfully noticed morphological changes only 25% of the time (down from 67%, in the simple recasts) and noticed syntactic changes 74% of the time (down from 91%, in the simple recasts). In summary, then, the learners were considerably more successful in noticing syntactic than morphological changes, in both simple and complex recasts.

TABLE 5
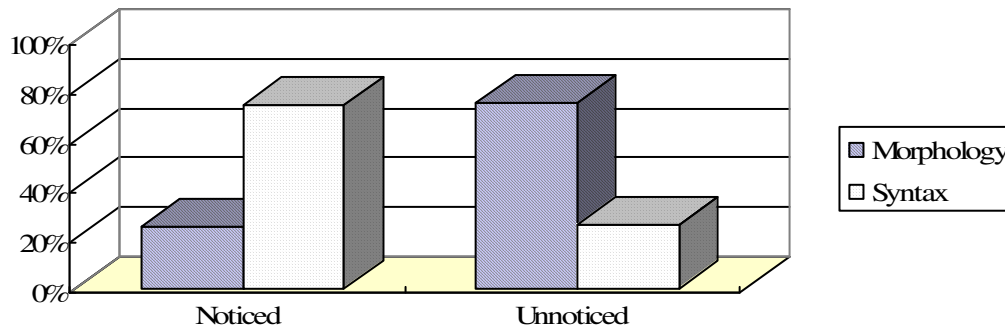**Relation between Learner Noticing and Linguistic Features of the Changes in the Recasts**

Linguistic features	Simple		Complex	
	Noticed	Unnoticed	Noticed	Unnoticed
Morphology	67%	33%	25%	75%
Syntax	91%	9%	74%	26%

Thus, while syntactic changes made in the recasts were noticed more than morphological ones, overall, this finding is more significant in the case of complex recasts, as illustrated in Figures 2 and 3.

FIGURE 2
Learners' Noticing of Simple Recasts
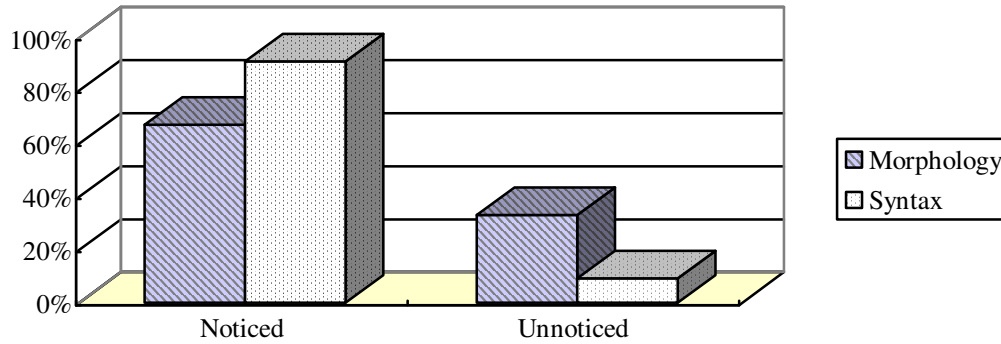
FIGURE 3
Learner's Noticing of Complex Recasts

The Relation between the Linguistic Items and Learner Noticing

Vital to the search for answers to the subsidiary research questions 1 and 2 are the findings that the beginning learners: (1) noticed changes more often in the simple than complex recasts, regardless of the type of linguistic features these contained, and (2) noticed more syntactic than morphological changes in the complex recasts.

It is also of interest that not all of the items falling within either of the two basic linguistic categories of morphology and syntax were noticed by the learner with the same degree of success, as shown in Table 6. For example, the present progressive participle –*ing*, the plural marker –*s,* and the possessive marker –*s* were the most common morphological errors in the learner's original utterances. And yet while 77% (10 out of 13) of the recasts of the present progressive –*ing* were successfully noticed and incorporated into the following utterances produced by the learner's, only 6% of the recasts of the plural marker –*s* (1 out of 16), and none of the possessive marker –*s* (0 out of 10), were noticed, leaving most of these errors unchanged in the learner's subsequent utterances.

