

The Effect of Explicit and Implicit Corrective Feedback on Segmental Word-Level Pronunciation Errors: Immediate and Delayed Effects

Mohammad Zohrabi ^{1*}, Nahal Behboudnia ²

¹ *Assistant Professor, University of Tabriz, Department of English Language, Faculty of Persian Literature and Foreign Languages, Tabriz, Iran*

² *Instructor, University of Tabriz, Department of English Language, Faculty of Persian Literature and Foreign Languages, Tabriz, Iran*

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Abstract: Over the last few years, the realm of foreign language learning has witnessed an abundance of research concerning the effectiveness of corrective feedback on the acquisition of grammatical features, with the study of other target language subsystems, such as pronunciation, being few and far between. In order to bridge this gap, the present study intended to investigate and compare the immediate and delayed effect of explicit (overt) and implicit (covert) corrective feedback (CF) on treating segmental word-level pronunciation errors committed by adult EFL learners of an institute in Tabriz named ALC. To this end, through a quasi-experimental study and random sampling, three groups were formed, an explicit, an implicit and a control group, each consisting of 20 low proficient EFL learners. Besides, considering the levels that learners were assigned to, based on the institute's criteria, a Preliminary English Test (PET) was administered in order to determine the proficiency level of learners. Having administered the pretest before treatment, to measure the longer-term effect of explicit vs. implicit CF on segmental word-level pronunciation errors, the study included delayed posttests in addition to immediate posttests all of which included reading passages containing 40 problematic words. The collected data were analyzed by ANCOVA and the obtained findings revealed that both explicit and implicit corrective feedback are effective in reducing pronunciation errors showing significant differences between experimental and control groups. Additionally, the outcomes showed that immediate implicit and immediate explicit corrective feedback have similar effects on reduction of pronunciation errors. The same result comes up regarding the delayed effect of explicit feedback in comparison with delayed effect of implicit feedback. However, the delayed effect of explicit and implicit CF lowered comparing to their immediate effect due to time effect. Pedagogically, this study could enhance teachers' effort, knowledge, and beliefs in teaching pronunciation and providing corrective feedback to pronunciation errors.

Keywords: Corrective Feedback; Explicit CF; Implicit CF; Segmental Word-level Pronunciation Errors.

* Corresponding Author.

Authors' Email Address:

¹ Mohammad Zohrabi (mohammadzohrabi@gmail.com), ² Nahal Behboudnia (n.behboudnia@yahoo.com),
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Introduction

Corrective feedback has recently attracted many researchers in Second Language Acquisition. Several studies have addressed the role of correcting errors in SLA, and most of these studies have focused on providing support for or against error correction in general. On the theoretical ground, there are different views on the role of corrective feedback in SLA. For example, White (1991) affirms that Error Correction (henceforth, EC) serves no purpose in SLA. Krashen (1982, 1985) is one of those researchers who believe that corrective feedback is not only useless but also harmful because it disrupts the flow of discourse. On the other hand, there are many studies that show the effectiveness of corrective feedback. Schmidt (1990), Swain (1998), and Long (1996) are among those researchers who assign a facilitative role to feedback. They argue that corrective feedback draws learners' attention to form, and this noticing to form helps them to recognize the gap between their interlanguage and target language. Likewise, many other researchers argue that correcting errors in language classrooms helps learners improve their proficiency in the target language (Allwright & Bailey, 1991). The most comprehensive classification of corrective feedback is the one proposed by Lyster and Ranta (1997) who classified corrective feedback into six categories including explicit correction, recast, metalinguistic feedback, elicitation, repetition, and clarification request. Among these, explicit correction and metalinguistic feedback are considered as the explicit ones while recast and clarification request are among the implicit types of corrective feedback. Carroll (2001) found that those learners who received explicit error correction were more successful than those who received implicit corrective feedback.

However, there is a paucity of research focusing on the value of corrective feedback in teaching pronunciation. Some insights in this area can be gleaned from descriptive studies of error correction, such as those conducted by Lyster and Ranta (1997), Lyster (1998) or Panova and Lyster (2002), in which pronunciation problems constituted one of the categories of errors considered in terms of uptake and repair. In view of the fact that no studies conducted to date have compared the effects of explicit and implicit correction on the acquisition of pronunciation features, it seems warranted to briefly consider the findings of research that has considered the effectiveness of these CF options in teaching other language subsystems. Most of these empirical investigations provide rather clear-cut evidence for the greater value of corrective techniques that are explicit and therefore can unambiguously be interpreted by learners. Support for the greater benefits of more explicit feedback types

comes from the studies conducted by Carroll and Swain (1993), Rosa and Leow (2004), Ellis et al. (2009), Ellis (2007).

Review of the Related Literature

Nature of Pronunciation

The term phonology refers to “the establishment and description of the distinctive sound units of a language (phonemes) by means of distinctive features” (Richards & Schmidt 2010, p. 435). As Burgess and Spencer (2000) maintained, the phonology of a target language (TL) consists of theory and knowledge about how the sound system of the target language works, including segmental and suprasegmental features.

Segmental features are minimal units of sound defined in phonetic terms. These features including vowels and consonants can be thought of as the segments of which speech is composed (Ladefoged & Johnson, 2011). Traditionally, the fundamental components of pronunciation are phonemes, and acquisition of the target language phonological system is viewed as mastery of the phonemic distinctions embodied in its phonological inventory and of the phonetic variants of phonemes which occur in particular environments within syllables and words (Pennington & Richards, 1986).

Superimposed on the syllables are other features known as *suprasegmentals*. In other words, suprasegmental features transcend the level of individual sound production and relate to sounds at the macro level. These features are independent of the categories required for describing segmental features (vowels and consonants). Linking, intonation, and stress are important features for effective pronunciation at the suprasegmental level (Burns & Claire, 2003). Length is also usually considered to be a suprasegmental feature, although it can affect single segments as well as whole syllables.

Corrective Feedback

The topic of error correction in its oral and written sense tends to spark controversy among both language teachers and researchers. Depending on different researchers, error correction is described on a continuum ranging from ineffective and possibly harmful (e.g., Krashen, 1994) to beneficial (e.g., Russell & Spada, 2006) and possibly even essential for some grammatical structures (White, 1991). Furthermore, teachers may be confronted with students' opinions about error correction since students are on the receiving end and often have their own views of it and how it should happen in the classroom.

