CONSTRAINTS ON "NOTICING THE GAP"

Nonnative Speakers’ Noticing of Recasts in NS-NNS Interaction

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Interaction has been argued to promote noticing of L2 form in a context crucial to learning—when there is a mismatch between the input and the learner’s interlanguage (IL) grammar (Gass & Varonis, 1994; Long, 1996; Pica, 1994). This paper investigates the extent to which learners may notice native speakers’ reformulations of their IL grammar in the context of dyadic interaction. Thirty-three adult ESL learners worked on oral communication tasks in NS-NNS pairs. During each of the five sessions of dyadic task-based interaction, learners received recasts of their nontargetlike question forms. Accurate immediate recall of recasts was taken as evidence of noticing of recasts by learners. Results indicate that learners noticed over 60–70% of recasts. However, accurate recall was constrained by the level of the learner and by the length and number of changes in the recast. The effect of these variables on noticing is discussed in terms of processing biases. It is suggested that attentional resources and processing biases of the learner may modulate the extent to which learners “notice the gap” between their nontargetlike utterances and recasts.

The findings reported in this paper are based on part of my doctoral dissertation completed at the University of Tasmania. Earlier versions were presented at the annual meeting of the American Association of Applied Linguistics in 1999 (Stanford, CA) and at the Second Language Research Forum in 1997 (Michigan State University). I am very grateful to Alison Mackey for her encouragement and astute criticisms on many earlier drafts, to Susan Gass and Noriko Iwashita for their insightful input, and to the anonymous SSLA reviewers for their detailed comments. Remaining errors are my own.

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For language learners, conversations with more competent speakers can be a rich source of exposure to the target language (TL). Some researchers have argued that learners benefit from such input only if they attend to the language forms they hear (Corder, 1967; Gass, 1997; Long, 1996; Schmidt, 1993). In conversation with native speakers, struggles for mutual comprehension typically result in modifications to both the language and the structure of the discourse itself (Hatch, 1978, 1983; Long, 1983, 1985; Long & Sato, 1983; Swain, 1985; Wagner-Gough & Hatch, 1975). These interactional modifications provide learners with implicit feedback on their own IL production (Gass; Long, 1996; Pica, 1994; Swain, 1995). This feedback comes at a time crucial to learning—when there is a mismatch between the input and the learner’s IL grammar (Gass & Varonis, 1994; Long & Robinson, 1998).

In (1) a native speaker (NS) and a nonnative speaker (NNS) carry out a story task together. The NNS apparently has difficulty in framing her question (first line), and her interlocutor’s initial response seems to be incongruent with what she had intended to say (second and third lines). This pushes the learner to try again; this time she is able to produce the key lexical item “guide,” and the NS provides her with a targetlike version, or recast, of her question (fourth line). The recast functions as a confirmation check of her meaning.

(1) NNS: The girl is it what the gui for the for the boy for the boy. [laughs]
    NS: Uh huh she likes him, too.
    NNS: She likes him no ah I mean is (...) the girl is this um ya be be a guide? guide?
    NS: Oh is she a guide?
    NNS: Uh huh.
    NS: Um I don’t know what she does maybe she’s a student.

Researchers have argued that it is the perception and resolution of the mismatch between the learner’s IL utterance and the TL response that may lead to destabilization and IL restructuring (Ellis, 1991; Faerch & Kasper, 1986; Gass, 1991, 1997; Gass & Varonis, 1994; Long, 1996). Recasts, in which the learner’s nontargetlike utterance (e.g., “The girl is this um ya be be a guide?”) is subsequently reformulated by the interlocutor as a TL version (e.g., “Is she a guide?”), exemplify this process: Recasts are congruent with the learner’s own production and juxtapose the incorrect with the correct. If the learner is focused on both form and message, such feedback may present a catalyst for change (Long; Long & Robinson, 1998; Mackey & Philp, 1998; Oliver, 1995; Saxton, 1997). Alternatively, the learner may simply consider a recast to be confirmation of meaning (Chaudron, 1977; Lyster, 1998; Lyster & Ranta, 1997) rather than linguistic correction. In (1) it is unclear whether the learner notices the NS’s reformulation of her own question or simply responds to the reiteration of her meaning (line 5). This paper explores the extent to which learners notice the form of recasts of their nontargetlike utterances.

Following L1 acquisition research, recasts have generally been described as utterances that “rephrase a child’s utterance by changing one or more sen-
Constraints on “Noticing the Gap”

tence components (subject, verb, or object) while still referring to its central meanings” (Long, 1996, p. 434; see also Baker & Nelson, 1984; Farrar, 1990, 1992). Although there is variation, particularly concerning the degree to which the recast might expand the initial utterance (Bohannon, Padgett, Nelson, & Mark, 1996) or add emphasis to the changed elements (Chaudron, 1977; see Nicholas, Lightbown, & Spada, 2001, for an overview of recasts in L1 and L2 acquisition research), this definition has been widely adopted in SLA research (e.g., Lyster, 1998; Mackey & Philp, 1998; Oliver, 1995). Recasts in the present study included all NS utterances immediately following a NNS’s nontargetlike utterance that reformulated part or all of the utterance while maintaining the central meaning (Long, Inagaki, & Ortega, 1998). No explicit emphasis was given to the changed elements in the recast; rather, the recasts were provided as confirmation checks, as seen in (1).

The central research question addressed in this study, in the context of dyadic interaction, is: Do learners notice recasts? Arguably, noticing is fundamental to the potential that feedback can have for the learner. According to Schmidt’s Noticing Hypothesis (Schmidt, 1990, 1993, 1998, 2001), it is only what the learner notices about the input that holds potential for learning because intake—that is, the detection, processing, and storage of input (Gass, 1997; VanPatten, 1990)—is conditional upon noticing. Long (1996), in a reformulation of the Interaction Hypothesis, also points to the importance of noticing (i.e., selective attention): “Negotiation work that triggers interactional adjustments by the NS or more competent interlocutor facilitates acquisition because it connects input, internal learner capacities, particularly selective attention, and output in productive ways” (pp. 451–452, emphasis in original). Evidence that learners notice interactional modifications, such as recasts, would provide support for the connection between input, the learner’s attentional resources, and intake (Carroll, 1999; Corder, 1967), and it may further our understanding of the processes of SLA.3

Currently, there is a paucity of work that directly investigates learners’ noticing of forms as a result of linguistic and conversational modifications in oral interaction.3 In part, this lack of research is due to the difficulty of operationalizing noticing for the context of interaction, which engages both the aural and oral skills of the learner. How can the internal processes of noticing be tapped at the time in which the learner is engaged in interaction? Therefore, one of the challenges for this study was to develop a means of measuring noticing in oral interaction.

