Corrective Feedback and Second Language Acquisition: Differential Contributions of Implicit and Explicit Knowledge

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ABSTRACT

The issue of error correction remains controversial in recent years due to the different positions of interface toward implicit and explicit knowledge of ESL learners. This study looks at the impacts of implicit corrective feedback in the form of recast on implicit and explicit knowledge of adult ESL learners. In an experimental study, lower-intermediate learners first were taught the grammatical features; then they completed communicative tasks during which the experimental group received recast and the control group received no feedback when an error occurred. Acquisition was measured by means of tests designed to measure implicit and explicit knowledge. Results of ANCOVA analysis revealed higher score for the experimental group; and result of t-test revealed that recast has significant effect on implicit knowledge. In line with the weak interface position toward implicit and explicit knowledge, the findings extend empirical support for Schmidt's noticing hypothesis and function of recast in language learning.

Keywords: *error correction, cognitive psychology, implicit knowledge, explicit knowledge*

INTRODUCTION

One of the concerns of teachers in the teaching English as a Second Language (ESL) learners, particularly in communicative classes, is how students' errors should be corrected and to what extent this correction would contribute to improving their knowledge. Another concern relates to the method of providing students the feedback needed to foster improvement without damaging their fluency and motivation. These apprehensions arise due to problems found during error correction in the ESL classrooms. Having errors corrected can sometimes be annoying for language learners, and such corrections may reduce students' willingness to communicate with their teachers or classmates. If teachers corrected too many errors, their students' fluency in speaking might be affected because they would fear making mistakes. Furthermore, it may affect students' confidence and performance in the learning process (Panova & Lyster 2002, cited in Chen, 2005).

On the other hand, if teachers do not correct enough student errors, students' accuracy would not improve. Students may continue making the same mistakes that teachers have never tried correcting (Truscott 1996). Recent studies in cognitive psychology and second language acquisition (SLA), based on the hypothesis that not all of the input is operated as intake for learning, gave priority to the role of attention and noticing in mediating input and learning (Izumi, 2002). Findings of such studies signify that language awareness is essential for learning to occur (Schmidt, 2001).

Schmidt (2001) declared "People learn much about the things that they attend to" (p. 30). Schmidt hypothesized that if input is noticed it becomes intake in language acquisition. This hypothesis proposes that negative feedback by noticing the gap between inter-language forms and target forms helps learners to develop inter-language.

Corrective feedback differs in accordance with the extent to which it is implicit or explicit. In implicit error correction teachers do not tell the students they made mistakes, while in explicit feedback there is an overt indication

of committing errors. Implicit feedback regularly takes the shape of recast where "the teacher first repeated a learner utterance with an error, highlighting the error through emphasis, and then, if this did not result in a learner self-correction, the teacher recasts the utterance using the correct form" (Ellis 2008, 884).

According to the Ellis, Loewen, and Erlam (2006) recasts and explicit corrective strategies can also be different in providing implicit or explicit learning. However, Long (1996, 2006) said that recasts, because of their implicit nature, assist acquisition. For Long recasts connect linguistic form to meaning in discourse contexts that encourage noticing or rehearsing in short-term memory (i.e., micro processing) required for implicit language learning. Doughty (2001, cited in Ellis et al., 2006) argued that "recasts constitute the ideal means of achieving an immediately contingent focus on form and afford a cognitive window in which learners can rehearse what they have heard and access material from their inter-language" (p. 340).

Such a prospect is questionable, first because assuming all recasts as implicit as Long (1996, 2006) and Doughty (2001) believed is not assured (Ellis et al., 2006). Second, recasts can simply assist acquisition on the assumption that learners notice the modifications that have been made to their own utterances, and this is not happening on all occasions (Ellis et al., 2006). Lyster (1998) pointed out that the level of repair in uptake following implicit and explicit types of feedback is not the same and it is remarkably low following recast. Lyster's findings were confirmed by Sheen (2004).