Before going further, it is important to have brief review of definitions made for the term “corrective feedback”. Lightbown and Spada (1993 p. 171) stated that corrective feedback is “any indication to the learners that their use of the target language is incorrect”. Chaudron (1988) also pointed out the fact that the term corrective feedback incorporates different layers of meaning. In his view, the term “treatment of error” may simply refer to “any teacher behavior following an error that minimally attempts to inform the learner of the fact of error”. The treatment may not be evident to the student in terms of the response it elicits, or it may make a significant effort “to elicit a revised student response” (p. 150). Finally, there is “the true” correction which succeeds in modifying the learner’s interlanguage rule so that the error is eliminated from further production (p. 150).

Long (1996) offered a more comprehensive view of feedback in general. He suggests that environmental input can be thought of in terms of two categories that are provided to the learners about the target language (TL): positive evidence and negative evidence. Long defines positive evidence as providing the learners with models of what is grammatical and acceptable in the TL; and negative evidence as providing the learners with direct or indirect information about what is unacceptable. Likewise, as Ellis (2009) proposed, positive feedback affirms that a learner response is correct. It may signal the veracity of the content of a learner utterance or the linguistic correctness of the utterance. Negative feedback signals, in one way or another, that the learner’s utterance lacks veracity or is linguistically deviant. It is for decades that error treatment is one of the main concerns of teachers to help learners overcome their weaknesses.

Corrective feedback has recently attracted many researchers in SLA. On theoretical ground, there are different views on the role of corrective feedback in SLA. Krashen (1982, 1985) is one of those researchers who believe that corrective feedback is not only useless but also harmful because it disrupts the flow of discourse. On the other hand, there are many studies that show the effectiveness of corrective feedback. Schmidt (1990), Swain (1998), and Long (1996) are among those researchers who assign a facilitative role to feedback. They argue that corrective feedback draws learners’ attention to form, and this noticing to form helps them to recognize the gap between their interlanguage and target language. Van Patten (2003) suggested that corrective feedback in the form of negotiating for meaning can help learners notice their errors and create form-meaning connections, and this facilitates acquisition (Ellis, 2009).

In a broad sense, the present study was designed to focus on the effectiveness of corrective feedback on pronunciation. In particular, the present study aimed to answer the following questions:

RQ1: Does explicit corrective feedback have any significant immediate effect on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners?

RQ2: Does explicit corrective feedback have any significant delayed effect on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners?

RQ3: Does implicit corrective feedback have any significant immediate effect on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners?

RQ4: Does implicit corrective feedback have any significant delayed effect on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners?

RQ5: Is there any significant difference in the immediate effect of explicit and implicit corrective feedback on segmental word-level pronunciation errors committed by low proficient EFL learners?

RQ6: Is there any significant difference in the delayed effect of explicit and implicit corrective feedback on segmental word-level pronunciation errors committed by low proficient EFL learners?

The Study

Site of the Study

This study was carried out in an institutional context named ALC (Atashian Language College) located in Tabriz, Iran. In this institute, each term is held for 20 sessions and the classes meet three times a week for a one-and-a-half-hour class time. The main course books covered in this institute are *New Total English* series for different levels of proficiency, by Clare and Wilson (2009). Each pack consists of a students' book, a workbook, a portfolio and audio CDs. The theme of the course books is English language communication. English is the only language spoken in classes and even among instructors of the institute.

Method

Design of the Study

This quasi-experimental research was based on a pretest-posttest method. Having administered the pretest before treatment, to measure the longer-term effect of explicit vs. implicit CF (corrective Feedback) on segmental word-level pronunciation errors, the study included delayed posttests in addition to immediate posttests. Prior to the initiation of the study, three groups were formed including two treatments and one control group. An explicit and an implicit group formed the treatment groups. The sixty subjects of this study were randomly assigned to one of the three groups. The independent variable in this study was explicit and implicit corrective feedback which was tested against the dependent variable being segmental word-level pronunciation errors. The researchers themselves acted as the instructor of all the groups under study. Having reached the intermediate-low level of English proficiency, all the subjects, over the period of the investigation, studied in lower-intermediate (LI). The participants' ability to pronounce the targeted words were measured on a pretest, a posttest, and a delayed posttest all of which included reading aloud a passage containing 40 problematic words. While the students in the CG followed their regular activities, those in the two experimental groups (Explicit G. and Implicit G.) had the benefit of an instructional treatment in which they were asked to perform tasks calling for the use of the 90 problematic words. The difference between the IG and EG was that in the former, the corrective feedback was implicit and took the form of recasts and clarification requests, and in the latter the correction was explicit and involved the use of direct error correction or elicitation, sometimes accompanied by metalinguistic cues. As can be seen from Table 1, which diagrammatically presents the design of the research project, it spanned a period of 7 weeks (the whole 20 sessions of the term).

Table 1. The design of the study

		Week 1	Week 2	Week 3	Week 7
Experimental Groups	Explicit G.	pretest	Explicit correction	Posttest	Delayed posttest
	Implicit G.	pretest	Implicit correction	Posttest	Delayed posttest
Control Group		Pretest	Regular activities	Posttest	Delayed posttest

Participants

In order to investigate the research questions, a sample of 60 female lower-intermediate EFL learners was selected from Atashian Language College in Tabriz, Iran. The age of participants under investigation ranged from 16 to 31 years old; the native language of the participants was Azerbaijani, their second language being Persian, and they were in the process of learning English as a foreign language. None of the participants had any background of residence in an English-speaking country. They were also asked if they suffered from any hearing deficiency. In this respect, none of them reported any background of hearing problems.

Besides, considering the levels that learners were assigned to (lower intermediate), based on institute's criteria, a Preliminary English Test (PET) was administered in order to determine the proficiency level of the learners. The reason why elementary and advanced levels were not considered as an intelligent choice for the current study is that elementary levels are behind the needed competence. On the other hand, advanced level learners also have already developed high competence in language and the number of errors is not considerable; therefore, teachers do not provide sufficient amount of feedback types. As a result, it would be fair to say that the intermediate, specifically lower-intermediate, levels were the most appropriate targets for the present study.