NOTICING AND THE MEASUREMENT OF NOTICING

Noticing has been described as the part of the attentional system that involves the detection and consequent registration of stimuli in memory (Posner & Peterson, 1990; Robinson, 1995; Tomlin & Villa, 1994). Noticing of stimuli makes it potentially available for inclusion in long-term memory and for further processing, hence Schmidt’s (1995) claim that noticing is requisite for
learning. Robinson distinguished between noticing and detection on the basis of awareness. More recently, Simard and Wong (2001, p. 119) suggested that we “view alertness, orientation, detection, and awareness as . . . coexisting and interacting in graded levels.” Noticing may then be conceived as detection accompanied by lesser and greater degrees or levels of awareness (see Leow, 2000; Philp, 1998). Further, as Williams (1999) and Robinson suggested, degrees of noticing (and, indeed, of awareness) may relate to the amount and nature of rehearsal in memory that occurs with detection.

Following Robinson (1995), noticing is viewed in the present study as one step beyond detection, being “what is both detected and then further activated following the allocation of attentional resources” (p. 297). Schmidt (1995) argued that L2 learning must entail awareness and particularly that “the noticing hypothesis claims that learning requires awareness at the time of learning” (p. 26, emphasis in original). Typically, in SLA research, noticing has been addressed through measuring awareness. Awareness has been variously described using both online procedures, such as think-alouds (Alanen, 1995; Leow, 1997, 2000; Rosa & O’Neill, 1999) or private speech (Ohta, 2000), and offline procedures, such as a written questionnaire following treatment (Robinson, 1995, 1996a, 1997). The section “Constraints on Noticing” discusses various methods used to tap noticing of form in oral contexts.

To date, noticing of form by learners engaged in oral interaction has been assessed through retrospective methods rather than online methods (Mackey, Gass, & McDonough, 2000; Schmidt & Frota, 1986). Schmidt and Frota’s often quoted diary study, in which Schmidt’s noticing of input at various stages in his development is traced through diary entries, relates to instruction and naturalistic input rather than specifically to negotiated interaction. Their study traced the acquisition of 21 verbal constructions by Schmidt as a beginning learner of Portuguese. The forms he produced were also those that had appeared in diary notes. On this basis, Schmidt and Frota stressed the role of conscious learning, suggesting that input only has an impact on IL production if it is noticed and becomes intake. Diary studies such as Schmidt and Frota’s provide a useful, albeit partial view of L2 learning processes. However, diary entries involve more than noticing and fall short of arriving at actual processes (Tomlin & Villa, 1994).

In a recent study, Mackey et al. (2000) used a variation on think-alouds to tap perception of feedback by L2 learners of English and Italian during oral interaction (see also Gass & Mackey, 2000). They used stimulated recalls in which learners were asked to respond to video replays of their own task-based interaction with NSs. As learners watched the video, it was stopped at particular points in the interaction (i.e., during sequences of interactional modification), and they were asked to recall what they were thinking at the time. Learners’ perceptions (rather than noticing) were operationalized as the learners’ articulations of what they considered to be the focus of the feedback. The researchers noted a much higher proportion of accurate reports about lexical and phonological feedback than of reports about morphological...
or syntactic feedback. The Mackey et al. study, although not online, provides an effective means of examining attention to modifications in the context of oral interaction. Their study, which investigated the extent to which learners perceive feedback as such, is one step beyond noticing. Stimulated recall involves verbal articulation of noticed feedback entailing detection and further processing of input. Clearly, as the authors noted, failure to notice cannot be inferred by a failure to verbalize something (see also Robinson, 1995).

An alternative means of accessing noticing may be immediate recall, a technique that, along with shadowing, has been commonly used within cognitive psychology to access detection and rehearsal in short-term auditory memory. Shadowing describes a task in which the subject simultaneously listens to and repeats the input given; in an immediate recall task, the subject responds to a cue to “replay” what was heard at a particular point in the input (e.g., Darwin, Turvey, & Crowder, 1972; Glucksberg & Cowan, 1970; Moray, Bates, & Barnett, 1965, as cited in Baddeley, 1990). Results from studies on shadowing (Cherry, 1953; Glucksberg & Cowan; Norman, 1969, as cited in Coren, Ward, & Enns, 1994), in which two messages are given (a different message in each ear) but only one repeated by the participant, have implications for the use of recall. Tests revealed that participants could not recall at the end of listening any of the unshadowed message. However, if interrupted during shadowing they could recall at least five to seven units of the message (words, numbers, etc.). This suggests that at some level people do detect filtered, seemingly “unattended” input. This input is available for processing for a short time, but, if not attended to, it is not stored in short-term memory. Schmidt’s (1995) description of noticing essentially captured this in his claim that input that was not attended to was not held in short-term memory and was not available for further processing.

The connection between recall and noticing may best be understood through a brief description of so-called working memory, as formulated by Baddeley and Hitch (1974) and further elaborated by Baddeley and others (Baddeley & Logie, 1999; for review, see Baddeley, 1986). According to their model, verbal input is handled by the “articulatory loop,” a subcomponent of working memory, and is held in “phonological store.” Information recently attended to, while held in working memory, is available for conscious recall. Thus, immediate recall can be a measure of what has been noticed—that is, “detected and then further activated following the allocation of attentional resources” (Robinson, 1995, p. 297). Additionally, as an oral medium, immediate recall could be appropriate for measuring noticing in the context of interaction.

Constraints on Noticing

Having discussed means of measuring noticing in oral interaction, I return to the central question posed by this study of whether learners notice recasts in NS-NNS interaction. Although noticing depends initially on available atten-
tional resources, a myriad of other factors have been suggested to mediate noticing (see Simard & Wong, 2001). These include: the readiness of the learner (Pienemann, 1989, 1999); frequency and saliency in the input (Bardovi-Harlig, 1987; Ellis, 1994; Gass, 1997); L1 influence (Carroll, 1999; Zobl, 1979); prior knowledge (Carroll; Ellis; Gass); familiarity, novelty of the input, or both (Ellis); linguistic content of the input (Mackey et al., 2000); the degree to which the discourse is understood (VanPatten, 1990, 1996); the degree of automaticity involved and the distinctiveness and complexity of the tasks (Robinson, 1995, 1996b; Rosa & O’Neill, 1999); individual differences in working memory capacity and abilities (Mackey, Philp, Fujii, Egi, & Tatsumi, 2002; Robinson, 2001); and the relevance and contiguity the discourse has for the learner (van Lier, 1994). The present study focuses on three independent variables that may affect noticing of recasts: the level of the learner, recast length, and the degree of difference between the recast and the learner’s initial utterance.

**Developmental Level of the Learner.** In an exploration of the connections between the input and the learner’s attentional resources (Long, 1996), the level of the learner may be a key factor modulating noticing for two reasons. First, research suggests that more experienced learners may benefit from the increasing automaticity that comes with repeated practice, which allows attentional resources to be focused on higher order aspects of speech processing (Ellis, 1994; McLaughlin, 1987; VanPatten, 1996). Second, there is the related issue of readiness. Speaking of the effectiveness of recasts on L1 acquisition of morphemes, Farrar (1990) claimed that so-called linguistic readiness is a determining factor. Farrar found recasts to be particularly effective at a certain stage in the child’s development of morphemes but not “prior to the time the children are cognitively ready to extract a morpheme or once they have successfully extracted it” (p. 621). Similarly, there may be a prime time in which recasts are effective in facilitating particular L2 forms, such as question forms in English (Mackey, 1999; Mackey & Philp, 1998). It may be that learners tend not to notice input that is beyond their level of acquisition.