TABLE 6
Relation between Learner Noticing and Linguistic Items Most Modified in Complex Recasts

	Morphological items		Syntactic items	
	Noticed	Unnoticed	Noticed	Unnoticed
Most	Present pogressive	Plural –s	Auxiliary	Article
↑	3rd person -s	Possessive 's	Word order	Preposition
	Tense marker	3rd person –s	Verb omission	Verb omission
↓	Comparative –er	Tense marker	Article	Word order
Least	Plural –s	Present progressive		

As for the syntactic items, those that the learner most successfully noticed in the complex recasts were omission of auxiliary (25 out of 26), word order (33 out of 35), and omission of the main verb (32 out of 36); conversely, the learner failed to notice more than half of the modified forms of articles (28 out of 45) and prepositions (19 out of 32). Clearly, the learner noticed some items more than others within the same linguistic category, especially with respect to morphological changes.

DISCUSSION

In general, the results of this study support the claim that learners notice a considerable amount of negative feedback provided to them via recasts, even if their responses do not always match the recasts they have received. I examined learner responses in the present study not only as a way of ascertaining that a linguistic form had been noticed, but also as a means of revealing exactly what the beginning learners could detect in the input they received. The learners were able to retain most simple recasts in working memory and to accurately incorporate them into their responses. On the other hand, in the case of complex recasts, while the learners appeared to notice that their original utterances were different from the recasts, their apperception of the recasts was not always accurate; they were able to grasp only a partial picture of the input given. This is illustrated in (5) and (6), which were stimulated recalls that followed episodes #103 and #116.

(5)   R: How long does it take from here to your company?
        L1:   It's 20 minute.
        R: Oh, it <u>takes</u> 20 minute<u>s</u>.   Recast
        L1:   It's take 20 minute. (Episode #103)

Here is L1's stimulated recall for his response, translated from Korean into English.

    R: *Why did you change your responses here?*
    L1:   *I did because you mentioned the word "take" which I didn't use in my answer.*
    R: *Didn't you hear anything else different from your original utterance?*

      L1:   Not really. What did you say again?

(6)   R: Does he have a car?
        L1:   He have two car.
        R: He <u>has</u> two car<u>s</u>.   Recast
        L1:   Oh, yeah, he has two car. (Episode #116)

Here is L1's stimulated recall for this response, translated from Korean into English.

      R: What made you change your original response?
      L1:   Because you said "has," and I said "have."
      R: Do you know why I said "has"?
      L1:   Yes, when I say "he" or "she," I have to use "has," not "have."
      R: Didn't you hear another correction I made here?
      L1:   More? I don't know…What?

      Apparently the learner in (5) and (6) noticed that his IL form was different from the recasts, but was unable to incorporate the complete utterance into his response; his response to the recasts was only partial. The present study's findings, therefore, lead to the conclusion that the two chief factors that seem to constrain the noticing of feedback are (a) the number of changes made in the recast and (b) the linguistic domain that those changes fall within. These factors appear all the more influential given the limited capacity of working memory.

The Relation between Working Memory and the Number of Changes in Recasts

      The finding that a recast containing only a single item-change leads to a more accurate response suggests that learners need to be able, first of all, to make a comparison between L2 input and their own IL utterances in order to notice the differences and process them (Gass, 1997; Gass & Varonis, 1994). It also supports the notion that such comparison of utterances is constrained by limited working memory capacity, especially when it comes to auditory input (Cowan, 1988, 1995). In other words, a complex recast containing multiple changes is not retained accurately in working memory and is thus rendered inadequate for purposes of comparison and further processing. Cowan suggests that auditory memory in particular can retain input for only a limited time.

      Thus, recasts that are linguistically closer to the original utterance may be of more benefit to learners, in that they tend to appear with greater accuracy in learner responses. This speculation certainly draws support from the work of such researchers as Gass (1991) and Philp (2003), who claim that most recasts containing more than one or two instances of correction within a single exchange are not accurately represented in working memory, making it very hard for a learner, especially a beginner, to reconstruct them. This seems all the more true, when we assume that working memory capacity is not really about the storage of memory per se, but rather about an ability to control and sustain attention even in the face of interference (Engle et al., 1999). Quite simply, too many changes in linguistic items and overly long recasts can adversely affect the noticing of recasts.