After that, through stratified random sampling, two treatment groups and one control group were formed, each including 20 subjects. One of the experimental groups received explicit CF (corrective feedback) and the other one was exposed to implicit CF while the control group received no feedback. All the learners were taught by the same teacher. It is also worth mentioning that all the participants expressed their willingness to take part in the study.

Instruments

Prior to the initiation of the study, a paper-based Preliminary English Test (PET), a second level Cambridge ESOL exam for the intermediate level learners was given to all the subjects as to ensure their homogeneity in terms of language proficiency. The test consisted of 85 items and included four sections of Reading, Writing, Listening, and Speaking. As assigned by the instructions given in the test itself, the participants were given about 120 minutes to complete the test and each section of the listening part was played twice.

The mastery of the pronunciation of the instructional targets was measured on a pretest, a posttest, and a delayed posttest. Being identical, these three tests included extracts of ten reading passages containing 40 targeted mispronounced words. These passages were selected from the students' course book named *New Total English: Pre-intermediate*. These problematic words were identified on the basis of observations of English classes as well as suggestions made by the teacher of the students taking part in the experiment. It must be mentioned that all ten passages were used repetitively in pretest, posttest, and delayed posttest. However, as the time interval between tests was four weeks, the memory factor influencing the test results had been removed.

The other material used to record the students' voice while reading aloud in pretest, posttest, and delayed posttest was a digital portable minidisc recorder Sony MZ-R37, with a stereo microphone to ensure high quality sound for the rater. In order to transcribe and score each student's performance on each item, a checklist of 40 problematic words was prepared.

Findings and Data Analysis

Statistical Analysis

In this regard, inferential statistical methods were used to test research hypotheses; the collected data were examined and analyzed by ANCOVA.

Testing the First Hypothesis

Research Question 1 (RQ₁): Does explicit corrective feedback have any significant immediate effect on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners?

Null Hypothesis 1 (H₀₁): Explicit corrective feedback has no significant immediate effect on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners.

Alternative Hypothesis 1 (H₁): Explicit corrective feedback has significant immediate effect on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners.

Considering the use of pretest and posttest in conducting this study and for analyzing the data related to this hypothesis, covariance analysis was used in order to control the effect of pretest. In this study, Smirnov-Kolmogorov test was administered for ensuring normal distribution of data. And Levene's test was used in order to ensure the homogeneity of the data.

*Normal distribution of data***Table 2.** Results of Smirnov-Kolmogorov test for normal distribution of variables

Variables	Group	Test	Significance level
Pretest	Explicit	0.55	0.91
Posttest		0.72	0.67
Pretest	Control	0.39	0.99
Posttest		0.49	0.96

Table 2 indicates the results obtained from Smirnov-Kolmogorov test for the explicit and control groups. Since the significance level for all the groups in pretest and posttest is more than 0.05, it can be stated that the data of this study is distributed normally.

*Equality of variances***Table 3.** Results of Levene's test for comparing variances of immediate effect in explicit and control groups

F	Degree of freedom 1	Degree of freedom 2	Significance level
16.95	1	38	0.11

The results revealed in Table 3 confirmed the assumption related to equality of variances of groups based on Levene's test. Accordingly, $F=16.95$ and $P>0.01$ and the variances of the population are equal; i.e. the distribution of scores related to immediate effect of explicit corrective feedback in both explicit and control groups are equal. Considering the assumptions mentioned earlier, the covariance analysis is presented in the following part:

Table 4. Results of covariance analysis of immediate effect in explicit and control groups

	Sum of squares	Degree of freedom	Mean of squares	F	Significance level	2η
Pretest	748.93	1	748.93	133.05	0.000	0.78
Groups	253.79	1	253.79	45.08	0.000	0.54
Error	208.26	37	5.62			

Table 4 illustrates the results of covariance analysis in explicit and control groups related to immediate effect of explicit corrective feedback. In this analysis, the scores related

to pretest have been controlled statistically. That is, the effects of scores related to a similar variable are removed from the scores of posttest of explicit group and then two groups are compared based on the remained variance. As the results of covariance analysis show, there is a significant difference between the scores of the explicit group and control group ($F=45.08$, $P<0.05$); 2η is 0.54, that is, the immediate effectiveness of explicit corrective feedback over segmental word level pronunciation errors is 54%.

Table 5. Mean and standard deviation of scores of immediate effect in explicit and control groups after controlling pretest

Group	Mean	Standard deviation	Confidence level	
			Low	High
Experimental	31.91	0.53	30.84	32.99
Control	26.88	0.53	25.8	27.95

Table 5 illustrates the mean and standard deviation of immediate effect of explicit corrective feedback on the control group and explicit group after controlling the similar variable. The mean score for the explicit group is 31.91 and for the control group is 26.88 which are significantly different. In other words, explicit corrective feedback is effective in reducing segmental word-level pronunciation errors of learners in immediate posttest. Thus, it can be argued that the first alternative hypothesis is confirmed and the null hypothesis is rejected.

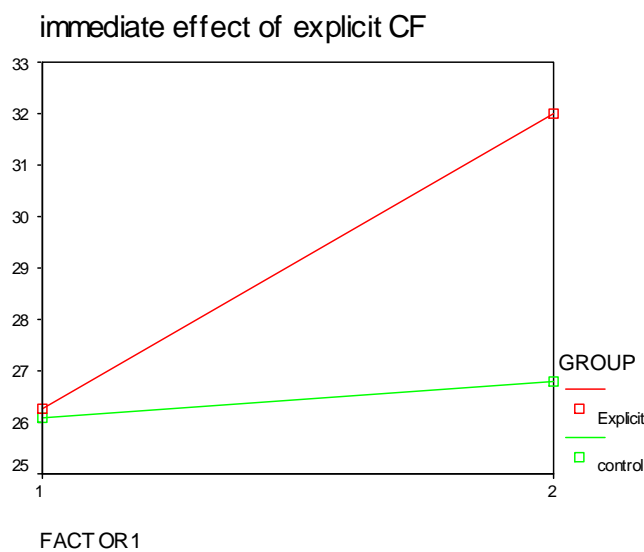


Figure 1. Comparing pretest and posttest of explicit and control groups

Testing the Second Hypothesis

Research Question 2 (RQ₂): Does explicit corrective feedback have any significant delayed effect on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners?