Others have examined this issue of readiness in terms of the learners’ prior knowledge. Saxton (1997) suggested that a child’s use of recasts depends on his or her prior knowledge that two variant forms fulfill identical grammatical functions (e.g., *bought*, *buyed*). It is on the basis of this knowledge that the child can then identify a recast as a contrast between two forms, one of which the adult prefers. Carroll (1999), speaking of input in general, argued that “intake is . . . determined by our grammars . . . [and] . . . we . . . perceive what our linguistic systems enable us to perceive—based on the categories and structures of the grammar” (p. 343). Other SLA researchers have also identified prior knowledge in terms of familiarity with lexical or grammatical items, suggesting that it may affect noticing of particular forms (Gass, 1997; Schmidt & Frota, 1986). Schmidt and Frota, for example, reported that Schmidt, as a learner of Portuguese, did not notice (at the level of articulation of form in a
diary entry) forms that were abundant in the input until they were highlighted through instruction. Perhaps the forms were not noticed at this high level of awareness until the learner was ready (in terms of psycholinguistic processing) or simply because the forms were not sufficiently encoded in long-term memory and were therefore not recognizable to the learner. In summary, readiness, in terms of processing mechanisms, prior knowledge, or both, may modulate noticing.

**Length of Recast.** The length of the recast is another factor that may critically affect noticing, as attentional capacity is limited. Units of information may be held in working memory for about 15–20 seconds, although by rehearsal (i.e., how long it takes to repeat the words) they may be held longer (Cowan, 1988). What remains in working memory is a factor of the rate of rehearsal as well as the rate of decay in the phonological store (Baddeley, 1986; Cowan, 1992, 1993, 1995; Cowan et al., 1992). Thus, longer recasts, which may exceed the limits of temporary phonological store, might be less accurately recalled than shorter recasts.

**Degree of Difference.** A third factor that may limit noticing is the degree of difference between the recast and the learner’s trigger utterance. A number of studies researching the effectiveness of recasts in L1 acquisition have considered whether recasts were more likely to be provided after single or multiple errors (Bohannon & Stanowicz, 1988; Farrar, 1992). SLA research has suggested differences in incorporation of these recasts by learners (Oliver, 1995). If recasts are too different from the learner’s original utterance, they may be unlikely to be imitated, as they are too far removed from this first attempt (Long, 1996). The present study considers whether L2 learners notice recasts involving multiple changes.

**RESEARCH QUESTIONS AND HYPOTHESES**

Do learners notice recasts? Noticing of recasts, the dependent variable, was operationalized as the learner’s cued, correct recall of a recast immediately following production of the recast. On the basis of the research previously outlined, the following questions and hypotheses were formulated:

1. Is the ability to recall a recast constrained by the level of the learner?
   
   **Hypothesis 1:** Accuracy of recall is correlated with the level of the learner such that the higher the level of the learner, the greater the accuracy of recall.

2. Is the ability to recall a recast constrained by the length of the recast?
   
   **Hypothesis 2:** Accuracy of recall will be higher for shorter recasts than longer recasts.

3. Is the ability to recall a recast constrained by the number of changes made by the recast?
   
   **Hypothesis 3:** Accuracy of recall will be higher the fewer the changes made in the recast utterance.
METHOD

Design and Participants

Following a preliminary placement session, each learner was involved in five NS-NNS dyadic interaction sessions over 2 weeks (100 minutes). Participants were 33 adult ESL students, enrolled in 6–8-week intensive English courses at an Australian university. There were 18 female and 15 male students who were of different ESL proficiencies, had various L1 backgrounds (Japanese, Korean, Thai, Cantonese, Russian, and Indonesian), and were between 17 and 30 years of age. Participation in the project was voluntary. Three NSs, including the researcher, acted as partners in NS-NNS dyads; there were two females and one male between 25 and 35 years of age. Participants were randomly assigned to NSs and rotated so that all participants were paired with all NSs over the five sessions.

Targeted Form

The order of acquisition for ESL question formation had been identified through previous research (Cancino, Rosansky, & Schumann, 1978; Johnston, 1985; Lightbown, 1980; Meisel, Clahsen, & Pienemann, 1981; Pienemann, 1984, 1989; Pienemann & Johnston, 1987; Pienemann, Johnston, & Brindley, 1988; Pienemann & Mackey, 1993; Spada & Lightbown, 1993, 1999). Thus, learners’ production of questions was considered to be a reliable indicator of their levels of development in terms of question forms and was chosen as the targeted structure of recasts. In SLA, the work of Pienemann and others has demonstrated that question forms in English are acquired in a fixed order regardless of instruction. I verified that, during the period of data collection, question forms were not a focus of instruction in the learners’ ESL classes.

Group Assignment

For coding purposes, following data transcription participants were assigned to one of three groups—Low, Intermediate, or High—according to their performance in a preliminary placement session and in the first treatment session. This group assignment was based on learners’ production of particular question forms that were the structures targeted in the study. The size of each group was constrained by the number of students studying at the language center. Learners fell within four of the six stages of development presented by Pienemann and colleagues (Pienemann & Johnston, 1987; Pienemann et al., 1988), as shown in Table 1. The distinction between groups was made according to learners’ readiness to acquire stage 4 and stage 5 question forms. Previous use of the treatment materials had established that these forms were most elicited by the tasks and therefore most likely to elicit recasts. The Low group was composed of seven learners (four at stage 3 and
Table 1. Summary of stages reached by participants in pretest performance

<table>
<thead>
<tr>
<th>Group</th>
<th>Stage</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>2</td>
<td>Canonical word order with rising intonation</td>
<td>You have girl?</td>
</tr>
<tr>
<td>Low</td>
<td>3</td>
<td>Yes-no questions in which an auxiliary (e.g., do or wh-word) fronts canonical word order</td>
<td>Do you have red alien? How old is he?</td>
</tr>
<tr>
<td>Intermediate</td>
<td>4</td>
<td>Yes-no questions in which subject and main verb or auxiliary are inverted or the wh-word fronts the verb</td>
<td>Is he angry? Where is the girl?</td>
</tr>
<tr>
<td>High</td>
<td>5</td>
<td>Auxiliary (e.g., do or have) in second position after wh-word and preceding the main verb</td>
<td>What does he do? What is your alien holding?</td>
</tr>
</tbody>
</table>


three at stage 2) who did not show any evidence of being able to produce stage 4 or stage 5 forms. The Intermediate group comprised 11 learners, all of whom could produce stage 4 question forms. Many in this group also showed emergence of IL stage 5 question forms, although not in sufficient numbers to consider that they had acquired stage 5 forms. Typically, any production of stage 5 forms was very limited and generally could be described as productive use of a formula pattern (Ellis, 1984; Weinart, 1995; Wong-Fillmore, 1976), such as What is he doing? What is he looking? In terms of readiness, it appears that this group was at an optimum stage for acquiring stage 5 forms. Learners in the High group were clearly able to produce both stage 4 and stage 5 forms. Typically, these learners produced both IL and TL question forms at stages 4 and 5.

