

# The Role of individual differences in L2 learners' retention of written corrective feedback

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The present study aims to investigate the extent to which L2 learners' individual differences (field dependency and writing motivation) predict their retention of a teacher's written corrective feedback (CF) in the short and in the long run. Using Ellis's (2010) theoretical framework, the study examines the issue from cognitive and affective perspectives. Data was collected from 127 intermediate-level university students through written essays, a field-dependence/independence (FDI) questionnaire, and a writing motivation questionnaire, which were analyzed through *t* test, ANOVA, and multiple regression. The results reveal that there is a strong relationship between field independence (FI) style and the students' successful short-term and long-term retention of corrections in the subsequent writings. Writing motivation, however, influences the short-term retention of CF only.

*Keywords:* Field dependence; Field independence; Writing motivation; Corrective feedback; Learning style; Individual differences; Retention of corrective feedback

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**P**roviding feedback on L2 learners' errors has been widely accepted as an essential teaching strategy by both practitioners and researchers. Bitchener & Ferris (2012) suggest that the negative evidence, that

is, teacher's corrective feedback (CF), is an integral part of any formal instruction, which eventually leads to second language acquisition (SLA). However, research has not yet reached conclusive results on the effectiveness of CF. Though the majority of experts support the beneficial effects of feedback (e.g., Bitchener, 2008; Bitchener & Knoch, 2008; Ellis, Sheen, Murakami, & Takashima, 2008; Ferris, 2006; Rahimi, 2009; Sheen, 2007), debates are ongoing with regard to its effectiveness in improving L2 learners' writing accuracy (e.g., Fazio, 2001; Kepner, 1991; Polio, Fleck, & Leder, 1998; Truscott, 1996, 1999, 2004, 2007, among others).

The lack of supportive evidence for the positive effect of written CF has been attributed to the large gap that is present in CF research designs (e.g., Bitchener, 2008; Bitchener & Knoch, 2008; Ellis, 2010; Evans, Hartshorn, McCollum, & Wolfersberger, 2010; Ferris, 2010; Goldstein, 2005; Guénette, 2007). Previous written CF research designs are now believed to be incomplete because they have not taken into account the contextual and the individual factors (language learning context, learning style, and motivation), which contribute to the efficacy of feedback and improve L2 learners' autonomy in error correction. Ellis (2010) contends, "The vast bulk of CF studies have ignored learner factors, focusing instead on the relationship and the effect of specific CF strategies and learning outcomes" (p. 339). Ferris (2010), also, calls for further research that controls for learners' contextual and individual differences. She argues that the lack of sufficient research on these aspects is "one of the most surprising oversights in written CF research" (p. 196).

The present study addresses this issue by investigating the relationship between individual learner variables and the extent to which L2 learners improve their writing accuracy in response to the teacher's written CF.

## Literature Review

In spite of the important role of individual differences (IDs) in L2 learning (Brown, 2007; Williams & Burden, 1997), their contribution to L2 learners' engagement with written CF or writing development, for that matter, has not been sufficiently investigated in writing research. The following sections report on the studies that have, directly or indirectly, touched upon this issue.

### *Individual Differences*

Empirical studies that address IDs in the discipline of written CF can be divided into two categories. The first is a series of studies investigating individuals' general preferences and attitudes toward the use of CF (e.g., Cumming, 1995; Ferris, 1995; Ferris & Roberts, 2001; Gram, 2005; Hedgcock & Lefkowitz, 1994; Hyland, 1998; Lee, 2004; Leki, 1991; Zacharias, 2007). The results of these studies indicate that learners value teachers' written feedback and expect their instructors to comment on their errors. These studies, however, as mentioned above, do not directly address the issue investigated in the present study, that is, whether and to what extent IDs contribute to L2 learners' response to written CF.

The second set of studies focuses on the role of learners' cognitive processes as well as their perceptions and views in receiving, taking up, and retaining CF. For example, Goldstein (2006) explored the role of contextual and individual factors in acceptance and application of written CF. From a close examination of two L2 writers, he found that the interaction between their motivation and the instructional setting contributed to how they used written feedback. He argued that such factors as motivation, attitude towards setting, sociopolitical forces, and communication between teacher and students play important roles in whether and how the students responded to written CF.

In another case study, Qui and Lapkin (2001) investigated the role of the quality of noticing in the uptake of CF. A qualitative analysis of think-aloud protocols obtained from two students showed that L2 learners' quality of noticing while applying teacher's comments positively affected their uptake of CF. Sachs and Polio (2007) replicated this study with a larger number of participants and found a positive relationship between noticing the feedback and the accuracy of subsequent revisions.

Taking a sociocultural approach to data collection and analysis, Storch and Wiggleworth (2010) showed that CF uptake was highly dependent on the depth of engagement with errors. The results also showed that the affective factors such as beliefs about language use shaped by the learners' previous language learning experiences, attitude toward the form of feedback, and goals to improve the accuracy of their texts contributed to feedback retention.