Null Hypothesis 2 (H₀₂): Explicit corrective feedback has no significant delayed effect on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners.

Alternative Hypothesis 2 (H₂): Explicit corrective feedback has significant delayed effect on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners.

Considering the use of pretest and posttest in conducting this study and for analyzing the data related to these hypotheses, covariance analysis was used in order to control the effect of pretest. In this study, Smirnov-Kolmogorov test was administered for ensuring normal distribution of data. And Levene's test was used in order to ensure the homogeneity of the data.

Normal distribution of data

Table 6. Results of Smirnov-Kolmogorov test for normal distribution of variables

Variables	Group	Test	Significance level
Pretest	Explicit	0.55	0.91
Delayed Posttest		0.97	0.29
Pretest	Control	0.39	0.99
Delayed Posttest		0.48	0.97

Table 6 indicates the results obtained from Smirnov-Kolmogorov test for the explicit and control groups. Since the significance level for all the groups in pretest and delayed posttest is more than 0.05, it can be stated that the data of this study is distributed normally.

Equality of variances

Table 7. Results of Levene's test for comparing variances of delayed effect in explicit and control groups

F	Degree of freedom 1	Degree of freedom 2	Significance level
23.86	1	38	0.11

The results revealed in Table 4-6 confirmed the assumption related to equality of variances of groups based on Levene's test. Accordingly, $F=23.86$ and $P>0.11$ and the variances of the population are equal. That is, the distribution of scores related to delayed effect of explicit corrective feedback in both explicit and control groups are equal. Considering the assumptions mentioned earlier, the covariance analysis is presented in the following part:

Table 8. Results of covariance analysis of delayed effect on explicit and control groups

	Sum of squares	Degree of freedom	Mean of squares	F	Significance level	2η
Pretest	734.59	1	734.59	125.16	0.000	0.77
Groups	159.16	1	159.16	27.11	0.000	0.42
Error	217.15	37	5.86			

Table 8 illustrates the results of covariance analysis in the explicit and control groups concerning the delayed effect of explicit corrective feedback. In this analysis the scores related to pretest have been controlled statistically. That is, the effects of scores related to a similar variable are removed from the scores of delayed explicit corrective feedback and then the two groups are compared based on the remained variance. As the results of covariance analysis show, there is a significant difference in delayed posttests of explicit and control group ($F=27.11$, $P<0.05$); 2η is 0.42, that is, 42% of the reduction of segmental word-level pronunciation errors in delayed posttest is due to explicit corrective feedback.

Table 9. Mean and standard deviation of scores of delayed effect in explicit and control groups after controlling pretest

Group	Mean	Standard deviation	Confidence level	
			Low	High
Experimental	30.72	0.54	29.62	31.81
Control	26.73	0.54	25.63	27.82

Table 9 illustrates the mean and standard deviation of delayed effect of explicit corrective feedback on the control and explicit groups after controlling the similar variable. The mean score for the explicit group is 30.72 and for the control group is 26.73 which are significantly different. In other words, explicit corrective feedback is effective in reduction of segmental word-level pronunciation errors of learners in delayed posttest. Thus, it can be

argued that the second alternative hypothesis is confirmed and the second null hypothesis is rejected.

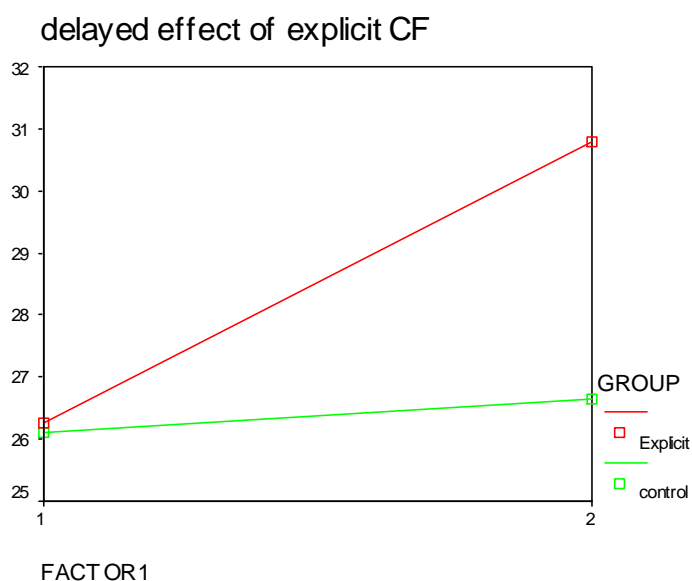


Figure 2. Comparing pretest and delayed posttest of explicit and control group

Testing the Third Hypothesis

Research Question 3 (RQ₃): Does implicit corrective feedback have any significant immediate effect on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners?

Null Hypothesis 3 (H₀₃): Implicit corrective feedback has no significant immediate effect on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners.

Alternative Hypothesis 3 (H₃): Implicit corrective feedback has significant immediate effect on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners.

Considering the use of pretest and posttest in conducting this study and for analyzing the data related to these hypotheses, covariance analysis was used in order to control the effect of pretest. In this study, Smirnov-Kolmogorov test was administered for ensuring normal distribution of data. And Levene's test was used in order to ensure the homogeneity of the data.

*Normal distribution of data***Table 10.** Results of Smirnov-Kolmogorov test for normal distribution of variables

Variables	Group	Test	Significance level
Pretest	Implicit	0.49	0.96
Posttest		0.74	0.63
Pretest	Control	0.39	0.99
Posttest		0.49	0.96

Table 10 indicates the results obtained from Smirnov-Kolmogorov test for the implicit and control groups. Since the significance level for all the groups in pretest and posttest is more than 0.05, it can be stated that the data of this study is distributed normally.