Learners were assessed as being at a certain level if they made at least two productive uses of question types of a particular stage in at least two different contexts (Mackey, 1999; Mackey & Philp, 1998; see also Lightbown & Spada, 1997; Pienemann & Johnston, 1987; Pienemann et al., 1988; Silver, 2000; Spada & Lightbown, 1993, 1999). For example, a learner would be assessed as being at stage 4 if he or she were able to generate in different contexts various forms of the same stage 4 question type, such as Is it book? Are they yellow?, and did not simply repeat a formula, such as Is it book? Is it yellow? Is it big house on left? Assessment was based on consistent performance over two sessions: the pretest and the first treatment session.

Materials

Sets of pictures were used to elicit questions from the participants in both treatment and test sessions. Two tasks were used in treatment sessions. The picture-drawing task required the NNS to ask questions to discover the con-
tents of a hidden picture held by her NS partner. The NNS had to ask questions about the picture and draw a picture to resemble as closely as possible the objects and their position in the hidden picture. In the story-completion task, the NNS was presented with a pictorial story. Six pictures were shown in sequence, one by one. As each picture was shown, the NNS was instructed to ask any questions to discover the story behind the pictures. Two tasks were used in the test sessions: a story-completion task in the treatment sessions, and a spot-the-difference task in which the NNS asked questions to find the differences between one picture and an almost identical one held by the NS partner.

Procedure

The protocol for treatment sessions was developed through piloting of the test instruments and use of recall 2 months prior to data collection. NS interlocutors were trained to a high level of consistency in task protocols by reading instructions and sample transcripts and by participating in and observing role plays. In each of the five 20-minute sessions, NNSs were paired with a NS and together performed three tasks: a warm-up task, a story-completion task, and a picture-drawing task. The warm-up training task involved the serial recall of numbers. Participants listened as their NS partner read a string of 12 random numbers. The reading was interrupted at places by the sound of two knocks, after which participants were required to attempt to recall the last two numbers they had just heard. No feedback was given as to whether recall was correct or incorrect. This warm-up task was used to train participants to recall the NS’s previous utterance in response to a knocking sound that was made by the NS who knocked twice on the table. All participants were able to complete this simple task without difficulty.

While working on picture tasks, the NNS asked the NS questions. The NS provided recasts in response to any nontargetlike utterance, particularly question forms. Following the recast, the NNS’s response was interrupted by the sound of two knocks on the table. The sound was a cue to the NNS to repeat the last thing he or she heard prior to that sound—namely, the recast, as illustrated in (2).

(2) NNS: Why he is very unhappy?
   NS: Why is he very unhappy? [2 knocks]
   NNS: Yeah why is very unhappy?

The five sessions were audio-recorded and took place over a 2-week period during and following classes, depending on the schedule of the participants.

One week prior to the treatment sessions, a similar placement session was administered for the purpose of group assignment. This session consisted of 20 minutes of NS-NNS, task-based interaction (without recasts) using a story-completion task and a spot-the-difference task. Data from this session and the
first treatment session were used to assess the developmental level of the learner.

**The Use of Recall as an Instrument for Measuring Noticing.** In the present study, it was important to preserve the flow of normal conversation, yet in some way access learners’ short-term auditory storage of recasts at the time the learner heard them. Cued immediate recall was used as a measure of a particular level of noticing (Leow, 1997, 2000; Rosa & O’Neill, 1999). Undoubtedly, learners may notice input yet be unable to recall it. For example, they may notice that something in the recast was different from their own utterance but be unable to perceive what it was that was different, or they may at least be able to report what they perceive. Mackey et al. (2000) demonstrated that certain input (e.g., morphological information) is less susceptible to verbal report of noticing than other types (e.g., phonological information). Alternatively, learners may notice the difference yet be unable to reproduce it because of the limitations of working memory. Thus, accurate recall is a very conservative measure, unlikely to capture all that is noticed. However, if recasts are recalled, it is evident that noticing at some level has taken place: Input has been detected and further processed in working memory to the extent that it is available for recall. Obviously, the task conditions, consistently providing recasts of question forms, and alerting learners to their interlocutor’s speech through the use of the recall signal made learners more alert to the details of that speech than they may have been ordinarily. Nevertheless, only what was already detected and entered in working memory was available for immediate recall.

**Coding Scheme**

Data were transcribed and coded according to the degree of accuracy with which learners recalled the recasts as well as the length of the recast and the number of corrections made by the recast. Accuracy of recall was categorized as “correct,” “modified,” or “no recall.” Correct recall was applied to repetition of the recast utterance. Modified recall described those instances in which the learner’s recall of the recast was inaccurate but represented a modification of the original trigger utterance; see (2) for an example. Both the repetition of the trigger utterance without change and failure to respond to the sound cue were categorized as no recall.

The degree of difference between the learner’s initial utterance and the recast was coded for the number of changes to the initial utterance: one, two, or more changes. The changes examined were only those errors directly related to question forms, the focus of the study. Thus, in (2), inversion counts as one change. Recasting “What are you doing?” as “What is he doing?” involves two changes—one to the subject and one to the auxiliary. A complete rephrasal such as “What is he carrying?” for “Does he the hand what?” involves more than two changes.
Table 2. Recasts provided to each group

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>N</th>
<th>M</th>
<th>Stage 3</th>
<th>Stage 4</th>
<th>Stage 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>15</td>
<td>659</td>
<td>43.93</td>
<td>7 (44)</td>
<td>65 (415)</td>
<td>28 (179)</td>
</tr>
<tr>
<td>Intermediate</td>
<td>11</td>
<td>531</td>
<td>48.93</td>
<td>8 (42)</td>
<td>62 (316)</td>
<td>30 (155)</td>
</tr>
<tr>
<td>Low</td>
<td>7</td>
<td>379</td>
<td>54.14</td>
<td>6 (15)</td>
<td>63 (237)</td>
<td>33 (122)</td>
</tr>
</tbody>
</table>

Note. N = total number of recasts provided to the group. M = mean number of recasts for each individual in the group. The percentage of type of question form presented in recasts was calculated as the number of recasts of that stage question form divided by the total number of recasts for that group. Numbers in parentheses are total raw scores.

Table 3. Length of recasts and changes to learners’ utterances in recasts: Percentages by group

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Short</th>
<th>Long</th>
<th>1 change</th>
<th>2 changes</th>
<th>≥3 changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>15</td>
<td>38</td>
<td>62</td>
<td>39</td>
<td>30</td>
<td>31</td>
</tr>
<tr>
<td>Intermediate</td>
<td>11</td>
<td>52</td>
<td>48</td>
<td>37</td>
<td>31</td>
<td>32</td>
</tr>
<tr>
<td>Low</td>
<td>7</td>
<td>67</td>
<td>33</td>
<td>30</td>
<td>30</td>
<td>40</td>
</tr>
</tbody>
</table>

Recasts were coded as long or short on the basis of morpheme count. Longer and shorter utterances were compared; longer utterances were those of more than five morphemes. This distinction was based on the pilot testing of the cued immediate recalls.