Hyland (2011), too, showed the positive impact of learners' attitudes and motivation on their engagement with written CF. The results of the study indicated that students' willingness to engage with form-focused feedback highly depended on their learning goals. The study also showed that progress in developing accuracy was strongly associated with diverse motivational profiles. Similar studies focusing on the role of affective variables in the effective uptake of written CF by Swain (2006) and Swain and Lapkin (2003) confirmed the relationship between L2 learners' goals, attitudes, and beliefs and successful CF uptake.

Overall, although the studies reviewed above have touched on the issue of IDs and written CF, they mainly focus on cognitive strategies and attitudes. These variables, unlike learning styles and writing motivation, are of a general and changing nature. In fact, learning styles are rather fixed and stable and could strongly contribute to CF effect because they represent learners' "general approaches to and preferred ways of learning" (Cohen, 2012, p. 142). On the other hand, writing motivation is an important learner factor that is specifically relevant to written CF because it has been proved to enhance the writing ability (Troia, Harbaugh, Shankland, Wolbers, & Lawrence, 2013). Additionally, the existing research has concentrated on learners' uptake of CF (i.e., the improvement in the immediate revisions), which is not necessarily indicative of writing improvement (Truscott, 1996). The impact of L2 learners' learning styles and writing motivation on their retention of written CF (i.e., observed improvement on writing tasks over time), however, is yet to be explored.

***Learning style and written CF.*** Empirical research on the contribution of learning style to the efficacy of written CF, or even to writing pedagogy, for that matter, is almost nonexistent. What has so far been done investigates the relationship between learning style and SLA (e.g., Ehrman, 1996; Johnson, Prior, & Artuso, 2000; Kinsella, 1995; Oxford, 1995; Sternberg & Grigorenko, 2001; Williams & Burden, 1997). However, among the identified learning styles, only a few seem to have strong bearing on the issue of CF effect, due to their relevance to form-focused instruction (Ellis, 2001); one of these learning styles is field-dependence/field-independence (FDI), which was proposed early on (Naiman, Frohlich, Stern, & Todesco, 1978) as the most important variable for learning a second language and

continues to receive research interest. Previous research in this area, although limited to the relationship between FDI style and second language learning, could shed some light on the contribution of this learning style to L2 learners' engagement with CF.

The two opposing styles (field dependence [FD] vs. field independence [FI]) signify different approaches to learning a second language. For instance, according to Ellis (1989), FD learners are strongly influenced by context, prefer an integrative approach to learning, usually accept the plan and the assistance provided by others, and are more cooperative in problem-solving activities. FI learners, on the other hand, are more autonomous, can plan their own problem-solving structure, and "are able to operate in a more analytical fashion" (Ellis, 1989, p.250). Research has also shown that FI students are more successful language learners in a classroom context, while FD learners do better in informal contexts (Abraham & Vann, 1987; Chapelle & Roberts, 1986; Day, 1984). More specifically, FI learners benefit from second language form-focused instruction more than FD learners (Ellis, 1989).

**Writing motivation and written CF.** Similar to research on FDI style, previous studies on motivation do not directly address the issue explored in the present study. The existing research reports on the positive effect of motivation for language leaning on writing improvement (Goldstein, 2006; Hayes, 1996; Hyland, 2011; Zimmerman & Riesmberg, 1997). Motivation for writing, however, is different from that of language learning because writing tasks are inherently more challenging for the students as they involve "numerous lower- and higher-order psycholinguistic processes that are situated within a dynamic motivational state" (Troia et al., 2013, p. 18). Hence, writing motivation requires special attention in research on writing development.

In sum, although the research on FDI and motivation, reviewed above, sheds some light on the relationship between IDs and language learning, it does not have direct bearing on the contribution of FDI and writing motivation to the efficacy of written CF. The present study, hence, seeks to address this issue in some detail.

## Theoretical Framework

The study adopted Ellis' (2010) framework for investigating oral and written CF (Figure 1). The model is one of the few attempts that has sought to identify potential variables for exploration.