*Equality of variances***Table 11.** Results of Levene's test for comparing variances of immediate effect in implicit and control groups

F	Degree of freedom 1	Degree of freedom 2	Significance level
7.27	1	38	0.011

The results revealed in Table 11 confirmed the assumption related to equality of variances of the groups based on Levene's test. Accordingly, $F=7.27$ and $P>0.011$ and the variances of the population are equal; that is, the distribution of scores related to immediate effect of implicit corrective feedback in both implicit and control groups are equal. Considering the assumptions mentioned earlier, the covariance analysis is presented in the following part:

Table 12. Results of covariance analysis of immediate effect on implicit and control groups

	Sum of squares	Degree of freedom	Mean of squares	F	Significance level	2η
Pretest	848.34	1	848.34	335.16	0.000	0.9
Groups	121.99	1	121.99	48.19	0.000	0.56
Error	39.65	37	2.53			

Table 12 illustrates the results of covariance analysis in the implicit and control groups concerning the immediate effect of implicit CF. In this analysis the scores of pretest have been controlled statistically. That is, the effects of scores related to a similar variable are

removed from the scores of immediate implicit corrective feedback and then the two groups are compared based on the remained variance. As the results of covariance analysis show, there is a significant difference between the posttests of implicit and control groups ($F=48.19$, $P<0.05$); 2η is 0.56, that is, 56% of the reduction of segmental word-level pronunciation errors in posttest is due to implicit corrective feedback.

Table 13. Mean and standard deviation of scores of immediate effect on implicit and control groups after controlling pretest

Group	Mean	Standard deviation	Confidence level	
			Low	High
Experimental	29.85	0.35	29.13	30.57
Control	26.34	0.35	25.62	27.06

Table 13 illustrates the mean and standard deviation of implicit corrective feedback in the control and implicit groups after controlling the similar variable. The mean score for the implicit group is 29.85 and for control group is 26.34 which are significantly different. In other words, implicit CF is effective in reduction of segmental word-level pronunciation errors of learners in immediate posttest. Thus, it can be argued that the third alternative hypothesis is confirmed and the third null hypothesis is rejected.

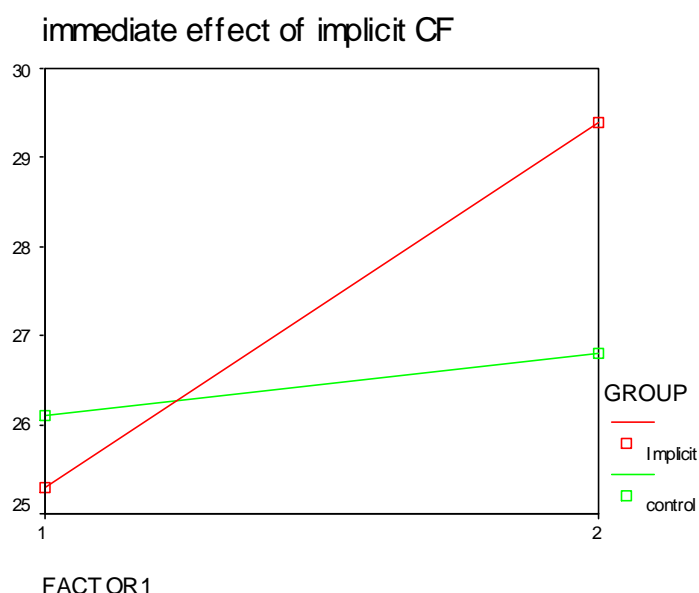


Figure 3. Comparing pretest and posttest of implicit and control group

Testing the Fourth Hypothesis

Research Question 4 (RQ₄): Does implicit corrective feedback have any significant delayed effect on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners?

Null Hypothesis 4 (H₀₄): Implicit corrective feedback has no significant delayed effect on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners.

Alternative Hypothesis 4 (H₄): Implicit corrective feedback has significant delayed effect on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners.

Considering the use of pretest and posttest in conducting this study and for analyzing the data related to this hypothesis, covariance analysis was used in order to control the effect of pretest. In this study, Smirnov-Kolmogorov test was administered for ensuring normal distribution of data. And Levene's test was used in order to ensure the homogeneity of the data.

Normal distribution of data

Table 14. Results of Smirnov-Kolmogorov test for normal distribution of variables

Variables	Group	Test	Significance level
Pretest	Implicit	0.49	0.96
Delayed Posttest		0.81	0.52
Pretest	Control	0.39	0.99
Delayed Posttest		0.48	0.97

Table 14 indicates the results obtained from Smirnov-Kolmogorov test for the implicit and control groups. Since the significance level for all the groups in pretest and delayed posttest is more than 0.05, it can be stated that the data of this study is distributed normally.

Equality of variances

Table 15. Results of Levene's test for comparing variances of delayed effect on implicit and control groups

F	Degree of freedom 1	Degree of freedom 2	Significance level
9.67	1	38	0.035

The results revealed in Table 15 confirmed the assumption related to equality of variances of groups based on Levene's test. Accordingly, $F=9.67$ and $P>0.01$ and the variances of the population are equal. That is, the distribution of scores related to delayed effect of implicit corrective feedback in both implicit and control groups are equal. Considering the assumptions mentioned earlier, the covariance analysis is presented in the following part:

Table 16. Results of covariance analysis of delayed effect on implicit and control groups

	Sum of squares	Degree of freedom	Mean of squares	F	Significance level	2η
Pretest	837.69	1	837.69	301.92	0.000	0.89
Groups	98.51	1	98.51	35.5	0.000	0.49
Error	102.65	37	2.77			

Table 16 illustrates the results of covariance analysis in the implicit and control groups concerning the delayed effect of implicit CF. In this analysis the scores related to pretest have been controlled statistically. That is, the effects of scores related to a similar variable are removed from the scores of delayed implicit CF and then the two groups are compared based on the remained variance. As the results of covariance analysis show, there is a significant difference between the scores of delayed posttest in the implicit and control groups ($F=35.5$, $P<0.05$); 2η is 0.49, that is, 49% of the reduction of segmental word-level pronunciation errors in delayed posttest is due to implicit CF.