RESULTS

One-way analysis of variance (ANOVA) with a priori paired comparisons (contrasts) and t-tests were carried out to test the hypotheses. ANOVA was used to determine differences between groups, whereas t-tests for paired samples were used to compare accuracy of recall with each variable for each individual group. An alpha level of .05 was used for all statistical tests.

The provision of recasts depended entirely on the production of nontargetlike forms by each learner. Generally, as illustrated in Table 2, each learner received 44–55 recasts of question forms over five sessions, with those in the Low group generally receiving higher numbers of recasts. Of these recasts, all groups received over 60% of recasts of stage 4 questions.

As shown in Table 3, the High group was presented more frequently with long recasts (62%), whereas the Low group received more short recasts (67%). Similar numbers of recasts with one, two, or three or more changes to
the learner’s trigger utterance were received by all groups, although the Low group received slightly more of the latter. A comparison between groups is shown in Figure 1.

**Noticing and the Level of the Learner**

To test hypothesis I, which predicted that recall of recasts would be more accurate the higher the level of the learner, the High, Intermediate, and Low groups were compared. The results of a one-way ANOVA, provided in Table 4, show a significant effect for learner level on recall of recasts. With an alpha level of .05, the effect of learner level on recall of recasts was statistically significant, $F(2, 30) = 4.1695$, $p < .05$. A priori contrasts, tested by the $t$ statistic, were computed to establish the source of difference between groups. A significant difference was found between the High and Intermediate groups on the one hand and the Low group on the other ($p < .05$). The High and Intermediate groups were not significantly different in performance on recall ($p = .814$). The ANOVA results were confirmed by $t$-test comparisons between High and Low learners, $t(14.18) = 2.76$, $p < .05$, and $\eta^2 = .35$, and between Intermediate and Low learners, $t(11.81) = 2.71$, $p < .05$, and $\eta^2 = .38$. The strength of association
Table 5. Correct recall by groups

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>M%</th>
<th>SD</th>
<th>SE of M</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>15</td>
<td>74.179</td>
<td>12.059</td>
<td>3.114</td>
</tr>
<tr>
<td>Intermediate</td>
<td>11</td>
<td>73.203</td>
<td>8.896</td>
<td>2.682</td>
</tr>
<tr>
<td>Low</td>
<td>7</td>
<td>60.675</td>
<td>9.957</td>
<td>3.764</td>
</tr>
</tbody>
</table>

Figure 2. Accuracy of recall for each group.

between the level of the learner and accuracy of recall was moderately high, at 35–38%, which suggests that level is one important factor but other variables also play a part in noticing. As shown in Table 5, High and Intermediate learners recalled over 70% of recasts accurately, whereas the Low learners accurately recalled 60% of recasts. A comparison by group according to recall is shown in Figure 2. The Low group modified more recasts in recall than the higher level groups (27% compared to an average of 19%). Fewer than 11% of recasts were not recalled at all. Notably, immediate recall involved some change to the trigger utterance in 88% of cases for the Low group and over 92–93% for the higher level groups.

In summary, the High and Intermediate groups were significantly more accurate on recall of recasts than the Low group. This is an indication that the higher level learners noticed recasts more consistently than the Low group.

Noticing and the Length of the Recast

The length of the recast utterance was investigated as a constraint on accurate recall, irrespective of the level of the learner, and hypothesis 2 was supported. The results of a t-test for paired samples performed on data from all groups found that recasts of five or fewer morphemes were recalled with greater accuracy than recasts of six or more morphemes, \( t(32) = 5.47, p < .05, \)
and $\eta^2 = .48$. The eta squared result reveals that almost 50% of the variability in this sample can be accounted for by the length of the recast. Differences are reflected in Figure 3. For the High and Intermediate groups, the percentage of correct recall was as much as 15% higher for short recasts than for long recasts, with over 80% accuracy on recall of short recasts. Similarly, the Low group performed far better on shorter recasts than on longer recasts, recalling the latter with only 50% accuracy on average. Thus, length of recast had a significant effect on accuracy of recall, which suggests that short recasts were more consistently noticed by learners. This result held irrespective of the learner’s level.

**Noticing and the Number of Changes in the Recast**

Finally, the difference between the learner’s nontargetlike utterance and the recast offered in response was another potential constraint on noticing. The results of a paired sample $t$-test indicated that all groups performed better the fewer the changes to the trigger utterance, $t(32) = 5.74$, $p < .05$, and $\eta^2 = .51$. The eta squared result reveals a strong association between noticing and the number of changes to the trigger utterance. For the High and Intermediate groups, there was a significant difference in accuracy of recall for recasts with only one change compared to recasts with two changes. However, the strength of association between these variables is low, $t(25) = 2.07$, $p < .05$, and $\eta^2 = .15$. This was also true of recasts with two changes compared to recasts with three changes, $t(25) = 3.71$, $p < .05$, and $\eta^2 = .36$. Figure 4 shows the relative performance of the three groups according to the number of changes in the recast. The High and Intermediate groups showed at least 20% greater accuracy on recasts containing only one change compared to recasts with three or more changes. The Low group’s accuracy was 14% greater for recasts with one or two changes compared to recasts with three or more changes.

In summary, all groups recalled recasts with three or more changes with
significantly less accuracy than they recalled recasts with fewer changes. This result held irrespective of level, and it is an indication that the more different the recast is from the original utterance, the less likely the learner is to notice all features of the recast with accuracy.

DISCUSSION

In general, the results support the claim that learners notice a considerable amount of implicit feedback provided through interaction in a primed context. However, recast length, the number of changes made in the recast, and the readiness of the learner are all factors that appear to constrain the noticing of feedback provided through recasts in the context of interaction.

The Level of the Learner

Bias. Learner biases may account for the relationship between the IL level of the learner and noticing. Both L1 and L2 acquisition researchers have argued that learners are biased to some degree to the input they hear by their current IL knowledge (Carroll, 1999; Gass, 1997; Harley, 1994; Newport, Gleitman, & Gleitman, 1977; VanPatten, 1996; White, 1987). This bias modulates the learner’s apperception of the recast and, ultimately, what becomes intake for the learner. As White (p. 97) noted, “the learner’s current grammar . . . acts as a filter on the input. . . . That is, the learner rejects input which cannot be interpreted in terms of his or her current knowledge, or modifies it so that it can be dealt with [emphasis added].”

This is illustrated in (3), in which the Low learner reinterprets two consecutive recasts according to her own IL grammar. In each case, consistent with her own IL production, she uses a stage 3 rather than a stage 5 question form in recall.

Figure 4. Accuracy of recall according to number of changes in recast.
(3) a. NNS: Does does he uh the hand uh on the hand ah what what.
   NS: What is he carrying?
   NNS: Yeah what he is carry?
   b. NNS: What are you doing what are you doing the pic uh the boys in the picture?
   NS: What is he doing?
   NNS: Yeah what he’s doing?