      Advanced learners are expected to more accurately recall a recast from working memory

than beginning learners, given that they benefit both from their familiarity with the modified forms and from their increased automaticity which makes it possible for them to turn their attention to other corrections about which they may initially have been unsure (Ellis, 1994; Philp, 2003; Segalowitz, 2003; VanPatten, 1996). Conversely, beginning learners who have little lexical or phonetic familiarity with the forms they encounter in recasts may experience difficulties in accurately recalling the recasts. If a learner is to notice morphological or syntactic forms that have low salience and low communicative value within the auditory input, it is vital that the utterance linger long enough in the learner's working memory for it to be processed. Given the awareness of the time and space constraints on working memory when it comes to verbal input, it can be safely assumed that learners who are familiar with the L2 data and who have achieved automaticity in comprehension and production will be best at noticing recasts that contain multiple changes.

Not All Grammatical Forms Are Equal: The Impact of Perceptual Saliency

Clearly, one of the most important facts to emerge from the present study is that grammatical forms are not equally salient from the learners' point of view. Linguistic forms at the higher levels of salience are most likely to be noticed and incorporated by the learner. Han (2004) points out that regardless of the degree of linguistic and/or cognitive complexity, some items are simply difficult for learners to acquire, owing to their lack of perceptual salience. She explains her distinction between the two basic types of salience, the physical and the semantical, as follows:

> Certain linguistic features are perceptually non-salient due, for example, to their physical attributes such as their position in a sentence (e.g., sentence-medial as opposed to sentence-initial or final) and their syllabicity (e.g., syllabic as opposed to non-syllabic), while others are semantically non-salient because they carry little semantic value. (pp. 141-142)

Table 7 shows this type of saliency, created by the physical and semantical values.

TABLE 7
Semantic Value, Redundancy, and Communicative Value (Han 2004)

Communicative value	Semantic value	Redundancy	Examples
High	+	-	English –*ing*
Medium	+	+/-	Tense markers
Low	-	+	Inflections on adjectives in Italian
Low	+	+	English 3rd person -*s*

In English, morphological items, being nonsyllabic, generally entail the addition of affixes before or after the base morpheme in a reasonably systematic and linear fashion. By contrast, such syntactic items as word order and omission or insertion of subject and main verb

of a sentence are salient because they entail the use of syllabic words. Very much in keeping with Han's suggestion, the findings of the present study show that beginning learners do a better job of noticing the syntactic as opposed to the morphological items corrected in the complex recasts. As for semantic salience, it, too, seems to play a vital role in facilitating the noticing of certain linguistic forms. For example, the highly unnoticed item, the sentence-final plural –s, illustrated in (5) and (6), is a form that has inherent semantic value in that it encodes the semantic notion of plurality within a temporal framework. It is, however, made redundant by the co-occurrence of the lexical item "two" that carries the same meaning. This redundancy has weak communicative value and, as a result, lowers perceptual salience. So, too, the weak communicative valence of such syntactic items as prepositions and articles tends to make those forms less noticeable.

CONCLUSION

For the most part, the beginning ESL learners in the present study noticed the changes made in the recasts of their non-target-like utterances. To be more exact, 87% of the simple recasts and 64% of the complex ones led to successful learner responses. These percentages do not, however, indicate that the learners always noticed everything in the recast. The study found that the learners noticed simple recasts (those containing a single change) to a greater extent than complex ones, and had more success in noticing changes targeting syntactic rather than morphological errors. The learners' noticing differed even among items sharing the same linguistic domain.

The present study has led to three main findings. First, recasts seem to work better as corrective feedback when they are simple rather than complex. Complex recasts certainly make the most arduous demand on learners' attentional resources, and thereby lead the learners to unsuccessful responses. They appear to have made it hard for the learners in the present study to effectively compare the IL output and the TL input of the targeted form. It would therefore be useful to devise recasts that could adequately control for the learners' focus of attention in the classroom, so as to ensure that their processing capacity is not overloaded. Second, the provision of such adequate recasts is especially important if the learners' output is to help draw their attention to particular grammatical forms. And third, recasts work best when they are used to target physically and semantically salient linguistic forms. This notion is in keeping with the finding that beginning learners benefit most from those recasts that correct the syntactic rather than the morphological errors in their utterances.