This framework describes how individual learner variables (i.e., cognitive and affective variables) and contextual factors (e.g., educational setting and language learning context) contribute to learners' response to and engagement with CF. As Ellis (2010, p. 338) suggests, these factors "mediate between the CF that learners receive and their engagement with the CF and thereby influence learning outcomes." He, however, emphasizes that the framework should not be regarded as a CF theory. He suggests,

The approach to the investigation of CF that I have expounded is componential, analytic, and, arguably, reductionist. The framework identifies specific variables involved in CF and provides a basis for examining each one separately and for investigating the relationships between them. (p. 346)

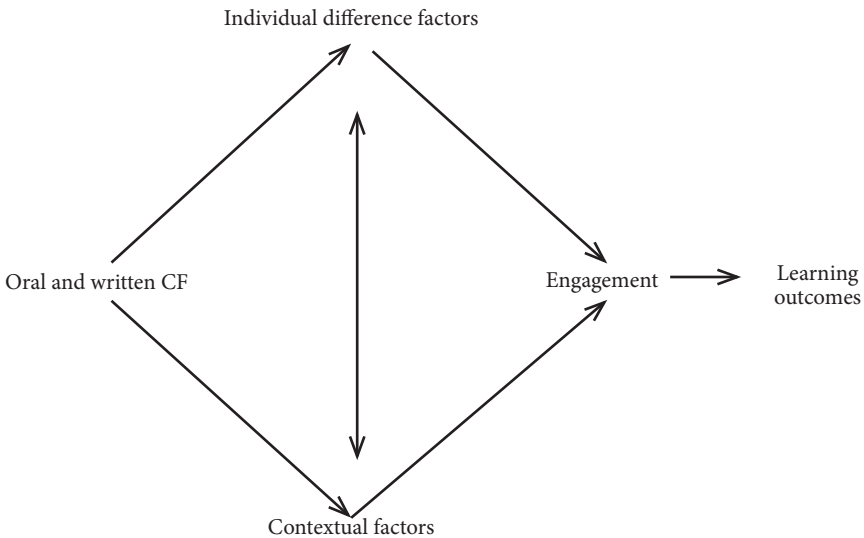


Figure 1. A componential framework for investigating CF (from Ellis, 2010, p. 337)

## Study Rationale

As mentioned above, Ellis (2010) argues that learners' IDs and contextual factors influence how and to what extent they respond to the teacher's CF and develop their interlanguage. Hence, in order to provide a clearer picture of the impact of CF on the improvement of L2 learners' linguistic accuracy, CF studies must incorporate these variables into their design. In a similar vein, Ferris (2010) emphasizes the important role of IDs in L2 learners' response to CF. She suggests, "some students benefit more from CF than others, for a variety of reasons such as motivation, learning style, and metalinguistic background knowledge" (p. 197). She also argues that contextual differences (EFL or ESL) are not accounted for in the present CF research. She, therefore, calls for research designs that take contextual and individual differences into account. In line with these discussions, the present study investigates the impact of FDI and writing motivation on students' short- and long-term retention of teacher's CF in an EFL context.

## Research Questions

To investigate the relationship between IDs and the efficacy of written CF, the following research questions were asked:

1. To what extent do EFL learners retain teacher's CF in their subsequent texts both in the short and in the long term?
2. To what extent do FDI style and motivation for writing predict Iranian EFL learners' short- and long-term retention of written CF?

## Method

In order to explore the extent to which writing motivation and FDI predict EFL learners' short- and long-term retention of written CF (if any), a pre-, post- and delayed post-test design was adopted.

## *Participants*

Data were collected from 127 sophomore EFL learners (85 females, 42 males), aged between 20 and 22, in a large public university in Iran. They were native speakers of Persian but had studied English (as one of their compulsory courses) at school for six years, and the courses they had passed in the first year of the university were all in English. All the participants had passed an advanced-writing, two reading, and two conversation courses and were taking a linguistics, an oral reproduction of stories, and four literature courses at the time of the experiment. This sample was selected from an original population of 157 students participating in four intact essay writing classes, who had been randomly assigned to an experimental (two classes) and a control (two classes) group. The essay-writing course was a developmental writing class intended to teach the students how to write well-organized expository and argumentative essays and prepare them for the following academic writing course.

The participants had intermediate English, which was the required proficiency level for the courses they were taking. However, as this was not tested by the university, they also completed a proficiency and then a writing test to provide a more accurate evaluation of their level of language proficiency and writing ability. Ensuring a homogenous sample in terms of general language proficiency and writing ability was important as these were not variables of interest in the present study.

The participants' general language proficiency was measured by the Oxford Placement Test (OPT) and their writing ability was evaluated by having them write an essay on an assigned topic, for which they were given 105 minutes (the whole class time). The essays were rated based on the Jacobs, Zinkgarf, Wormuth, Hartfiel, and Hughey (1981) ESL Composition Profile, which is an analytic scoring scheme assessing writing content and accuracy. Based on the results obtained from the OPT, 139 students were at an intermediate level of proficiency. From among the students who took the writing test, the data belonging to the ones whose scores fell within two standard deviations above and below the means ( $n = 127$ ) were retained.

The teachers who taught the essay writing class were two experienced writing instructors who worked under the supervision of the researcher.



The syllabus, the teaching procedures, and the feedback strategies were all designed by the researcher. Instructor effect was removed by having each teacher teach one experimental group and one control group.