The learner’s struggle to express her question is resolved by the NS’s recast (second line). The learner modifies this recast in her recall, maintaining the lexical item “carry” but modifying the syntax and morphology (third line). She uses a stage 3 form in which the question word is placed before canonical word order. This pattern is repeated in (3b). This time the NNS initially uses a formulaic question, “What are you doing?” (first line). In response to the recast she reformulates the stage 5 question as a stage 3 form, again using a question word to front canonical word order, ignoring the use of inversion in the NS’s recast (last line). This inversion, required in stage 5 question forms, is not consistent with the learner’s current IL grammar. Arguably, the learner may have noticed that her IL form was different from the recast, but her apperception of the recast was partial; she received an incomplete picture of the input given. Thus, it may be that the learner is biased by her own IL grammar and potential immediate developments beyond it. An alternative argument is that apperception was accurate, but retrieval was problematic. It appears that where the recast is sufficiently long for the learner to have to reconstruct it to some degree—that is, where the whole recast utterance cannot accurately be represented in working memory—recall may be affected by reliance on long-term memory and the learner’s own IL system.

Clearly, the level of the learner is not the sole determining factor in terms of what is noticed. Even learners in the Low group were able to retain very short recasts in working memory and recall them accurately, such as the stage 4 form Where is she? Perhaps such short chunks, although beyond the level of the learner, form the basis for future development. The possibility that long-term rather than short-term effects are one outcome of interactional feedback has been suggested by other researchers (Brock, Crookes, Day, & Long, 1986; Lightbown, 1998; Mackey, 1999; Mackey & Philp, 1998). This is in keeping with the claim that pattern extraction is a key mechanism in language acquisition and that learners slowly accumulate frequent sequences in the input (Ellis, 1996, 2002).

**Familiarity.** Familiarity with form in the input may also account for the disparity between groups in accuracy of recall, particularly with longer recasts when attentional resources are taxed. Compare, for example, the responses of these two learners to recasts of their nontargetlike utterances:

(4) Intermediate learner
   NS: He’s selling the house.
   NNS: Why he is sell the house?
In (4), the Intermediate learner constructed a question using the language provided by the NS in the preceding utterance and omitted the morpheme previously provided with the verb (second line). In the recast, a stage 5 form was provided; the auxiliary and subject were inverted, and the morpheme was repeated in the verb (third line). Following the recast, it was the morphological change that the NNS apparently noticed; perhaps now hearing it for the second time, she did not pick up the syntactic changes made (fourth line). Her recall was marked by pauses and hesitation, she appeared to have difficulty repeating the recast from working memory, and she did not manage to recall it accurately. Stage 5 forms were not part of this learner’s IL grammar, and her unfamiliarity with the form may have affected recall. In (5), the High learner recalled with accuracy a rather lengthy recast in which there were two changes: the insertion of the auxiliary “do” and the deletion of the particle “to” after “sell” (third line). This was perhaps a performance error on her part. Both directly before and after this recast episode this learner produced the auxiliary in stage 5 question forms in a targetlike way, as shown in (6). Arguably, familiarity with the form allowed her to focus on other corrections in the utterance of which she may have been unsure initially. She recalled the previous recast accurately.

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activated makes a big difference in working memory tasks” (p. 166). The same mechanisms concerning phonotactic and lexical familiarity may hold for morphosyntactic forms (see Ellis, 1996).24

In summary, both the learner’s processing biases and familiarity with the target structure may modulate noticing of recasts. In terms of acquisition of question forms, recasts may be of more or less potential benefit to the learner according to how well the recast matches the learner’s readiness to acquire the form (see Mackey & Philip, 1998; Spada, 1997). Recognition of units within a recast may have contributed to increased accuracy according to the level of the learner. The higher level learner may have had the advantage of prior familiarity with the input. As working memory is limited in capacity, learners who have a larger store of L2 data and greater automaticity in comprehension and production may have an advantage.

The Length of the Recast

The fact that all learners, irrespective of level, found shorter recasts easier to recall suggests that recast length is a factor related to the limitations of working memory rather than one linked to developmental level. Working memory appears to offer a brief window of time in which data may be retained through rehearsal (Baddeley, 1986; Cowan, 1988, 1993, 1995; Ellis, 1996), and the results concerning length of recast reflect that phenomenon.

The finding that the length of the recast affects accuracy of recall is relevant to the claim that learners make comparisons between L2 input and the IL (Gass, 1991, 1997; Gass & Varonis, 1994). To do this, learners should first notice the differences and process them sufficiently for long-term memory storage. Previous research on the learning of new words (Baddeley, Papagno, & Valler, 1988; Cowan, 1995) and on morphosyntactic development (Ellis, 1996; see Ellis & Sinclair, 1996, for review) has suggested that short-term phonological store, through processes of rehearsal, allows input to remain in working memory potentially long enough for subsequent comparison and consolidation. Cowan (1988, p. 66) suggested that because auditory memory can retain input for a limited time this input is available for comparison of utterances just as it is for problem-solving tasks. Further, Ellis claimed that morphosyntactic and other aspects of language are acquired through implicit analysis of memorized sequences from L2 input. He asserted that “the repetition of sequences in working memory results in consolidation of long-term representations of this sequence information” (p. 113). This reflects the importance of auditory memory in language development.

These findings suggest that shorter recasts may be of more benefit to learners because they can be accurately retained in working memory and thus made available for comparison and further processing: Lengthy recasts (over five morphemes) may overload time limitations of phonological store and are difficult to retain in working memory in precisely the form given. Having said
this, length of the recast is just one of many factors affecting retention in working memory.

**The Number of Changes Made by the Recast**

In a similar way, recasts that are closer to the trigger utterance and that change the utterance in few ways linguistically may be of more benefit to learners, as they were recalled with greater accuracy in this study. These results support the claims of researchers such as Gass (1991) and Boulouffe (1986), who noted that if the mismatch between the TL utterance and the learner’s utterance is too great, it will not be perceptible to the learner; cognitive comparison (Ellis, 1994) by the learner will be unlikely.

Previous research on the incidence of recasts in L1 and L2 acquisition has suggested that recasts are less likely to be provided when there are more errors (Bohannon & Stanowicz, 1988; Doughty, 1994a; Farrar, 1992; Oliver, 1995). The findings of the present study suggest that such recasts are also less likely to be noticed by learners. Again, factors related to working memory, such as length of recast, are likely to interact with the number of changes in the recast.

**Limitations and Future Research**

**Generalizability of Findings.** It is emphasized that this has been a report of an essentially exploratory study. The majority of learners were educated to at least postsecondary level, most were socioeconomically advantaged, and, in general, they were motivated to study the L2. They were young adults, enrolled in intensive, short ESL courses in the context of an English-speaking country. For many, their course was preparatory to university studies either in home countries or in Australia. The learners were eager to practice their English with NSs. Different populations involving larger samples from both foreign and second language settings and with less educated learners would allow for factors such as L1 and instructional context to be controlled and for findings to be generalized.