The present study also suggests that some sort of attention-getting device needs to be added to recasts to enable learners to perceive the less salient linguistic forms and then incorporate these into their output. This is in line with the findings of researchers (Doughty, 2001; Doughty & Williams, 1998; Long, 1996) indicating that pedagogical intervention may facilitate attentional switch from meaning to those syntactic or morphological aspects of the input that might otherwise lack salience for learners and thus go unnoticed during communication. A more widespread use of the technique adopted by Doughty and Varela (1998), whereby the error is repeated just before the recast provides the corrected form, would very likely promote learner noticing. Also helpful in this regard would be (a) verbal enhancement, as when a phonological emphasis is placed on the non-salient morphological forms reformulated in the recasts, and (b) the concurrent recasting of several forms that share a similar grammatical feature.

Limitations of the Present Study

The results of the present investigation need to be interpreted within the context of its methodological limitations. This was a longitudinal study involving only a small number of learners who were working in the controlled setting of one-on-one, NNS-NNS interactions. Thus, any attempt to extrapolate too broadly from its results would be inadvisable.

The finding that the learners in this study, as contrasted with those in most classroom studies, were more likely to notice linguistic items in the recasts alone may not be used as a counter argument for the general observation that recasts are likely to go unnoticed by students in the classroom. It should also be noted that this study has focused only on the morphological and syntactic domains in recasts, while largely ignoring learner errors in other linguistic domains such as phonology, discourse, pragmatics, and the lexicon. It can be argued that an overt attempt to draw learners' attention to such limited linguistic domains would indeed produce more successful responses to recasts. In addition, since recasts are provided to learners intent on communicating meaning, the recipients of recasts may not perceive a reason to switch their attention to form. Only a failure in communication may require the learners to attend to form. A final limitation of this study is related to the occasional use of stimulated recall which might have primed the participants and, as a result, affected their noticing patterns.

While this study has examined instances of uptake to see whether they indicate the effectiveness of recasts, it is important to recognize that lack of uptake does not necessarily mean lack of noticing. Some researchers have argued that we should not lend too much credence to the idea of immediate incorporation (e.g., Long, 2003, 2007). They point out that the immediate effectiveness of such incorporation is often measured strictly via spoken production after exposure to single tokens of a target form, an approach which does not necessarily signify any change in a learner's underlying grammar. Mackey (1999) and Mackey and Oliver (2002) have also warned that a learner may echo a teacher's model utterance as nothing more than a rote language behavior; in such a case we cannot assume that the learner's immediate incorporation of the feedback is a reliable indicator that he or she has actually learned the relevant structure.

One promising avenue for future researchers to explore would be to further investigate how noticing occurs in recasts, and to try to pin down the role it can play in interlanguage development. Although the present study's findings suggest that recasts generate both the noticing of linguistic items and the production of successful responses during oral interaction, the study has not attempted to determine the relationship between learners' noticing and their ultimate success or failure in language learning. To date, we have certainly seen some conflicting findings on this issue.

It is hoped that future investigations will explore not only how the various linguistic domains may affect noticing and immediate incorporation of particular forms, but also how further processing of a form can be promoted. Such studies, as opposed to the present primarily descriptive one, will probe deeply into the exact nature of the linguistic forms targeted in recasts, and into the relationship between learners' noticing and their ability to then use the targeted linguistic items. We may then be able to assert that learners' successful noticing of the discrepancies between their own utterances and the reformulations provided by recasts does indubitably facilitate their L2 learning.

ACKNOWLEDGMENTS

REFERENCES

Alanen, R. (1995). Input enhancement and rule presentation in second language acquisition. In R. Schmidt (Ed.), *Attention and awareness in foreign language learning* (Tech. Rep. No. 9, pp. 259-302). Honolulu: Second Language Teaching and Curriculum Center, University of Hawaii at Manoa.