### ***Materials***

The students wrote six in-class essays during the 16-week academic term, focusing on a variety of expository and argumentative topics. They then revised them based on their teachers' written CF (form and content feedback for the experimental group and content feedback for the control group). Based on the study design (pre-test, post-test, delayed-post-test), only the first essay, the pre-test, and the sixth essay, the post-test, were retained. The delayed post-test was administered to the participants eight weeks following the termination of the experiment (the time interval between the fall and the winter terms) in the first session of the participants' subsequent class, an academic writing course. It focused on an argumentative topic and was also used as data. The purpose of this delayed writing task was to collect data on the students' long-term retention of CF (improvement observed in the accuracy of their subsequent writings in the absence of CF). The topics for the pre-, post-, and delayed post-tests were as follows:

1. Do you believe that the existing co-ed university classes are more effective than the segregated classes? Provide reasons and examples for your response.
2. Although exams constitute an integral part of any educational system, some believe that they are not only useless but also detrimental to learning and must be removed from the educational system. To what extent do you agree or disagree with this opinion?
3. Attending university classes should not be obligatory. To what extent do you agree or disagree with this opinion?

It is worth mentioning that parallel writing topics were selected to ensure that the improvement (if any) observed in the students' writing accuracy would not stem from their need to use different lexical terms and syntactical patterns.

## *Measures*

Three tests were used to measure FDI and student writing motivation in the experimental group: GEFT, Block Designs, and writing motivation scale.

**GEFT scale.** The Group Embedded Figures Test (GEFT) (Witkin, Oltman, Raskin, & Karp, 1971) was used to collect information on students' FDI style because it is the most commonly used measure of FDI style. The test requires the participants to locate a previously seen figure within a large complex figure. The test consists of three sections. The first section is a two-minute warm-up session, composed of seven easy figures to be located. The second and the third sections, which must be completed in 30 minutes, include nine items each. An item is considered correct if the respondent locates and traces simple forms embedded within complex drawings. Scoring is based on the number of items correctly traced, and may range from 0-25. A higher score is associated with a more FI style, while a lower one is indicative of a more FD style.

**Block Designs.** According to Johnson et al. (2000), to increase the construct validity, one should use two measures of FDI. A high correlation between the two measures confirms the validity of the obtained results. In their study, Johnson et al. (2000) used GEFT as their main instrument and correlated the results obtained from this measure with those of another instrument called Block Designs (Wechsler, 1981). Block Designs is a timed task in which the learners should use colored blocks to reproduce pictures models. Similar to the results obtained from GEFT, a higher score indicates a more FI style. The participants of the present study took the Block Designs, too. The correlation between the participants' scores obtained from these two instruments was 0.82, higher than those reported in Johnson et al. (2000) (0.78) and Witkin, Dyk, Faterson, Goodenough, and Karp (1962) (0.65). The reliability index acquired for GEFT was 0.89.

**Writing motivation scale.** The students' level of writing motivation was measured by The Writing Motivation Scale (WMS) adopted from Troia et al. (2013). This questionnaire forms part of a larger scale, which measures writing motivation, self-efficacy, success attribution, and so on. However, only the writing motivation section, which is the largest and the most important part of the test, and which is relevant to the aim of the present study, was adopted. The questionnaire consists of 30 items on an 11-point

scale, ranging from 0% (totally disagree) to 100% (totally agree), with increments of 10. The reliability obtained for this instrument was 0.91. All the three tests were administered to the students within the same session.

### ***Research Procedures***

The study was conducted in a university essay-writing course. The major objective of the course was to help the students write well-developed and well-organized expository and argumentative essays; however, linguistic accuracy was also emphasized. That is, for each essay genre, the typical grammatical patterns (e.g., patterns used for expressing causal relationships) were highlighted and briefly explained while sample essays were introduced to the students. The first half of the semester focused on introducing and practicing expository essays, while the second half dealt with presenting and practicing argumentative essays. Six class sessions were devoted to each essay type. That is, for each genre, two full class periods focused on presenting writing models and analyzing their different components in order for the students to become familiar with the discursive structure of the genre in question. Then, four class sessions were spent on having the students write essays on the given topics and revise their writing after receiving the teacher's CF.

The students in the experimental group wrote three expository and three argumentative essays (450–550 words), received the teacher's CF and revised their writing based on the feedback. The time allotted to completing each writing task was 105 minutes (essentially a full class period). The CF did not target the linguistic errors only. Comments were also given on the organization and the content of the essays; these comments addressed such issues as appropriate sequencing of the essay content, coherence, and relevance of the content to the topic of the essay. The procedure for the control group was similar to the experimental group except that they only received feedback on content. They were also told to look for language errors and correct them in their revisions. This group served as a comparison group in order to see whether the improvement (if any) observed in the writing accuracy of the experimental group was the result of the teacher's CF, or, the result of practice with writing, which over time helps students improve their accuracy (Truscott, 1996).

