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The Efficacy of Different Types of Metalinguistic Information in L2 Written Corrective Feedback

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The study investigates whether differences in metalinguistic information contained in written corrective feedback (CF) mediate its effectiveness for second language (L2) development. To address this, metalinguistic CF was distinguished into three types in terms of how specific its metalinguistic information was. They were then compared among themselves and with non-metalinguistic direct CF in their efficacy for short- and long-term development of explicit and implicit L2 knowledge. The target features for written CF were the English articles, and explicit and implicit knowledge were measured by the error correction test and dictogloss writings by 93 EFL learners respectively. The results suggest that, for both explicit and implicit L2 knowledge, metalinguistic CF was beneficial for short-term development only when it had high levels of specific information while it was effective for long-term development regardless of its type. The findings are discussed from the perspective of SLA theory, and their pedagogical implications and suggestions for future research are put forth.

Key words: written corrective feedback, metalinguistic information, explicit knowledge, implicit knowledge

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1. INTRODUCTION

It has been an important issue in SLA research whether oral and written corrective feedback (CF) can contribute to second language (L2) learning. Oral CF has long been examined in the SLA literature, and yet the question on its efficacy still remains inconclusive. Some studies have provided evidence for its positive effects (Doughty & Varela, 1998; Long, Inagaki, & Ortega, 1998; Mackey, 1995, 1999; Mackey & Oliver, 2002) while other studies have demonstrated its ineffectiveness (Ellis, 2007; Lyster, 2002, 2004). More recently, written CF began to be taken seriously from the perspective of SLA. It was largely triggered by Truscott's (1996) influential study arguing that written CF is not helpful and even harmful to L2 acquisition and suggesting that it should not be practiced in L2 classes. However, a number of subsequent studies empirically showed that, opposite to his claim, written CF improved L2 knowledge (Bitchener, 2008; Bitchener & Knoch, 2008; Chandler, 2003; Ellis, Sheen, Murakami, & Takashima, 2008; Ene & Upton, 2018; Han, 2019; Sheen, 2007; Simard, Guenette, & Bergeron, 2015).

Written CF research advanced to explore factors that could mediate its efficacy. Learner internal factors such as language aptitude (Sheen, 2007), language anxiety (Jang, 2013) and proficiency level (Jang, 2014) were reported to have a mediating impact. As for learner external factors, research has widely examined written CF type, drawing on its various classifications. Some studies distinguished focused CF from unfocused CF (Bitchener & Knoch, 2008; Ellis et al., 2008; Sheen, 2007) while other studies compared direct CF with indirect CF (Chandler, 2003; Ferris, 2006; Robb, Ross, & Shortreed, 1986; Semke, 1984). Research has shown that the efficacy of written CF is affected by both its focused/unfocused and direct/indirect aspects. Another line of studies differentiated written CF according to whether to deliver error-related metalinguistic information and showed that metalinguistic CF was more effective than non-metalinguistic CF (Bitchener, 2008; Bitchener & Knoch, 2008, 2010; Jang, 2012a, 2012b, 2013, 2014; Lado, Bowden, Stafford, & Sanz, 2014; Sheen 2007, 2010). However, metalinguistic information offered via written CF in those studies varied considerably in its nature. Motivated by such diversity of metalinguistic information appearing in written CF literature, the current study aims to compare different types of metalinguistic CF, both among themselves and with non-metalinguistic CF, in their efficacy in order to get a fuller understanding of how written CF is linked with L2 acquisition.

2. THEORETICAL BACKGROUND

2.1. Written CF in SLA

Written CF did not receive much attention until the mid-1990s from SLA researchers who had primarily focused on oral CF. It was initially investigated by L2 writing experts who took a process-oriented approach to writing. The approach places a high value on enabling students to produce revised texts of a higher quality via the composing processes of planning, drafting, feedback and correcting. Written CF was thus examined in L2 writing domain for its efficacy on text revision rather than L2 acquisition (Ashwell, 2000; Cha & Lee, 2012; Ferris & Roberts, 2001; Kim, 2012).

Written CF began to be brought up as a major issue in SLA when Truscott's (1996) research came out. It was one of the early studies that seriously dealt with written CF from the perspective of SLA and led SLA researchers to look into its effectiveness on L2 acquisition in earnest. Truscott (1996) contended that written CF only leads to pseudo-knowledge that is not retrieved for automatic use and thus it does not make fundamental changes in learners' L2 knowledge. He further asserted that it can have a negative impact on learners' confidence. He concluded that written CF should be abandoned in writing classes as it is not only ineffective but counterproductive to L2 acquisition. His strong claim induced a number of subsequent studies to empirically inspect it. Overall, contrary to Truscott's position, written CF was reported to help improve L2 knowledge (Bitchener, 2008; Bitchener & Knoch, 2008; Chandler, 2003; Ellis et al., 2008; Sheen, 2007).