Sheen (2004) in four different instructional contexts found that repair most often happened following metalinguistic and explicit feedback than following recasts. Finally, according to Ellis et al. (2006) we cannot make sure that recasts enhance acquisition of implicit knowledge. In fact, it is viable that recasts result in explicit knowledge. Long, Inagaki, and Ortega (1998) observed that a number of the students who had learned a grammatical feature throughout recasts were capable of explaining the rule explicitly and correctly. Therefore, there are some uncertainties about the extent of effectiveness of recasts in promoting learning likewise the type of learning and provided knowledge.

Growing attention has been given to the issues of error correction in SLA in recent years. Some descriptive studies were rooted in data collection in classes (e.g., Morris & Tarone 2003; Panova & Lyster 2002; Sheen 2004) and some on data collection in laboratories (e.g., Iwashita 2003; Mackey, Oliver & Leeman 2003; Philp 2003). However, the outcomes of these studies concerning the performance of recasts are conflicting. Nicholas, Lightbown, and Spada (2001) noted that the different results of these studies can be related to the employment of recasts in various circumstances. Nicholas, Lightbown, and Spada (2001) indicate it seems that recasts are more efficient in a laboratory setting than in a classroom setting, apparently because the target structure and the kind of feedback are likely controlled in a laboratory context, so that learners probably realize the intent of the feedback and distinguish it from repetitions.

Moreover, several experimental studies have tried to inspect the efficiency of error correction in language acquisition (e.g., Ammar & Spada 2006; Ayoun 2004; Carroll 2001; Fawbush 2010; Kim & Mathes 2001; Leeman 2003; Lyster 2004; Muranoi 2000; Rosa & Leow 2004; Sanz 2004). However, these issues remain highly debated and controversial. Most of the studies differed in their purposes and designs. The kind of treatment the learners underwent differed in nature. In some studies, the tasks were mechanical exercises (e.g., Carroll 2001), while in others they were communicative activities. Furthermore, the treatment in these studies also differed in terms of whether it involved output processing (most of them) or input processing (Rosa & Leow 2004; Sanz 2004).

These studies also differ in another aspect. In some of them practice activity follows an explanation of the target structure explicitly (e.g., Fawbush 2010; Lyster 2004; Muranoi 2000), while others did not. The distinctions in design mirror the various objectives of the studies. In most of the studies implicit feedback has taken the form of recasts, while Muranoi (2000) used recasts and requests for repetition equally. Thus, due to the considerable distinctions in the objectives and designs of these studies, we cannot generalize their findings.

One of the important deficiencies of these studies which make their findings controversial is related to the methods of measuring acquisition. "Most of the studies that examined the relative effectiveness of implicit and explicit instruction [or error correction] relied on methods of measuring acquisition that favored explicit instruction [or error correction]" (Ellis 2009, p. 20). Therefore, it can be asserted that they were biased on the side of explicit error correction.

Using the kinds of instruments prepared to measure implicit and explicit ESL learners' knowledge distinctly, this investigation tries to overcome the measurement problems of previous studies and seeks to find whether implicit error correction in the form of recast has significant effects on implicit and explicit knowledge of ESL learners. So the following research questions were proposed:

1. Is there any significant effect of implicit error correction in the form of recast on the grammar acquisition of

ESL learners, as measured by tests of implicit knowledge?

2. Is there any significant effect of implicit error correction in the form of recast on the grammar acquisition of ESL learners, as measured by tests of explicit knowledge?

3. Is there any significant difference between the effect of implicit corrective feedback on implicit and explicit knowledge of ESL learners?

METHOD

The current study evaluates the impact of implicit corrective feedback in the form of recast on implicit and explicit knowledge of ESL learners at lower intermediate level. The purpose for considering SLA of the sentence structures in terms of implicit and explicit knowledge is to understand the extent to which implicit error correction on these grammatical features is beneficial, not only in increasing knowledge *about* them (explicit knowledge), but in acquiring knowledge *of* them (implicit knowledge).

A quantitative study was conducted in an intensive course over a one month period at the University of Malaya Center for Continuing Education (UMCCED) during March 2013 in Kuala Lumpur. These classes were held in 18 sessions over 4 weeks.