**Error.** As mentioned above, the students in the experimental group received CF on their linguistic errors. These errors were classified into five major categories: verb, noun, article, word, and sentence. These categories were adopted from Ferris & Roberts' (2001) error classification.

The indirect written feedback given to students was provided in a coded form according to the above categories. Ferris (2003, p. 52) asserts that indirect feedback, as compared to direct feedback, contributes to long-term improvement of students' writing due to "the increased student engagement and attention to forms and problems." Comments on content and organization, which were provided according the rubrics in ESL Composition Profile (Jacobs et al., 1981), were written in the margins, within the texts, and at the end of the texts.

The linguistic errors of the students in the control group were identified and recorded on separate sheets, counted, and compared in the different drafts for analysis. The students in this group, however, did not see any comments targeting their language errors on their papers.

In order to ensure the accuracy of error coding, before analyzing the data, 15% of the essays were selected randomly and reviewed by the researcher and a native English speaker with experience in teaching writing. The Cohen's Kappa inter-coder reliability was calculated through SPSS; the acquired index was 0.97, which, according to Landis and Koch (1977), is an outstanding agreement index. Table 1 illustrates the data collection procedure.

Because the study focused on the grammatical accuracy of students' writing, the number of grammatical errors in each error category and the total number of errors in each task were calculated. In order to calculate the error means, the procedure suggested by Biber, Conrad, and Reppen (1998) was followed—the error counts were divided by the number of words in the text and then multiplied by a standard number representing the average number of words in each text in the whole sample, which was 500 in the present study. In addition to this, the experimental groups' mean scores on GEFT and WMS, which indicated their level of motivation and FI, were calculated.

The data were subjected to two repeated-measures (RM) ANOVA to compare the differences between the error means of the pre-, post-, and delayed post-tests of each group (control and experimental), which indicated the short- and the long-term retention of CF. Three independent *t*

Table 1. Data Collection Procedure

Week	Procedure
Week 0	Writing motivation questionnaire, GEFT, and Block Design (Experimental group only)
Week 1	OPT & Writing test
Weeks 2–3	Introduction to expository essay
Week 4	Essay 1 (Pre-test): In-class expository essay
Week 5	Revision of Essay 1
Weeks 6–9	Practicing expository essay and writing two new drafts and revising them (at home and in-class)
Weeks 10–11	Introduction to argumentative essay
Weeks 12–14	Practicing argumentative essay and writing two new drafts and revising them (at home and in-class)
Week 15	Essay 6 (post-test): In-class argumentative essay
Week 16	Revision of Essay 6: End of the term
Week 24	Essay 7 (delayed post-test): In-class argumentative essay (Beginning of winter term)

tests were run to compare the error means of the two groups on the pre-, post-, and delayed post-tests. Finally, in order to investigate the extent to which FDI and writing motivation predicted the experimental group's retention of CF in the short and in the long run, two multiple regression analyses were run: one for the short-term retention of CF (the difference between the pre- and the post-test) and the other for the long-term retention of CF (the difference between the pre- and the delayed post-test).

## Results

The main concern of the present study was investigating the impact of the students' IDs (FDI style and writing motivation) on their retention of teacher's CF (i.e., the improvement observed in their writing accuracy on subsequent essays) over time. Hence, the first set of analyses examined whether any reduction can be observed in the errors made by the students in their subsequent essays as a result of being exposed to the teacher's CF.

### *CF Effect on the Improvement of Writing Accuracy*

Table 2 presents the results of RM ANOVA for the differences between the error means of pre-, post-, and delayed post-tests of the experimental group.

The results of RM ANOVA show a significant effect for the CF ( $F = 112.24$ ,  $p < .001$ ), indicating that the experimental group significantly improved their writing accuracy and retained the corrections over time. The results of the post hoc paired t tests showed that all the differences between the means were significant; that is, the error mean significantly reduced from the pre-test to the post-test, and from the post-test to the delayed post-test. The effect size for the differences between the means is 0.75, which is a large value. According to Cohen (1988), an effect size index greater than 0.70 is regarded as a large effect size value.

Table 2. RM ANOVA for the differences between error means of pre-, post-, & delayed post-tests (experimental group)

	Mean	<i>F</i>	<i>p</i>	Effect size
Pre-test	32.09	112.24	.00	0.75
Post-test	22.64			
Delayed	17.90			

The means of the experimental group were compared with those of the control group, who did not receive any CF on their language errors, to see if the observed improvement was due to the CF they received. The performances of the two groups on the three tests were compared using independent t tests. The results are illustrated in Table 3.