Table 17. Mean and standard deviation of scores of delayed effect on implicit and control groups after controlling pretest

Group	Mean	Standard deviation	Confidence level	
			Low	High
Experimental	29.35	0.37	28.59	30.1
Control	26.19	0.37	25.44	26.95

Table 17 illustrates the mean and standard deviation of delayed effect of implicit CF in the control and implicit groups after controlling the similar variable. The mean score for the implicit group is 29.35 and for the control group is 26.19 which are significantly different. In other words, implicit CF is effective in reduction of segmental word-level pronunciation

errors of learners in delayed posttest. Thus, it can be argued that the fourth alternative hypothesis is confirmed and the fourth null hypothesis is rejected.

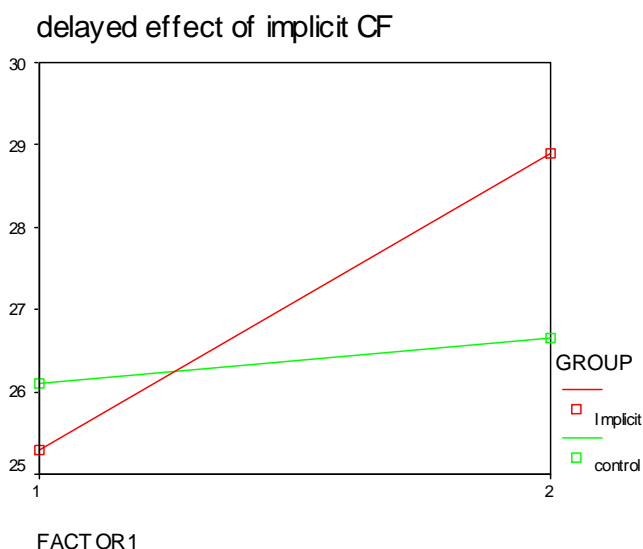


Figure 4. Comparing pretest and delayed posttest of implicit and control group

Testing the Fifth Hypothesis

Research Question 5 (RQ₅): Is there any significant difference in the immediate effect of explicit and implicit corrective feedback on segmental word-level pronunciation errors committed by low proficient EFL learners?

Null Hypothesis 5 (H₀₅): There is no significant difference in the immediate effect of explicit and implicit CF on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners.

Alternative Hypothesis 5 (H₅): There is significant difference in the immediate effect of explicit and implicit CF on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners.

Considering the use of pretest and posttest in conducting this study and for analyzing the data related to this hypothesis, covariance analysis was used in order to control the effect of pretest. In this study, Smirnov-Kolmogorov test was administered for ensuring normal distribution of data. And Levene's test was used in order to ensure the homogeneity of the data.

*Normal distribution of data***Table 18.** Results of Smirnov-Kolmogorov test for normal distribution of variables

Variables	Group	Test	Significance level
Pretest	Explicit	0.55	0.91
Posttest		0.72	0.67
Pretest	Implicit	0.49	0.96
Posttest		0.74	0.63

Table 18 indicates the results obtained from Smirnov-Kolmogorov test for the explicit and implicit groups. Since the significance level for all groups in pretest and posttest is more than 0.05, it can be stated that the data of this study is distributed normally.

*Equality of variances***Table 19.** Results of Levene's test for comparing variances of immediate effect on explicit and implicit groups

F	Degree of freedom 1	Degree of freedom 2	Significance level
3.95	1	38	0.054

The results revealed in Table 19 confirmed the assumption related to equality of variances of groups based on Levene's test. Accordingly, $F=3.95$ and $P>0.05$ and the variances of the population are equal. That is, the distribution of scores of posttests in explicit and implicit corrective feedback is equal. Considering the assumptions mentioned earlier, the covariance analysis is presented in the following part:

Table 20. Results of covariance analysis of immediate effect on explicit and implicit groups

	Sum of squares	Degree of freedom	Mean of squares	F	Significance level	2η
Pretest	929.35	1	929.35	128.57	0.000	0.77
Groups	20.98	1	20.98	2.9	0.000	0.07
Error	267.44	37	7.22			

Table 20 illustrates the results of covariance analysis related to immediate effect of explicit and implicit corrective feedback. In this analysis, the scores of pretest have been controlled statistically. That is, the effects of scores related to a similar variable are removed

from the scores of immediate effect of explicit and implicit corrective feedback and then the two groups are compared based on the remained variance. As the results of covariance analysis show, there is no significant difference between the scores of explicit and implicit corrective feedback in posttests ($F=2.9$, $P>0.09$). In other words, both explicit and implicit CF have equal immediate effect.

Table 21. Mean and standard deviation of scores of immediate effect on explicit and implicit groups after controlling pretest

Group	Mean	Standard deviation	Confidence level	
			Low	High
Experimental	29.97	0.6	28.74	31.19
Control	31.42	0.6	30.2	32.65

Table 21 illustrates the mean and standard deviation of posttests in explicit and implicit CF after controlling the similar variable. The mean score for immediate effect of explicit CF is 29.97 and for immediate effect of implicit CF is 31.42 which are not significantly different. In other words, the effectiveness of explicit CF is similar to implicit CF in immediate posttests. Thus, it can be argued that the fifth alternative hypothesis is rejected and the fifth null hypothesis is confirmed.

Testing the Sixth Hypothesis

Research Question 6 (RQ₆): Is there any significant difference in the delayed effect of explicit and implicit corrective feedback on segmental word-level pronunciation errors committed by low proficient EFL learners?

Null Hypothesis 6 (H₀ 6): There is no significant difference in the delayed effect of explicit and implicit CF on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners.

Alternative Hypothesis 6 (H₆): There is significant difference in the delayed effect of explicit and implicit CF on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners.

Considering the use of pretest and posttest in conducting this study and for analyzing the data related to this hypothesis, covariance analysis was used in order to control the effect of pretest. In this study, Smirnov-Kolmogorov test was administered for ensuring normal distribution of data. And Levene's test was used in order to ensure the homogeneity of the data.