Participants

Based on the design of the study, 66 ESL learners in the lower intermediate level whose homogeneity was assessed through placement test participated in this study and were randomly assigned into the experimental and control groups (Group A and Group B respectively). Participants of the study were international students mostly from East Asia with both genders. The age of the participants was between 20 to 30 years. Table 1 shows the number of participants in each group.

Table 1. Breakdown of Students in Control and Experimental Groups.

Subjects Total	Group A (Experimental)	Group B (Control)
66	32	34

Target structures

Based on the judgments of 6 UM experts in the field of Linguistics and TESL in the Faculty of Languages and Linguistics *Verb complements, question tags, yes/No questions, possessives –s, indefinite articles, and adverb placement* were chosen as target structures of the study from a list of universally problematic structures (Ellis, 2009) by means of a five-point Likert Scale. The purpose of choosing the target structures from this list is first, attempt to select language structures that were recognized to be universally problematic to learners. Second, taking into consideration the lower intermediate syllabus of UMCCED (i.e., Focus on Grammar One & Two by Eckstut & Ordover, 2007) the structures in this list had not been taught as yet to the students in previous levels. However, the purpose of the study is to find out whether corrective feedback assists students in achieving greater control over structures they have already partially learned; as Lyster, Saito, and Sato (2013) stated, corrective feedback is more effective in triggering associations between existing knowledge structures.

Treatment

Meant for the purpose of the study, two groups were exposed to the same amount of training, 100 hours in total. First the participants in Group A (N = 32) and Group B (N = 34) were taught the grammatical structures and then with the aim of establishing what they have been taught, they were given tasks of the study. Treatment for both groups was the same except during the tasks in case of producing errors the experimental group received implicit feedback in the form of recast and the control group received no feedback on target structures.

Instructional Procedures

The same instructor was responsible for conducting the tasks of the study. The target grammatical features of the study were taught in both groups through what Ellis (2004) called focused tasks (i.e., intended to promote the use of specific linguistic forms) ensuing Willis's framework (1996, cited in Rezaei & Derakhshan, 2011). The researcher observed the sessions and recorded on paper every case of applying the target structures and each case of error correction to make sure that the treatment had been conducted (Table 2 shows the result).

Table 2. Number of Target Structures Educed and Occurrences of Feedback.

Type of the structure	Occurrence of the Structures	Incorrect forms	Feedback
Verb complements	44	38	36
Question tags	51	47	47
Yes/no questions	44	38	36
Possessives –s	51	47	47
Indefinite articles	42	31	29
Adverb placement	37	36	34

Instrumentation and Procedures

According to the regulation of the UMCCED, ten days prior to the start of the program, participants were required to take part in a session to complete a placement test. Based on the placement test scores totally 66 students at lower-intermediate level were randomly assigned into two groups (one experimental and one control). Three days prior to starting of the treatment, participants were required to sign consent forms and joined in a session to complete the entire pretest. The posttest was conducted in a session at the end of the treatments. Three tests, adapted from the test battery of Ellis (2005), were managed during each testing session in this order: Oral Imitation Test and Timed Grammaticality Judgment Test designed to assess learners' implicit knowledge; and Metalinguistic Knowledge Test designed to assess learners' explicit knowledge. Two versions of the test were formed to administer as pretest and posttest of the study; in each, the same statements were used in a different order.

Oral Imitation Test consists of 24 belief sentences. In this test four statements were allocated to each target structure. Each sentence, one by one, was displayed orally on an audiotape. Test takers first were asked to write on an answer sheet whether they agree with, disagree with, or are unsure about the statement. This was planned to center their attention on meaning. Then, they were required to restate the statement verbally in correct form. Each reproduced statement was scored either 1 (student reproduced the grammatically correct target structure properly or he/she corrected the grammatically incorrect target structure) or 0 (student avoided the target structure, attempted the grammatically correct target structure but imitated incorrectly, or imitated the grammatically incorrect target structure without correction). In the case of self-correction the initial incorrect imitation was scored, since there is a tenet that this would yield the better measurement of students' implicit knowledge (Ellis 2009).