The results indicate that although the two groups were similar with respect to their writing accuracy at the beginning of the term, the students in the experimental group, who received CF, made significantly fewer errors than the control group in the subsequent essays. The results for the

Table 3. T-test results for the difference between the error means of experimental and control groups

Group	Pre-test		Post-test		Delayed	
	Exp.	Cont.	Exp.	Cont.	Exp.	Cont.
Mean	32.09	31.55	22.64	27.60	17.30	26.87
<i>t</i>	0.30		5.89*		8.93**	
Effect size			0.53		0.79	

\* $p < .05$     \*\* $p < .001$

post-test show an error mean of 22.64 for the experimental group and an error mean of 27.60 for the control group. The difference between the two means is significant ( $t = 5.89, p < .05$ ) with a moderate effect size (0.53). The same is true for the delayed post-test ( $t = 8.93, p < .001$ ) with a large effect size (0.79). Hence, it can be claimed that the teacher's CF helped the experimental group to outperform the control group in improving their writing accuracy over time.

In order to more confidently attribute this improvement to the teacher's CF, it was needed to specifically look at the type of error that the students in the experimental group previously committed and received feedback on. In so doing, the error means on the five error categories on which CF was provided were calculated and compared between the three essays through RM ANOVA. Table 4 illustrates the results.

Table 4. ANOVA for the difference between the error means of pre-, post-, & delayed post-tests (Experimental group)

Category	Pre-test	Post-test	Delayed	<i>F</i>	<i>p</i>
Verb	6.87	4.84	3.78	37.7	8.00
Noun	4.19	2.99	1.95	35.85	.00
Article	13.4	9.91	8.49	43.01	.00
Word	4.80	3.04	2.20	19.41	.01
Sentence	2.74	2.04	1.34	21.98	.00

As the results show, for all the five categories, verb, noun, article, word, and sentence, one can see a significant effect for the CF. The results of the follow-up paired t tests revealed that all the differences were significant, indicating that the students improved their errors in the specific categories on which they received feedback from the pre-test to the post-test, and from the post-test to the delayed post-test. These results confirm the data in Table 3, attributing the reduction observed in the error means to the teacher's CF.

### ***Effect of IDs on the Short- and Long-term Retention of CF***

In order to examine the relationship between the IDs and the short-term retention of CF, the error mean loss was calculated by subtracting the error mean of the post-test from that of the pre-test and then a multiple regression test was run. The results showed that the overall regression model was

significant ( $F = 29.19, p < .001$ ). The results also showed an  $R^2$  value of 0.52, indicating that the two predictor variables accounted for around 52% of the variation observed in the dependent variable (retention of CF). Table 5 illustrates the coefficients for the writing motivation and FDI.

Table 5. Regression coefficient for the effect of writing motivation and FDI on short-term CF retention

Indep. variables	$\beta$	$p$	$R^2$
FDI	0.48	.00	0.52
Writ Mot	0.34	.00	

As the results indicate, both motivation for writing and FDI have significantly predicted the short-term retention of feedback. The B values show that FDI is a stronger predictor than writing motivation (0.48 and 0.34, respectively). As for the learning style, the  $\beta$  value indicates that for every unit of increase in FI, one can see 0.48 units of decrease in the error mean of the subsequent essay (the post-test), while this index for writing motivation is 0.34 units.

The same procedure was followed for the error categories to see if the short-term retention of CF observed in these categories, too, can be predicted by the participants' IDs. The results of multiple regression revealed that the two IDs predicted the students' short-term retention of four categories, namely, verb ( $F = 3.83, p < .01$ ), noun ending ( $F = 3.04, p < .05$ ), article ( $F = 4.23, p < .001$ ), and sentence ( $F = 2.92, p < .05$ ). Table 6 presents the coefficients for these four categories.

Table 6. Regression coefficient for the effect of IDs on short-term retention of CF on error categories

Category	$\beta$	
	FDI	Writing motivation
Verb	0.39*	0.29*
Noun	0.37*	0.28*
Article	0.41*	0.32*
Sentence	0.35*	0.30*

\* $p < .05$



The same statistical procedure was followed for investigating the link between the students' IDs and the long-term retention of feedback (the improvement observed from the pre-test to the delayed post-test). The results showed that the overall regression model for the long-term effect of feedback was significant ( $F = 8.62, p < .001$ ). The  $R^2$  value for this test was 0.24, which indicates that the participants' IDs altogether accounted for about 24% of the variation observed in the dependent variables (i.e., long-term retention of feedback). Table 7 illustrates the coefficients for the two variables.

Table 7. Regression coefficient for the effect of writing motivation and FDI variables on long-term feedback retention

Indep. variables	$\beta$	$p$	R2
FDI	0.34	.01	0.24
Writing motivation	0.22	.10	

As illustrated in Table 7, unlike the short-term feedback retention, only FDI has significantly predicted feedback retention in the long run. The  $\beta$  value for FDI is almost similar to that of short-term retention ( $\beta = 0.34$ ), indicating that the variation in this learning style accounted for 0.34 unit of variation (decrease) in the error mean on the delayed post-test.