This study involved one-on-one NS-NNS interaction in a controlled setting, which is clearly different from many other contexts, including the L2 classroom. Differences in context, description of feedback, and analysis reveal different results with regard to recasts (Nicholas et al., 2001). Lyster (1998) argued (in the context of the French immersion primary-grade classroom) that recasts provided by the teacher, although frequent, are unlikely to be noticed by the learner as corrective feedback. However, examining a different type of feedback (using more explicit, narrowly focused corrective recasts in a content-based ESL science class), Doughty and Varela (1998) found contrary results. Ohta (2000), evaluating responses to recasts through noting the private speech of L2 Japanese university students, similarly suggested that learners did notice recasts. These differences point to the need for more classroom-
based research that focuses on various types of feedback and that includes noticing.\textsuperscript{25} Additionally, given that NNS-NNS groups are more common in the language classroom, a replication of the study with NNS-NNS dyads or groups would be of interest, particularly in light of earlier work (Gass & Varonis, 1989; Porter, 1986) on the (non)incorporation of NNS corrections.

As debate over implicit versus explicit feedback continues (Norris & Ortega, 2000; Spada, 1997), an extension of the current research would also be to compare learners’ noticing of recasts with noticing of NS input or other types of NS feedback. Finally, the analysis was confined to learners’ noticing of morphosyntactic changes to question forms. Obviously, this represents a small part of all the linguistic features presented to learners in recasts. Future research might explore learners’ noticing of phonological, lexical, and pragmatic elements as well as other morphological and syntactic forms.

**Learner Production and Noticing.** Another avenue for research lies in the connection between output and noticing. Within the context of the classroom a number of researchers have suggested that recasts are less effective as a form of corrective feedback to the learner because they do not lead to self-repair and thus do not push learners in their output (Allwright & Bailey, 1991; Calvé, 1992; Chaudron, 1988; Lyster, 1998; Pica, 1988; Pica et al., 1989; van Lier, 1988). However, it remains unclear whether the internal processes of noticing, comparison, and integration occur following recasts, regardless of whether pushed output is an outcome (Mackey & Philp, 1998). Other researchers have debated the relationship between feedback and immediate output and its effect on IL change (Gass, 1989; Gass & Varonis, 1994; Schachter, 1983). An important theoretical question is: Does production per se make learners more attentive to the feedback they receive? (See also, on the issue of learners’ active participation in negotiated interaction, Ellis, Tanaka, & Yamazaki, 1994; Mackey, 1999; Pica, 1992; Swain, 1995; Swain & Lapkin, 1995.)

**CONCLUSION**

The results demonstrate that these adult ESL learners for the most part noticed the changes made to their nontargetlike utterances through recasts. Learners whose level of acquisition of question forms matched those provided in recasts accurately recalled at least 70\% of recasts and modified the trigger utterance in over 90\% of cases. This finding suggests that recasts of question forms may be effectively used by learners when developmental level and feedback correspond.

However, learners did not always notice recasts, and they did not always notice every detail. In part, difficulties in recall may reflect the limitations of working memory. Unfamiliar input, multiple corrections, complex changes, and long utterances all pose high demands on learners’ attentional resources. Recasts may be less accessible to low-level learners in particular, who, while struggling with the unfamiliarity of the input, may find the disparity between
the recast and their own attempts too great to deal with. Recasts may often present forms far beyond learners’ IL grammar. The learner’s own processing biases may limit noticing—that is, biases to comprehend the message over analyzing form and biases to perceive form in terms of the IL grammar. In terms of understanding processes of SLA, these findings support the claim for an interface between interaction, noticing, and SLA (Long, 1996). However, the relationship between interactional modifications, noticing, and intake is highly complex, balancing the learners’ IL knowledge and attentional resources against linguistic forms in the input. Future research on the role of noticing in L2 development through interaction needs to take this balance into account.

(Received 7 May 2002)

NOTES

1. All data is from Philp (1998).
2. This study focuses on recasts as one type of implicit corrective feedback to learners occurring in interaction. Recasts may function, though not exclusively, as negotiation for meaning (Long & Robinson, 1998). Although reducing the possibility of “pushed” output (Calvé, 1992; Pica, Holliday, Lewis, & Morgenthaler, 1989; Swain, 1995), recasts have been argued to be an important source of feedback to L2 learners (Long & Robinson, 1998; Mackey & Philp, 1998; Ohta, 2000) and appear to be more prevalent in the classroom than other types of feedback (Doughty, 1994b; Lyster & Ranta, 1997).
3. Many of the recent studies in SLA that have investigated learners’ noticing of form tended to use reading and written tasks or focus on instruction (input enhancement); for example: Alanen (1995), Doughty and Varela (1998), Fotos (1993), Jourdenais, Ota, Staufer, Boyson, and Doughty (1995), Leow (1997, 1998), Robinson (1996a), Rosa and O’Neill (1999), Slimani (1989), Swain and Lapkin (1995), VanPatten (1990), and VanPatten and Cadierno (1993). Spada (1997), in a review of research on form-focused instruction, described it as drawing “the learners’ attention to form either explicitly or implicitly” (p. 73). Typically, research in this area assumes rather than tests noticing and looks at outcomes rather than internal processes (Truscott, 1998). Observation of learner uptake, for example, assumes noticing of interactional modifications and focuses on use, rather than seeking to directly measure noticing per se as a first step (e.g., Ellis, Basturkmen, & Loewen, 2001; Lyster & Ranta, 1997).
4. Both Robinson (1995) and Schmidt (1994) clearly wished to distinguish between detection leading to registration in short-term memory and detection as evidenced by transient, subliminal exposure effects, such as those measured in priming experiments (Tomlin & Villa, 1994). This distinction is also made here as the issue of unconscious learning (e.g., Robinson, 1997) is beyond the goals of this study.
5. I am thankful to an anonymous SSLLA reviewer for this observation.
6. The idea that prior knowledge primes the learner to apperceive specific elements in the input (Gass, 1997) is upheld in general learning theory (Ausubel, Novak, & Hanesian, 1978; Bruner, 1961, as cited in Driscoll, 1994). Ausubel (1968), for example, claimed that we perceive and interpret verbal messages in light of existing knowledge and that “the most important single factor influencing learning is what the learner already knows” (p. vi). Bruner (1961, 1973, as cited in Driscoll, 1994) suggested that feedback be provided in a mode that is both meaningful (i.e., related to what the learner already knows) and within the information processing capacity of the learner.
7. Level here refers to development, not proficiency, as determined by learners’ production of question forms (see Mackey, 1999).
8. This study represents part of a larger study that examined learners’ noticing and use of recasts (Philp, 1998). The complete study, including three posttest sessions, took place over 6 weeks and was based on a design developed by Mackey (1999); see also Mackey and Philp (1998).
9. Records of weekly lesson plans were made available to the researcher.
10. This study focused on IL production of question forms. Therefore, group assignment was not made according to proficiency level. However, it is noted that groupings roughly corresponded to class groupings in the school, which were based on in-house proficiency measures: Six of the seven...
the Low learners had not yet built up this resource of sets of sequences in long-term memory. Both L1 and L2 is acquired through implicit analysis of memorized sequences of language. Arguably, L1 is acquired through explicit analysis of sequences of language. The figure in the input, a step argued by most to be requisite to acquisition (Gass, 1991, 1997; Schmidt, 1989, 1999). In this framework, acquisition is constrained by the prior acquisition of certain forms. Here it is suggested that readiness to acquire a structure affects the learner's noticing of that structure. This is supported by the fact that the difference in performance between the higher level groups and the Low group provides support for the notion of “readiness” and the sequential acquisition of question forms in ESL (Pienemann, 1984, 1998; Pienemann & Mackey, 1993).