Timed Grammaticality Judgment Test (Timed GJT) consisted of 24 sentences, four sentences for each of the target structures. It was presented under time pressure by using PowerPoint slides. Sentences were shown one by one within a specific time limit as specified after a pilot study. Participants were asked to judge whether each sentence on the screen is grammatical or ungrammatical by ticking in the provided answer sheet. Each item was scored 0 or 1 for incorrect or correct answer, with unanswered items scored 0. A percentage accuracy score was estimated.

Metalinguistic Knowledge Test is in written form and includes two parts. Part one was an untimed multiple-choice test consisting of 24 ungrammatical sentences, four sentences for each of the target sentence structure. The error part of each item was underlined. Learners were required to choose the rule that best explains each error out of four choices provided. In part two, they were asked to read a short passage and then to find examples of specific grammatical structures from the passage. Two examples were allocated for each target structure. A total percentage accuracy score was calculated.

Pilot studies

The three instruments were administered to a sample of 38 students from lower intermediate level to find out their psychometric properties (i.e., reliability) in February 2013 in UMCCED. Data about the validity of the three tests

has been collected by a panel of five UM experts in the Faculty of Language and Linguistics. Internal consistency of the three tests was checked by calculating alpha reliability coefficients using SPSS 20.

For the Oral Imitation Test, the overall alpha coefficient of the entire scale was .91. Furthermore, examination of item-total correlations indicated that all items contributed to the consistency of scores with item-total correlations higher than .67. Initial results indicate that the Oral Imitation Test is a reliable and valid measure of implicit knowledge.

The overall alpha coefficient of the entire scale for the Timed Grammaticality Judgment Test was .89. Furthermore, examining item-total correlations indicated that all items contributed to the consistency of scores with item-total correlations exceeding .59. Initial results indicate that the Timed Grammaticality Judgment Test is a reliable and valid measure of implicit knowledge.

For the Metalinguistic Knowledge Test, the overall alpha coefficient of the entire scale was .88. Furthermore, examination of item-total correlations indicated that all items contributed to the consistency of scores with item-total correlations higher than .58. Initial results indicate that the Metalinguistic Knowledge Test is a reliable and valid measure of explicit knowledge.

In another pilot study 3 native speakers participated in a session conducted in the center with purpose of fixing the time interval of each item in the Timed GJT. The time limit for each sentence was specified on the basis of average response time for each sentence by native speakers. Considering slower processing speed of ESL learners than native speakers, especially in intermediate level, 30% of time taken for each sentence is added for each sentence. The time interval between each sentence ranged from 10 to 15 seconds.

Test Administration Procedure

The tests were conducted in this order: (A) Elicited Oral Imitation Test, (B) TGJT, (C) Metalinguistic Knowledge Test. One training model was included in each test for students to practice on. The imitation test was conducted between the researcher and participants in a one-on-one meeting. Each participant listened to the sentences one by one on a voice recorder, specified his or her response to the belief statement in an answer sheet, and then restated the sentence orally. This was audio recorded. The timed GJT and the metalinguistic knowledge test were answered individually on paper. Participants completed all of the tests in a 1.5 hour session.

Research Design and Approach

An experimental design was used. The independent variable is implicit feedback correction whereas the dependent variables are implicit knowledge and explicit knowledge. The covariate variables are student's proficiency in the pretests (pre explicit knowledge test and pre implicit knowledge test).

Data Analysis

To explore the differences between students' scores in the experimental and control groups in implicit and explicit knowledge, ANCOVA analysis was used. The assumptions of ANCOVA were fulfilled (i.e., the normality of data, homogeneity of variance, linearity between pretest and posttest (three tests), and homogeneity of regression indicated no violation of ANCOVA assumptions and all of the assumptions were met). To study the difference between students' performances in implicit knowledge and explicit knowledge, the paired samples *t*-test was used.

RESULTS

An analysis of covariance was used to assess whether the experimental group significantly scored higher than the control group in implicit knowledge after controlling for differences between students in both groups in the pretest scores. Results indicate that after controlling for the effect of the pretest, there is a significant difference between experimental group and control group in implicit knowledge, F (1, 63) = 99.71, p =.00, eta squared =.49). The partial Eta squared value of 0.49 showed that 49% of the variance in the dependent variable (implicit knowledge) could be explained by the independent variable (group) (See Table 3).