Baddeley, A. (1990). *Human memory: Theory and practice.* Mahwah, NJ: Erlbaum.

Carroll, S., & Swain, M. (1993). Explicit and implicit negative feedback: An empirical study of the learning of linguistic generalizations. *Studies in Second Language Acquisition, 15*, 357-386.

Cowan, N. (1988). Evolving conceptions of memory storage, selective attention, and their mutual constraints within the human information processing system. *Psychological Bulletin, 104,* 163-191.

Cowan, N. (1995). *Attention and memory: An integrated framework.* Oxford, UK: Oxford University Press.

Cowan, N. (1999). An embedded-processes model of working memory. In A. Miyake & P. Shah (Eds.), *Models of working memory: Mechanisms of active maintenance and executive control* (pp. 62-101). Cambridge, UK: Cambridge University Press.

Doughty, C. (1994). Fine-tuning of feedback by competent speakers to language learners. In J. Alatis (Ed.). *Georgetown University Roundtable on Languages and Linguistics (GURT) 1993* (pp. 96-108). Washington, DC: Georgetown University Press.

Doughty, C. (2001). Cognitive underpinnings of focus on form. In P. Robinson (Ed.), *Cognitive and second language instruction* (pp. 206-257). Cambridge, UK: Cambridge University Press.

Doughty, C. (2003). Instructed SLA: Constraints, compensation, and enhancement. In C. Doughty & M. Long (Eds.) *Handbook of second language acquisition* (pp.256-310). Oxford, UK: Blackwell.

Doughty, C., & Varela, E. (1998). Communicative focus on form. In C. Doughty & J. Williams (Eds.), *Focus on form in classroom second language acquisition* (pp. 114-138). New York: Cambridge University Press.

Doughty, C., & Williams, J. (1998). Pedagogical choices in focus on form. In C. Doughty & J. Williams (Eds.), *Focus on form in classroom second language acquisition* (pp. 197-261). New York: Cambridge University Press.

Ellis, N. (1994). Implicit and explicit language learning: An overview. In N. Ellis (Ed.), *Implicit and explicit learning of languages* (pp. 1-31). San Diego: Academic Press.

Ellis, R., Basturkmen, H., & Loewen, S. (2001). Learner uptake in communicative ESL lessons. *Language Learning, 51*, 281-318.

Engle, R. W., Kane, M. J., & Tuholski, S. W. (1999). Individual differences in working memory capacity and what they tell us about controlled attention, general fluid intelligence and

functions of the prefrontal cortex. In A. Miyake & P. Shah (Eds.), *Models of working memory: Mechanisms of active maintenance and executive control* (pp. 102-134). New York: Cambridge University Press.

Gass, S. (1991). Grammar instruction, selective attention, and learning processes. In R. Phillipson, E. Kellerman, L. Selinker, M. Sharwood Smith, & M. Swain (Eds.), *Foreign/second language pedagogy research* (pp. 134-141). Clevedon, UK: Multilingual Matters.

Gass, S. (1997). *Input, interaction and the development of second languages.* Hillsdale, NJ: Lawrence Erlbaum.

Gass, S., & Selinker, L. (1994). *Second language acquisition: An introductory course.* Hillsdale, NJ: Lawrence Erlbaum.

Gass, S., Svetics, I., & Lemelin, S. (2003). Differential effects of attention. *Language Learning, 53,* 497-545.

Gass, S., & Varonis, E. M. (1994). Input, interaction, and second language production. *Studies in Second Language Acquisition, 16*, 283-302.

Han, Z-H. (2002). Rethinking the role of corrective feedback in communicative language teaching. *RELC Journal, 33*, 1-34.

Han, Z-H. (2004). *Fossilization in adult second language acquisition.* Clevedon, UK: Multilingual Matters.

Hulstijn, J. (2001). Intentional and incidental second language vocabulary learning: A reappraisal of elaboration, rehearsal and automaticity. In P. Robinson (Ed.), *Cognition and second language instruction* (pp. 258-286)*.* New York: Cambridge University Press.

Izumi, S. (1999). *Promoting noticing and SLA: An empirical study of the effects of output and input enhancement on ESL relativization.* Unpublished doctoral dissertation, Georgetown University, Washington, DC.