2.2. Mediating Factors for Written CF Efficacy

Once positive evidence for written CF efficacy was observed, research expanded to investigate whether it can be mediated by certain factors. This line of research is particularly of pedagogical utility as it can help to customize written CF for specific learners and learning contexts. Individual learner difference variables such as language aptitude, language anxiety and proficiency level were confirmed in some studies to impact written CF efficacy. Sheen (2007) reported that learners' language aptitude was positively related to the effects of direct CF and metalinguistic CF. Jang's (2013, 2014) studies found indirect CF to have greater benefits for more anxious and higher proficient learners.

Written CF type has received most attention as a mediating factor based upon a variety of its classifications. One general way to categorize written CF is to make the distinction between focused CF and unfocused CF. The former is intended to correct errors in limited pre-determined linguistic structures, while the latter is provided for errors without such pre-set conditions. Recent studies on focused CF showed that it played a positive role in

improving L2 knowledge (Bitchener & Knoch, 2008, 2010; Ellis et al., 2008; Sheen, 2007). However, comparative studies of the two types have not produced consistent results on their relative effectiveness. Farrokhi and Sattarpour (2012) reported the superiority of focused CF over unfocused CF while Ellis et al. (2008) and Frear and Chiu (2015) found no differential effects between them.

Quite commonly, written CF is also divided into direct CF and indirect CF according to whether to provide correct form of error. Indirect CF takes various forms: signaling only whether error has occurred; providing the number of errors that have occurred; and indicating where errors have occurred. Direct CF is more specific than any sort of indirect CF in that it additionally presents correct form of error. Although a number of direct CF studies reported its positive impact on L2 acquisition (Ellis et al., 2008; Farrokhi & Sattarpour, 2012), some studies found no such effects (Truscott & Hsu, 2008). Mixed results were produced from studies comparing the two types as well. Indirect CF was shown to have a greater effect in Ferris's (2002, 2006) studies while direct CF was more effective in the majority of studies (Bitchener & Knoch, 2010; Chandler, 2003; van Beuningen, de Jong, & Kuiken, 2012).

2.3. Written CF with Metalinguistic Information

One significant way to classify written CF is to consider whether it provides metalinguistic information on linguistic features for which learners have made errors. A number of studies found that written CF had greater effects when it contained metalinguistic information (Bitchener, 2008; Bitchener & Knoch, 2008, 2010; Diab, 2015; Gao & Ma, 2019; Jang, 2012a, 2012b, 2013, 2014; Sheen, 2007, 2010; Shintani, Aubrey, & Donnellan, 2016). However, metalinguistic information varied across studies in terms of how specific it was and how it was delivered. Three types of metalinguistic CF, as briefly described below, have widely been examined in previous research. They are named, according to what is marked on error in writing, as 'metalinguistic code (MC)', 'metalinguistic symbol (MS)', and 'metalinguistic naught (MN)' for comparison purposes in this study.

1. MC: Metalinguistic information is given in the form of codes. A code is marked on each error in a student's writing and it specifies the grammatical category of a linguistic feature for which the error has been committed (e.g., Robb et al., 1986).
2. MS: Metalinguistic information is given in the form of symbols plus rule explanations. A symbol is marked on each error in a student's writing and what the symbol represents (i.e., a brief explanation of the rule that governs the use of the linguistic

feature for which the error has been committed) is separately provided (e.g., Bitchener & Knoch, 2010).

3. MN: Metalinguistic information is given in the form of rule explanations. Nothing is marked on errors in students' writing. Brief explanations of rules that regulate the use of linguistic features for which students have committed errors are separately provided (e.g., Shintani & Ellis, 2013; Shintani, Ellis, & Suzuki, 2014).

These types are distinct from one another in two aspects of metalinguistic information, namely, its concreteness and individualization. MC is less concrete than MS and MN as it does not present relevant rule explanations. MN is less individualized compared with MC and MS in that it leaves every error in a student's writing unmarked.

As noted above, written CF efficacy can depend upon its type (e.g., focused vs. unfocused, direct vs. indirect). By extension, the efficacy of a particular type of written CF may vary with its subtype. This opens the possibility that the efficacy of metalinguistic CF could be mediated by its subtypes. The purpose of the study is to empirically address this issue by directly comparing the aforementioned three metalinguistic CF types in their effectiveness for L2 acquisition. In so doing, given the lack of comparative metalinguistic CF research in the SLA literature, the study should provide fruitful insights into how to implement metalinguistic CF to maximize its contribution for L2 development.