Table 3. Analysis of Covariance for Implicit Knowledge as a Function of Group, Using Pretest Scores as a Covariate

Source	Df	Mean Square	F	Sig.	eta²
Pretest	1	243.29	5.99	.03	.36
Group	1	4051.47	99.71	.00	.49
Error	63	40.63			

Table 4 presents the means and standard deviations for the experimental group and control group on implicit knowledge, before and after controlling for pretest effect. As is evident from this table, virtually no difference between experimental group and control group remains after differences in pretest scores are controlled. This table also shows that students in the experimental group (*M* = 87.69, *SD* = 2.73) scored significantly higher than students in the control group (*M* = 74.00, *SD* = 2.36).

Table 4. Adjusted and Unadjusted Groups Means and Variability for Implicit Knowledge, Using Pretest Scores as a Covariate

Group	N	Unadjusted M	SD	Adjusted M	SE
Experimental	32	87.69	2.73	84.76	.26
Control	34	74.00	2.36	84.32	.67

Furthermore, an analysis of covariance was used to assess whether the experimental group significantly scored higher than the control group in explicit knowledge after controlling for differences between students in both groups in the pretest scores. Results indicate that after controlling for the effect of the pretest, there is a significant difference between the experimental group and control group in explicit knowledge, (*F* (1, 63) = 8.48., *p* =.01, eta squared =.45). The partial Eta squared value of .45 showed that 45% of the variance in the dependent variable (explicit knowledge) could be explained by the independent variable (group) (See Table 5).

Table 5. Analysis of Covariance for Explicit Knowledge as a Function of Group, Using Pretest Scores as a Covariate

Source	Df	Mean Square	F	Sig.	eta²
Pretest	1	163.12	79.84	.00	.31
Group	1	17.34	8.48	.01	.45
Error	63	2.04			

Table 6 presents the means and standard deviations for the experimental group and control group on explicit knowledge, before and after controlling for pretest effect. As evident from this table, virtually no difference between the experimental group and control group remains after differences in pretest scores are controlled. This table also shows that students in the experimental group (*M* = 11.41, *SD* = 2.00) scored significantly higher than students in the control group (*M* = 8.43, *SD* = 2.26).

Table 6. Adjusted and Unadjusted Groups Means and Variability for Explicit knowledge, Using Pretest Scores as a Covariate

Group	N	Unadjusted M	SD	Adjusted M	SE
Experimental	32	11.41	2.00	10.21	.66
Control	34	8.43	2.26	10.33	.62

To study the effect of implicit error correction on implicit knowledge and explicit knowledge among experimental group students, *t*-test for paired samples was used and students' scores in both implicit and explicit knowledge have been converted to 100.

Table 7 shows the summary results of *t*-test. Results from *t*-test revealed that implicit corrective feedback has significant effect on implicit knowledge (*t* (31) = 12.26, *p* = .00). Students scored in implicit knowledge (*M* = 94.34, *SD* = 5.73) significantly higher than in explicit knowledge (*M* = 67.44, *SD* = 6.23) (See Table 7).

Table 7. Summary Results of *t*-test for Comparison between Performances in Explicit and Implicit Knowledge of Experimental Group

	Mean	N	SD	Df	t-value	p-value
Implicit knowledge	94.34	32	5.73	31	12.26	.00
Explicit knowledge	67.44	32	6.23			

DISCUSSION

Based on a number of exclusive methodological specifications, this study compared the effects of implicit corrective feedback in the form of recasts on English proficiency of ESL learners. The second unique feature of this study is its context; the study was conducted in the classroom with students performing communicative tasks. A third unique specification of the study is the array of instruments, developed by Ellis (2005), to separately measure implicit and explicit knowledge.