Izumi, S. (2002). Output, input enhancement, and the noticing hypothesis: An experimental study on ESL relativization, *Studies in Second Language Acquisition, 24*, 541-577.

Izumi, S., & Bigelow, M. (2000). Does output promote noticing and second language acquisition? *TESOL Quarterly, 34,* 239-278.

Jourdenais, R. (1998). *The effects of textual enhancement on the acquisition of the Spanish preterit and imperfect.* Unpublished doctoral dissertation, Georgetown University, Washington, DC.

Jourdenais, R., Ota, M., Stauffer, S., Boyson, B., & Doughty, C. (1995). Does textual enhancement promote noticing? A think-aloud protocol analysis. In R. Schmidt (Ed.), *Attention and awareness in foreign language learning* (pp. 183-216). Honolulu: Second Language Teaching and Curriculum Center, University of Hawaii at Manoa.

Leeman, J. (2003). Recasts and L2 development: Beyond negative evidence. *Studies in Second Language Acquisition, 25,* 37-63.

Leow, R. (1997). Attention, awareness and foreign language behavior. *Language Learning, 47,* 467-505.

Leow, R. (2000). A study of the role of awareness in foreign language behavior: Aware versus unaware learners. *Studies in Second Language Acquisition, 22,* 557-584.

Leow, R., Egi, T., Nuevo, A., & Tsai, Y. (2003). The roles of textual enhancement and type of linguistic item in adult L2 learners' comprehension and intake. *Applied Language Learning, 13,* 1-16.

Leow, R., & Morgan-Short, K. (2004). To think aloud or not to think aloud: The issue of

reactivity in SLA research methodology. *Studies in Second Language Acquisition, 26,* 35-57.

Long, M. (1996). The role of linguistic environment in second language acquisition. In W. C. Ritchie & B. K. Bahtia (Eds.), *Handbook of second language acquisition* (pp. 413-468*).* New York: Academic Press.

Long, M. (2003). Stabilization and fossilization in interlanguage development. In C. Doughty & M. Long (Eds.) *Handbook of second language acquisition* (pp. 487-536). Oxford, UK: Blackwell.

Long, M. (2007). *Problems in SLA.* Mahwah, NJ: Lawrence Erlbaum.

Long, M., Inagaki, S., & Ortega, L. (1998). The role of implicit negative evidence in SLA: Models and recasts in Japanese and Spanish. *Modern Language Journal, 82*, 357-371.

Long, M., & Robinson, P. (1998). Focus on form. In C. Doughty & J. Williams (Eds.), *Focus on form in classroom second language acquisition* (pp. 15-41). Cambridge, UK: Cambridge University Press.

Loewen, S. (2004). Uptake in incidental focus on form in meaning-focused ESL lessons. *Language Learning, 54,* 153-188.

Lyster, R. (1998). Recasts, repetition, and ambiguity in L2 classroom discourse. *Studies in Second Language Acquisition, 20*, 51-81.

Lyster, R., & Ranta, L. (1997). Corrective feedback and learner uptake. *Studies in Second Language Acquisition, 19*, 37-66.

Mackey, A. (1999). Input, interaction, and second language development: An empirical study of question formation in ESL. *Studies in Second Language Acquisition, 21,* 557-587.

Mackey, A., Gass, S., & McDonough, K. (2000). How do learners perceive interactional feedback? *Studies in Second Language Acquisition, 22,* 471-497.

Mackey, A., & Oliver, R. (2002). Interactional feedback and children's L2 development. *System*, *30*, 459-477.

Mackey, A., & Philp, J. (1998). Conversational interaction and second language development: Recasts, responses, and red herrings? *Modern Language Journal, 82,* 338-356.

McLaughlin, B., & Heredia, R. (1996). Information-processing approaches to second language acquisition and use. In W. C. Ritchie & T. K. Bhatia (Eds.), *Handbook of second language acquisition,* (pp. 213-228). New York: Academic Press.

Oliver, R. (1995). Negative feedback in child NS-NNS conversation. *Studies in Second Language Acquisition, 17,* 459-482.