Regarding the error categories, similar to the overall errors, only FDI influenced the long-term retention of CF. Here, however, the results were significant for three categories only, that is, verb ( $F = 3.12, p < .05$ ), noun ending ( $F = 2.78, p < .05$ ), and article ( $F = 3.64, p < .05$ ). Table 8 illustrates the coefficients for these four categories.

Table 8. Regression coefficient for the effect of IDs on long-term retention of CF on error categories

Category	$\beta$	
	FDI	Writing motivation
Verb	0.31*	0.17
Noun	0.27*	0.15
Article	0.35*	0.21

\* $p < .05$

## Discussion of the Results

For the most part, the results of the first section of the study showed that the teacher's CF helped the participants improve their errors over time. These findings confirm the results of such studies as Bitchener (2008) and Ellis et al. (2008), in that they also found a significant enduring impact for the written CF. The findings of the present study, however, challenge Truscott's (1996, 1999, 2004, 2007) claims regarding the fact that feedback can have negative effects on the students' writing accuracy in their subsequent writings. The findings are also incompatible with Truscott and Hsu's (2008) research results in that, although their study found support for the beneficial effect of error correction on immediate revisions, it rejected the feedback's longitudinal positive effect on the learners' writing development. They concluded that successful performance in revision acts could not lead to good performance on new tasks of writing.

The results of the study also showed a significant positive effect for both cognitive (FI) and affective (writing motivation) factors on the retention of teacher's CF. More specifically, FI successfully predicted the retention of CF both in the short run and in the long run. In other words, FI-oriented learners benefited from the teacher's CF more than FD-oriented ones and wrote more accurately on the subsequent writing tasks over time. The same was true for the students with a higher level of motivation for writing.

These findings support the theoretical assertions of a number of recent studies (e.g., Ellis, 2010; Ellis, 2012; Ferris, 2010; Goldstein, 2005; Guénette, 2007; Hyland & Hyland, 2006) that have attributed the diversity of L2 learners' performances in taking up and applying feedback to their individual characteristics (e.g., motivation, L1, learning styles, goals) as well as to the context in which they receive feedback. Besides, the findings are in line with Brown (2007), Dörnyei (2005), Ehrman & Leaver (2003), Ellis (2012), Mackey, Philip, Egi, Fujii, and Tatsumi (2002), Robinson (2002), and Skehan (1989), who deem a significant role for the learner-internal variables (specifically cognitive and affective ones) as the important factors that mediate between instruction and L2 learning.

More specifically, with regard to FDI style, as mentioned above, the previous studies have confirmed the relationship between FDI and L2 learning in general (Chapelle & Green, 1992; Bialystok & Hakuta, 1994; Tinajero &

Páramo, 1998). However, given that the students' retention of CF on their linguistic errors indicates interlanguage development (Ellis, 2006), then the results of the present study corroborate the findings of the previous research suggesting that FI-oriented L2 students are more successful language learners in a formal classroom context (Hansen & Stansfield, 1981; Day, 1984; Chapelle & Roberts, 1986; Abraham & Vann, 1987; Stansfield & Hansen, 1983). As stated by Johnson et al. (2000, p. 539), "the superior restructuring ability associated with the FI pole should facilitate linguistic analysis and thus acquisition of formal competence in second language." Similarly, Ellis (2001) finds FI students' large capacity for grammatical analysis an important factor in their higher success in language learning, as compared to FD learners.

The results related to the specific error categories add further support to this discussion. As the results showed, FI affected the retention of CF in the errors belonging to four categories, that is, verb, noun ending, article, and sentence in the short run, and verb, noun ending, and article, in the long run. Recognition of the errors in these categories and application of teacher's feedback require careful and detailed linguistic analyses, for example, using proper verb tense, right article, correct sentence structure, and so on. Moreover, recognizing and correcting the errors identified with codes are very challenging and require complex cognitive analyses, which corresponds more to the learning orientations of FI learners (Witkin et al., 1962; Witkin & Goodenough, 1981).

The results, nonetheless, showed no relationship between the improvement observed in the errors belonging to the word category and FI style. In other words, no difference was found between the FI and FD learners in improving their word errors over time. A likely explanation for this finding might be the fact that word errors are untreatable and non-rule-governed (Ferris & Roberts, 2001). Hence, the FI learners' higher ability in linguistic analysis did not give them an advantage over the FD learners in correcting word errors. Jamieson (1992) contends that FI learners' ability to perceive analytically is associated with understanding language as a system. This systematic aspect of language is not manifested in the errors of this category.

However, although sentence structure errors, too, are untreatable, the results of the present study showed that FI significantly predicted the

decrease in the errors of this category in the short run. Rahimi (2009) argues that for Persian learners of English, in lower-intermediate to intermediate proficiency levels, errors in the sentence category can be categorized as treatable since they are quite limited and, hence, more recognizable and amenable to correction. For the Iranian learners participating in Rahimi (2009), the sentence structure errors were mainly run-ons (more than 60%), the majority of which could be corrected by replacing a comma with a semicolon or a full stop. Rahimi (2009) suggests that this phenomenon stems from the interference of learners' L1 (Persian) and the dominant teaching method in the EFL context of Iran.