*Normal distribution of data***Table 22.** Results of Smirnov-Kolmogorov test for normal distribution of variables

Variables	Group	Test	Significance level
Pretest	Explicit	0.55	0.91
Delayed Posttest		0.97	0.29
Pretest	Implicit	0.49	0.96
Delayed Posttest		0.81	0.52

Table 22 indicates the results obtained from Smirnov-Kolmogorov test for explicit and implicit groups. Since the significance level for all the groups in pretest and delayed posttest is more than 0.05, it can be stated that the data of this study is distributed normally.

*Equality of variances***Table 23.** Results of Levene's test for comparing variances of delayed effect on explicit and implicit groups

F	Degree of freedom 1	Degree of freedom 2	Significance level
3.85	1	38	0.057

The results revealed in Table 23 confirmed the assumption related to equality of variances of groups based on Levene's test. Accordingly, $F=3.85$ and $P>0.05$ and the variances of the population are equal. That is, the distribution of scores regarding the delayed effect of explicit and implicit corrective feedback is equal. Considering the assumptions mentioned earlier, the covariance analysis is presented in the following part:

Table 24. Results of covariance analysis of delayed effect in explicit and implicit groups

	Sum of squares	Degree of freedom	Mean of squares	F	Significance level	2η
Pretest	938.98	1	938.98	120.62	0.000	0.76
Groups	5.58	1	5.58	0.71	0.4	0.01
Error	288.01	37	7.78			

Table 24 illustrates the results of covariance analysis related to delayed effect of explicit and implicit CF. In this analysis the scores of pretest have been controlled statistically. That is, the effects of scores related to a similar variable are removed from the scores of delayed effect of explicit and implicit CF and then the two groups are compared

based on the remaining variance. As the results of covariance analysis show, there is no significant difference between the scores of delayed effect of explicit and implicit corrective feedback ($F=0.71$, $P>0.4$).

Table 25. Mean and standard deviation of scores of delayed effect in explicit and implicit corrective groups after controlling pretest

Group	Mean	Standard deviation	Confidence level	
			Low	High
Experimental	29.49	0.62	28.2	30.74
Control	30.22	0.62	28.95	31.49

Table 25 illustrates the mean and standard deviation of the delayed effect of explicit and implicit CF after controlling the similar variable. The mean score for delayed effect of explicit corrective feedback is 29.47 and for delayed effect of implicit corrective feedback is 30.22 which are not significantly different. In other words, the explicit corrective feedback is similar to implicit corrective feedback in delayed posttest. Finally, it can be argued that the last alternative hypothesis fails to be confirmed.

Discussion

The form of feedback that should be used has been a point of contention in ESL and EFL teaching in recent years. In a classroom setting where students receive feedback, they can usually expect to receive explicit feedback in the form of metalinguistic correction, or they can receive implicit feedback, often given in the form of recasts.

Research Questions One to Four

The obtained results related to the first four research questions showed the effectiveness of corrective feedback on reduction of pronunciation errors. There are several studies that revealed the general effectiveness of corrective feedback. Hence, the general results of these four hypotheses are in line with the following studies: Ferris (1999) has disputed this claim, arguing that it was not possible to dismiss correction in general as it depended on the quality of the correction – in other words, if the correction was clear and consistent it would work. Schmidt (1990), Swain (1998), and Long (1996) are also among those researchers who assign a facilitative role to feedback. They argue that corrective feedback draws learners' attention to form, and this noticing to form helps them to recognize the gap between their interlanguage and target language.

The first research question investigated whether explicit corrective feedback has any significant immediate effect on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners. As the results of covariance analysis exposed, there is significant difference between the scores of explicit group and control group in immediate posttest. Therefore, it can be concluded that explicit corrective feedback is effective in reduction of segmental word-level pronunciation errors in short term.

The second research question investigated whether explicit corrective feedback has any significant delayed effect on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners. As the results of covariance analysis showed, there is significant difference between the scores of explicit group and control group in delayed posttest. That is, explicit corrective feedback is effective in reduction of segmental word-level pronunciation errors in long term.

The third research question investigated whether implicit corrective feedback has any significant immediate effect on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners. According to the results obtained from covariance analysis, there is significant difference between the scores of implicit group and control group in immediate posttest. Thus, it can be concluded that implicit corrective feedback is effective in reduction of segmental word-level pronunciation errors in short term.

The fourth research question investigated whether implicit corrective feedback has any significant delayed effect on reduction of segmental word-level pronunciation errors committed by low proficient EFL learners. As the results of covariance analysis showed, there is significant difference between the scores of implicit group and control group in delayed posttest. Therefore, it can be concluded that implicit corrective feedback is effective in reduction of segmental word-level pronunciation errors in long term.

Studies Related to Research Questions One to Four

The results obtained from the following research projects are in line with the present study. Considering explicit feedback Van Patten (2003) advocated that explicit corrective feedback in the form of negotiating for meaning can help learners notice their errors and create form-meaning connections, and this facilitates acquisition.

Support for the greater benefits of more explicit feedback types comes, among others, from the studies conducted by Carroll and Swain (1993), Rosa and Leow (2004), Lyster (2004), Ellis et al. (2009), and Ellis (2007).

Carroll and Swain (1993) investigated different types of corrective feedback in acquisition of English dative verbs by adult native speakers of Spanish and found that all groups receiving feedback, explicit or implicit, performed significantly better at the end of the study than the control group. Any kind of feedback was hence found to be beneficial, but the group receiving explicit feedback outperformed the other groups.

The computer-based study undertaken by Rosa and Leow (2004) proved that the group which was provided with explicit feedback on accurate and inaccurate utterances as well as the opportunity to self-correct scored significantly higher on multiple-choice recognition tests and written controlled production tests than the one in which implicit correction was employed, although the students in this group still did better than the controls.

Ellis, et al. (2009) conducted a classroom-based study which investigated the impact of explicit and implicit CF on the acquisition of the regular past tense ‘-ed’ ending by lower-intermediate adult ESL learners in New Zealand. Also here the feedback groups did better than the controls, and prompts involving the use of metalinguistic information proved to be more effective than recasts in the long run, particularly with respect to the development of implicit knowledge as well as the occurrence of system-learning.

Similar in design was the study undertaken by Ellis (2007), which focused on the acquisition of the ‘-ed’ ending and the comparative, and also corroborated the superiority of more overt corrective feedback options.