Philp, J. (1998). *Interaction, noticing, and second language acquisition: An examination of learners' noticing of recasts in task-based interaction.* Unpublished doctoral dissertation, University of Tasmania, Australia.

Philp, J. (2003). Constraints on "noticing the gap": Non-native speakers' noticing of recasts in NS-NNS interaction. *Studies in Second Language Acquisition*, *25,* 99-126.

Robinson, P. (1995). Attention, memory, and the noticing hypothesis. *Language Learning, 45,* 283-331.

Robinson, P. (2003). Attention and memory during SLA. In C. Doughty & M. Long (Eds.) *Handbook of second language acquisition* (pp. 631-678). Oxford, UK: Blackwell.

Rosa, E., & O'Neill, D. (1999). Explicitness, intake, and the issue of awareness: Another piece to the puzzle. *Studies in Second Language Acquisition, 21,* 511-553.

Schmidt, R. (1990). The role of consciousness in second language learning. *Applied Linguistics, 11,* 129-158.

Schmidt, R. (1993). Awareness and second language acquisition. *Annual Review of Applied*

Linguistics, 13, 206-226.

Schmidt, R. (1994). Implicit learning and the cognitive unconscious: Of artificial grammars and SLA. In N. Ellis (Ed.), *Implicit and explicit learning of languages* (pp. 165-209). London: Academic Press.

Schmidt, R. (1995). Consciousness and foreign language learning: A tutorial on the role of attention and awareness in learning. In R. Schmidt (Ed.), *Attention and awareness in foreign language learning* (pp. 1-63). Honolulu: University of Hawai'i, Second Language Teaching and Curriculum Center.

Schmidt, R. (2001). Attention. In P. Robinson (Ed.), *Cognition and second language instruction* (pp. 3-32). New York: Cambridge University Press.

Segalowitz, N. (2003). Automaticity and second language acquisition. In C. Doughty & M. Long (Eds.), *Handbook of second language acquisition* (pp. 382-408). Oxford, UK: Blackwell.

Sharwood Smith, M. (1991). Speaking to many minds: On the relevance of different types of language information for the L2 learner. *Second Language Research, 7,* 118-132.

Sharwood Smith, M. (1993). Input enhancement in instructed SLA: Theoretical bases. *Studies in Second Language Acquisition, 15,* 165-179.

Simard, D., & Wong, W. (2001). Alertness, orientation, and detection: The conceptualization of attentional functions in SLA. *Studies in Second Language Acquisition, 23,* 103-124.

Spada, N., & Lightbown, P. M. (1993). Instruction and the development of questions in L2 classrooms. *Studies in Second Language Acquisition, 15*, 205-224.

Swain, M. (1995). Three functions of output in second language learning. In G. Cook & B. Seidlhofer (Eds.), *Principle and practice in applied linguistics: Studies in honor of H. G. Widdowson* (pp. 125-144). Oxford, UK: Oxford University Press.

Swain, M. (2000). The output hypothesis and beyond: Mediating acquisition through collaborative dialogue. In J. Lantolf (Ed.), *Sociocultural theory and second language learning* (pp. 97-114). Oxford, UK: Oxford University Press.

Tomlin, R., & Villa, V. (1994). Attention in cognitive science and second language acquisition. *Studies in Second Language Acquisition, 16,* 183-203.

VanPatten, B. (1990). Attending to form and content in the input: An experiment in consciousness. *Studies in Second Language Acquisition, 12,* 287-301.

VanPatten, B. (1996). *Input processing and grammar instruction in second language acquisition.* Westport, CT: Ablex.

White, L. (1991). Adverb placement in second language acquisition: Some positive and negative evidence in the classroom. *Second Language Research, 7,* 133-161.

White, J. (1998). Getting the learners' attention: A typographical input enhancement study. In C. Doughty & J. Williams (Eds.), *Focus on form in classroom second language acquisition* (pp. 85-113). New York: Cambridge University Press.

White, L., Spada, N., Lightbown, P. M., & Ranta, L. (1991). Input enhancement and L2 question formation. *Applied Linguistics, 12,* 416-432.