Although NS partners were instructed to recast any nontargetlike utterance (so as to minimize the likelihood of learners recognizing question forms as the focus of the research), in practice, recasts of other forms were disparate and few. NS partners provided 9–12 recasts on average for nontargetlike question forms compared to 0–2 recasts of other forms per session. For the importance of using a sound cue rather than a verbal cue, see Baddeley (1990).

Clearly, any intrusion interrupts the natural flow of conversation to some extent. The transcripts, however, indicate that the use of recall posed minimal interference insofar as learners remained on task. Note that with regard to NS feedback this study focuses only on noticing of recasts.

All sessions were transcribed by the researcher. To ensure accuracy, approximately 10 hours of data were also transcribed by two research assistants. The researcher coded all transcripts and recoded approximately 15% of all data at least 6 months after the initial coding. The intrarater reliability on coding of accuracy of recall, based on percentage agreement of 135 recasts from 10 random transcripts from learners of all levels, was 99.92%. One-third of the treatment transcripts were double-coded by six assistants. The interrater reliability between three coders on coding of accuracy of recall in treatment sessions was based on 50 recasts from four random transcripts from learners of all levels, and it was 91%. Intrarater reliability on coding of changes to the trigger utterance, based on percentage agreement of 100 recasts from eight random transcripts, was 89%.

Thus, unrelated errors not pertinent to the question form, such as phonological change or the addition of an article in a recast, were not considered in the analysis. Given the work of Baddeley (1986), Cowan (1995), and others, in which the word-length effect on recall appears to be a function of rate of rehearsal, the length of time taken to articulate the recast may have been a more accurate measure rather than a morpheme or syllable count. However, the relationship between speech rate and memory span is still a contentious and complex issue (for discussion, see Cowan, 1993) involving not only duration of words but also pauses between words. Although important, this issue is beyond the means or goals of this paper.

During piloting of cued immediate recall by six learners of different levels, learners demonstrated less accuracy in reproducing recasts of questions longer than five morphemes. Stage 5 question forms, such as What is he doing?, were accurately recalled more consistently by learners than longer versions, such as What is she going to do? or What is that angry man saying?

Differences between groups on the provision of recasts were not considered problematic because, for each research question, group performance was treated separately in the analyses. Where comparisons were made, averages were given. Although it is possible that the question used by the learner is not formulaic, this is very unlikely here, as this learner’s production is consistent with stage 3 utterances and no other examples of stage 5 question forms are found in the data. Additionally, “What are you doing?” is a commonly found formulaic question form in these learners’ production (see Lightbown, 1998, for discussion of analysis of unanalyzed chunks). Assessment of the learner’s IL production is a result of data comprising a minimum of 100 minutes over 5 days.

Whereas High and Intermediate learners had acquired stage 4 prior to treatment sessions, present in over 60% of recasts, Low learners had yet to acquire these forms. This explanation for the difference in performance between the higher level groups and the Low group provides support for the notion of “readiness” and the sequential acquisition of question forms in ESL (Pienemann, 1984, 1989, 1999). In this framework, acquisition is constrained by the prior acquisition of certain forms. Here it is suggested that readiness to acquire a structure affects the learner’s noticing of that structure in the input, a step argued by most to be requisite to acquisition (Gass, 1991, 1997; Schmidt, 1990).

Ellis (1996) argued that much of language—lexical, phonological, and morphosyntactic—in both L1 and L2 is acquired through implicit analysis of memorized sequences of language. Arguably, the Low learners had not yet built up this resource of sets of sequences in long-term memory.

subjects in the Low group came from beginner-level classes, 7 of the 11 in the Intermediate group came from intermediate-level classes, and 10 of the 15 in the High group came from two advanced-level classes.

The hierarchy of stages is derived from hypothesized processing constraints that underlie each stage. This hierarchy is implicational in that each stage is a prerequisite to the formation of structures in the following stage. The picture tasks used in the sessions were based on those developed at the Language Acquisition Research Centre (LARC), University of Sydney, with funding from Language Australia. The tasks were chosen for demonstrated elicitation of question forms (see Mackey, 1999; Mackey & Philp, 1998; Pienemann & Mackey, 1993).

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Thus, unrelated errors not pertinent to the question form, such as phonological change or the addition of an article in a recast, were not considered in the analysis. Given the work of Baddeley (1986), Cowan (1995), and others, in which the word-length effect on recall appears to be a function of rate of rehearsal, the length of time taken to articulate the recast may have been a more accurate measure rather than a morpheme or syllable count. However, the relationship between speech rate and memory span is still a contentious and complex issue (for discussion, see Cowan, 1993) involving not only duration of words but also pauses between words. Although important, this issue is beyond the means or goals of this paper.

During piloting of cued immediate recall by six learners of different levels, learners demonstrated less accuracy in reproducing recasts of questions longer than five morphemes. Stage 5 question forms, such as What is he doing?, were accurately recalled more consistently by learners than longer versions, such as What is she going to do? or What is that angry man saying?

Differences between groups on the provision of recasts were not considered problematic because, for each research question, group performance was treated separately in the analyses. Where comparisons were made, averages were given. Although it is possible that the question used by the learner is not formulaic, this is very unlikely here, as this learner’s production is consistent with stage 3 utterances and no other examples of stage 5 question forms are found in the data. Additionally, “What are you doing?” is a commonly found formulaic question form in these learners’ production (see Lightbown, 1998, for discussion of analysis of unanalyzed chunks). Assessment of the learner’s IL production is a result of data comprising a minimum of 100 minutes over 5 days.

Whereas High and Intermediate learners had acquired stage 4 prior to treatment sessions, present in over 60% of recasts, Low learners had yet to acquire these forms. This explanation for the difference in performance between the higher level groups and the Low group provides support for the notion of “readiness” and the sequential acquisition of question forms in ESL (Pienemann, 1984, 1989, 1999). In this framework, acquisition is constrained by the prior acquisition of certain forms. Here it is suggested that readiness to acquire a structure affects the learner’s noticing of that structure in the input, a step argued by most to be requisite to acquisition (Gass, 1991, 1997; Schmidt, 1990).

Ellis (1996) argued that much of language—lexical, phonological, and morphosyntactic—in both L1 and L2 is acquired through implicit analysis of memorized sequences of language. Arguably, the Low learners had not yet built up this resource of sets of sequences in long-term memory.
In this study, although recall provided a limited measure of noticing, it nevertheless was a useful means of accessing noticing in oral interaction at the time that feedback was provided to learners. The use of recall provided information not only about noticing but also about what morphosyntactic elements in particular were noticed by learners and how this related to their own representations of the data.

REFERENCES


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Constraints on “Noticing the Gap” 125