Corresponding results have been reported by Sheen (2007), who compared the effects of direct correction coupled with metalinguistic explanation and recasts on the acquisition of English articles by intermediate-level students, as well as Varnosfadrani and Basturkmen (2009), who found that explicit correction resulted in better scores on individualized posttests, with the caveat that its contribution was mediated by the participants’ developmental readiness (i.e. it benefitted developmentally early features more than developmentally late features).

Finally, in a study conducted by Lyster (2004), he used corrective feedback with participants and divided them into three groups: 1) implicit feedback in the form of recasts, 2) explicit feedback, and 3) a control group. In his study, the explicit feedback group outperformed the implicit group and both experimental groups outperformed the control group. In addition to the laboratory studies, some classroom research studies, conducted by Doughty (1991) have also shown that explicit correction is more beneficial than implicit correction.

This overview would surely be incomplete without mentioning the researches which have failed to provide clear evidence for the greater effectiveness of explicit CF options, such as those conducted by Kim and Mathes (2001), Sanz (2003), and Loewen and Nabei (2007). The first of these was a replication of the study carried out by Carroll and Swain (1993), which was considered above, but it failed to identify statistically significant differences between any of the feedback conditions.

Some insights in this area can be gleaned from descriptive studies of error correction, such as those conducted by Lyster and Ranta (1997), Lyster (1998) or Panova and Lyster (2002), in which pronunciation problems constituted one of the categories of errors considered in terms of uptake and repair. All of these studies demonstrated that although recasts, which are input-providing and relatively implicit, were the most frequent, they were the least likely to generate output modifications or prompts. They proved to be effective in the case of pronunciation errors, but only because these were corrected during reading-aloud activities, in which their corrective function was transparent to the learner, and it is doubtful that they would have been responded to in the same way during fluency-oriented activities.

Research Questions Five and Six

The fifth research question investigated whether there is any significant difference in the immediate effect of explicit and implicit corrective feedback on segmental word-level pronunciation errors committed by low proficient EFL learners. As the results of covariance analysis revealed, there is no significant difference between the scores of explicit and implicit corrective feedback in immediate posttest. Thus, it can be concluded that the effectiveness of explicit corrective feedback is similar to implicit corrective feedback in short term and there is no difference between explicit and implicit feedback related to immediate posttest.

The sixth research question investigated whether there is any significant difference in the delayed effect of explicit and implicit corrective feedback on segmental word-level pronunciation errors committed by low proficient EFL learners. As the results of covariance analysis revealed, there is no significant difference between the scores of explicit and implicit corrective feedback in delayed posttest. Thus, it can be concluded that the effectiveness of explicit corrective feedback is similar to the effectiveness of implicit corrective feedback in long term and there is no difference between explicit and implicit feedback related to delayed posttest.

Studies Related to Research Questions Five and Six

The last two research questions revealed that explicit and implicit CFs in immediate and delayed forms have similar degree of effectiveness in correcting students' pronunciation errors. This revealed that both explicit and implicit feedbacks are effective in error correction, still the use of a certain method in correcting learners' errors is based on the preference of the teacher and the contextual and academic factors which are existent during providing feedback.

There are several studies conducted in this field which are generally in line with the findings of the present study. However, due to the novelty of this study there are no specified studies related to immediate and delayed effect of explicit and implicit CFs on pronunciation errors.

Saito and Lyster (2011) compared the effects of form-focused instruction with and without corrective feedback in the form of recasts on the acquisition of the English /r/ by 65 Japanese learners. They conducted acoustic analysis of the frequency values of the third formant in controlled and spontaneous speech production on a pretest and a posttest, and found that FFI with CF was more effective than FFI alone or a sheer focus on meaning.

The influence of corrective feedback on the occurrence of item-learning was also explored by Pawlak and Pospieszyn'ska (2003), who investigated the contribution of implicit correction in the form of recasts provided in communicative activities on 32 secondary school learners' ability to pronounce 36 problematic words. Even though the scores on the pretest, immediate and delayed posttest demonstrated a dramatic improvement, these findings have to be regarded with circumspection in view of the fact that there was no control group or a comparison group that would have received more explicit correction.

Jelska-Cydzik (2006), in turn, looked into the role of explicit instruction, which included a phase involving self-correction and peer-correction, in helping Polish learners of English gain greater control over word stress, thus focusing on item-learning rather than system-learning. The intervention proved to be effective in raising the learners' awareness of the stress patterns of particular words, but the weakness of the study is that the participants were requested to mark the primary stress in 40 instructional targets rather than to produce them.

Pedagogical Implications

Commonly, the field of foreign language teaching is focused on the teaching of grammar, writing, reading, and vocabulary. In this regard the spoken aspect of language learning and having the accurate and proper pronunciation have received inadequate attention and, therefore, the research conducted in this ground is limited. As can be seen from the foregoing discussion, error correction proved to be an effective way of helping learners eliminate persistent errors in the pronunciation of problematic words. Having precise and correct pronunciation requires teachers to present the related information properly, correct the occurred errors and provide students with adequate form of feedback. While it is much more difficult to draw definitive conclusions about the contribution of explicit and implicit corrective feedback options, the outcomes obtained from this study can help and guide EFL teachers in instructing learners in dealing with pronunciation problems.

According to the findings, there is no difference between explicit and implicit corrective feedbacks and teachers can make use of these two methods in correcting learners' errors considering the context of error occurrence and their own preferences, which is linked to different matters like the proficiency level and individual differences of learners, expertise of teachers and type of errors. Pedagogically, this will enhance teachers' effort in providing corrective feedback since the results also showed that both explicit and implicit feedback in immediate and delayed forms are effective in reducing learners' pronunciation errors.

In addition, the findings can better illuminate experienced EFL teachers' reasoning, knowledge, and beliefs about the teaching of pronunciation. This information should represent valuable source material for teacher education programs. On the other hand, learners' scores in delayed posttest were lower than their scores in immediate posttest; this requires teachers to review the taught materials related to pronunciation issues frequently so that learners may not forget the learnt and corrected errors within time.

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