An assessment of the pretest scores prior to the start of the program indicated that at first all the participants had only limited implicit and explicit knowledge of the structures. But the results showed a significant advantage for the recast group after instruction. As clearly indicated in the tables given, corrective feedback is effective in acquisition of both implicit and explicit knowledge. In other words, corrective feedback can potentially extract the inaccurate structures from the learners' statements and therefore approximate the learners' production to the native-like accurate language production. One conceivable reason for better achievement of the implicit feedback group may have been the vital part of attention in learning. According to Schmidt (2001, cited in Varnosfadrani & Basturkmen 2009) "attention controls access to conscious knowledge, allowing the new features to be learned" (p. 11).

As illustrated in Table 7 these results propose that the effect of corrective feedback on learners' implicit knowledge was more significant than on their explicit knowledge. So it seems that the instructions enhanced learners' awareness of the target structures and they were encouraged to monitor their output using their explicit knowledge.

The descriptive statistics in Tables 3, 4, 5 and 6 and the results of ANCOVA show that the error correction in the form of recast has significant effect on both implicit and explicit knowledge of ESL learners. However its effect on implicit knowledge is more significant than on explicit knowledge (as shown in Table 7). Indeed, overall, it seems that the treatments implicitly enhanced learners' awareness of the grammatical target structure, thus encouraging them by using their explicit knowledge to monitor their output.

Evidence of this study strongly support the theoretical position that error correction by providing negative evidence plays a facilitative and perhaps even vital role in second language acquisition. This study, by measuring implicit and explicit knowledge separately, also provides good evidence to support Schmidt's (2001) noticing hypothesis and suggests negative feedback assists learners to become aware of the gap between inter-language forms and target forms, and "noticing the gap has been hypothesized to help inter-language development" (Schmidt 2001, cited in Naeini, 2008, p. 120).

According to the Schmidt's noticing hypothesis theory (2001) "for something to be learned, it has to be noticed first" (p. 13). "But noticing by itself does not result in acquisition" (Schmidt 2001, p. 13). Schmidt posited that "Learners have to consciously pay attention to or notice input in order for input to become intake for L2 learning" (p. 13). This is because such corrective feedback encourages learners to notice the gaps between target norms and their own inter-language (IL), thus facilitating grammatical restructuring (Schmidt 2001, p. 13). Schmidt noted that errors by Second Language students are part of the learning process, and that drawing attention to them is a key part of their language development.

These results also support the weak interface position toward implicit and explicit knowledge (Ellis, 2006) according to which corrective feedback by providing a kind of attention and consciousness in learners, not only facilitates explicit learning and explicit memory, but also implicit learning and implicit memory.

Implications

Pedagogical implication. The findings of this study could be an appropriate guideline for language teachers, educators or language program designers who are in a position to decide whether and how corrective feedback is to be presented in an instructional context. Extending empirical support for the weak interface position of cognitive psychology, we can propose that ESL students could benefit more from pedagogical techniques which promote their explicit knowledge such as interactional feedback in which a set of conversational devices such as clarification requests, comprehension checks, confirmation checks, and repetitions are used to draw learners' attention to ungrammatical forms in their output for modification (Dalili 2011).

Methodological implication. The results of this study also support recent studies (Bowles, 2011; Ellis, 2005; Ellis & Loewen, 2007; Ellis et al., 2006; Han & Ellis, 1998) which have proposed better understanding of the effect of error correction could be achieved through measuring implicit and explicit knowledge separately. However, "The main limitation of the research to date lies in the method of testing" (Ellis, Loewen, Elder, Erlam, Philp & Reinders, 2009, p. 315). So this study by providing a relatively separate measurement of implicit and explicit knowledge of language structures according to tests incorporating the distinguishing criteria of the two types of language knowledge (Bowles, 2011; Ellis et al., 2009) tried to overcome methodological limitation of previous studies in error correction.

Limitations and suggestions for further research

As in all classroom studies, there are inevitable limitations. First, participants in this study were over 20, so the results could not be generalized to learners below this age. Second, this study did not analyze nor discuss the effect of implicit feedback on each structure separately, so it has not considered whether the effect on each structure is different from others, although as a whole it shows that implicit feedback has significant effect on acquisition knowledge of ESL learners. As researchers (e.g., Han, 2002) argue, recast is less effective on some linguistic features than other types of feedback. Therefore, further research is needed to discard all the doubts regarding the potential effect of different types of error correction on different sentence structures.

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