Similarly, in the present study, 63% of the sentence errors in the pre-test were run-ons, whereas this number reduced to 32.5% in the post-test. Hence, since the majority of the sentence errors in the first essay were rule-governed, the FI participants' analytical and problem-solving ability helped them recognize and use them more correctly than the FD ones in their subsequent writings.

The above discussion corroborates Ellis's (2010) idea of the interaction of IDs and contextual factors in mediating between CF and learning outcomes. Given that Rahimi (2009) considers sentence structure errors treatable for the Iranian learners of English with an intermediate English proficiency, one can argue that the students' context of language learning and their L1—Persian—contribute to their retention of feedback on sentence errors. Concerning the long-term retention of CF, however, FI did not predict the reduction observed in the sentence errors. Following the above discussion, one could argue that the nature of the students' sentence errors changed as they had more practice with writing, received feedback on their errors and corrected the sentence errors they had at the beginning. As a result, they attempted to use more complex structures and this led to different types of errors, which were more difficult to correct due to their untreatable nature. A review of sentence errors in the post-test revealed that only 22% of the errors in sentence structure originated from using run-ons; the remaining ones belonged to erroneous embedded sentences, lack of subject-verb agreement, fragments, and so on.

In regard to the affective factor, the results of the present study showed a significant relationship between the participants' short-term retention of CF and their writing motivation. The findings support those of the studies

which envisaged a central role for L2 learners' motivation in the process of feedback implementation (e.g., Goldstein, 2006; Guénette, 2007; Hyland, 2011; Storch & Wiggleworth, 2010; Swain, 2006; Swain & Lapkin, 2003) and those that found a link between motivation and writing development (Chenoweth & Hayes, 2003; Goldstein, 2006; Guénette, 2007; Hayes, 1996; Kormos, 2012; Pintrich & Schunk, 2002; Shute, 2008; Troia et. al, 2013; Zimmerman & Riesmberg, 1997). However, as mentioned above, so far, no study has investigated the relationship between L2 learners' motivation for writing and the efficacy of teacher's CF.

All in all, the results of the present study confirm Ellis's (2010) framework of CF—that is, teacher's CF does not simply and unconditionally lead to learning. This relationship is mediated by learner's individual characteristics, namely, cognitive and affective variables, as well as the specific features of the learning context.

## Conclusions and Implications

The findings of the present study make notable contributions to the current CF literature and classroom practices. By being aware of the individual characteristics and the important role they play in the learning process, teachers can better devise their instructional methods and plan the most suitable writing tasks and correction strategies that best address their learners' strengths and weaknesses. In other words, they should fine-tune their feedback approach to adjust it to their learners' needs and individual characteristics (Ferris, Liu, Sinha, & Senna, 2013).

More specifically, since the result of the present study showed that indirect written CF is more in line with the superior restructuring ability associated with FI learners, a different feedback method should be adopted for FD learners. A more explicit and, at the same time, interpersonal and communicative feedback method such as teacher-student conferences on a one-on-one basis might help FD learners to take advantage of teacher's comments. As Ellis (2001) suggests, pushing L2 learners to adapt to the teacher's method of instruction would create a state of anxiety in them. Rather, writing teachers should try to match their instruction and the students' learning style through "the teacher catering for individual needs during the moment-by-moment process of teaching (i.e., by emphasizing

group dynamics and offering a range of activity types)” (Ellis, 1989, p. 260).

At the same time, teachers can help students learn how to change their approach to learning. As Wang and Nunan (2011, p. 146) state, we need “the addition of a learning-how-to-learn dimension to the curriculum as the key.” This helps to make a balance between the two approaches, that is, adapting the instruction to the students’ learning orientations and, at the same time, helping them to adapt their learning habits so that they can make their learning more effective.

The results of the present study, however, need to be interpreted cautiously due to some important limitations. First, in Ellis’s (2010) framework, cognitive and affective factors include a wide range of variables. The present study, however, focused on one cognitive and one affective factor. To explore the interaction between CF and the mediating variables more accurately, further research could ideally include a wider range of factors—induction/deduction, ambiguity tolerance, general language learning motivation, and L2 learners’ attitude toward the teacher’s CF.

Moreover, as one of the contributing factors identified in the model is the context of learning, further studies could investigate the impact of the same variables in a different context (ESL context, for example). Additionally, the study only examined the students’ improvement of writing accuracy, which is but one aspect of writing development. Further studies can focus on the overall writing quality and fluency and explore the contribution of IDs to the CF effect on these aspects.

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