It should be noted that metalinguistic CF contained not only metalinguistic information about error but its correct form (i.e., metalinguistic CF combined with direct CF) in much of the previous research (Bitchener, 2008; Ellis et al., 2008; Jang, 2012a, 2012b, 2013, 2014; Sheen 2007, 2010). Thus, it was equivocal whether observed effects resulted from provision of metalinguistic information or correct forms or both. To discover the precise isolated impact of metalinguistic information, none of the three metalinguistic CF types contained any correct form in this study. As noted above, previous research showed metalinguistic CF to be more effective than non-metalinguistic CF. It would then be an issue worth investigating whether the superiority is sustained across different types of metalinguistic CF. Such inquiry is expected to provide a highly sophisticated basis for determining whether to carry out metalinguistic CF over other types of CF in pedagogical contexts. In an attempt to address this issue, metalinguistic CF types were compared not only among themselves but with a non-metalinguistic direct CF, hereafter referred to as DR in this study.

It is generally acknowledged in SLA that L2 acquisition involves developing knowledge at two different levels, namely explicit and implicit knowledge (DeKeyser, 1998, 2001, 2004; Ellis, 2004). Accordingly, the study examined the efficacy of written CF separately for each level of knowledge. Two research questions were devised to achieve the study's objectives.

1. Do the three metalinguistic CF types and direct CF vary in their efficacy for the development of explicit L2 knowledge?
2. Do the three metalinguistic CF types and direct CF vary in their efficacy for the development of implicit L2 knowledge?

3. METHOD

3.1. Participants

A total of 93 EFL students from a Korean university voluntarily participated in the experiment designed and conducted for the study's purposes. All of them were sophomore Korean learners from a variety of majors including special education, computer engineering, business administration, design, and mechanical engineering. They were 39 male and 54 female students and had received ten years of English instruction at their primary and secondary schools before entering the university. Their TOEIC scores ranged from 400 to 500 out of 990, indicating that their English proficiency was at the low-intermediate level.

The participating students were randomly assigned to one of four experimental groups or a control group. The experimental groups were distinguished by the type of written CF given to them while no written CF was provided to the control group. For the sake of brevity, the experimental groups are named after the type of written CF they received (e.g., the group that received MC is called the MC group) and the control group is referred to as the CO group. Twenty learners were in the DR group, 19 in the MC group, 18 in the MS group, 17 in the MN group, and 19 in the CO group.

3.2. Target Linguistic Structures

Written CF was given intensively and exclusively on errors in the English articles in the learners' writing. Although unfocused CF is more commonly practiced in actual teaching and thus ecologically more valid (van Beuningen et al., 2012), the study chose to provide focused CF because it allows learners to receive repeated corrections on the same error in a particular grammatical structure, enabling them to engage in deeper cognitive processes to internalize it. In addition, if focused CF shifts its focus of correction to other grammatical structures over time in different pieces of writing, it can also deal with diverse errors as does unfocused CF (Shintani & Ellis, 2013). That way, focused CF may potentially be as ecologically feasible as unfocused CF.

The articles were selected as target structures for written CF. The choice was made on two considerations. First, the learners were very apt to make errors in the English articles. Their native language has no equivalent structure. Moreover, usage of the English articles is extremely complex in that their correct use demands the combined application of their linguistic, semantic and pragmatic elements. Second, articles are the most frequently used grammatical features in English (Sinclair, 1991). Given this error-prone yet frequent nature, it was then important for the learners to develop knowledge of the articles, particularly considering that they were in academic settings where the accuracy of language use is often deemed critical.

In view of the high complexity of article usages and the learners' low-intermediate proficiency level, written CF focused only on two article functions in this study, namely, the first mention of the indefinite article and the anaphoric mention of the definite article. The rule for the former function states that the indefinite article *a/an* is used to refer to something for the first time while that for the latter function involves employing the definite article *the* to indicate that its following noun has been mentioned elsewhere within a given discourse context (e.g., ***A*** *man fell in love with* ***a*** *woman. Unfortunately,* ***the*** *woman was married.*).

3.3. Delivery of Written CF

An error occurred in writing when an article was used inaccurately or was missing in the obligatory context. To provide DR, MC and MS, the teacher, who was the researcher of this study, first identified and underlined each error in individual writing and then added certain error-related information above it. Added information constituted the correct form of an error for DR, and one of two symbols, "*" and "#" related to the indefinite and the definite article respectively for MS (see Appendix A). In the case of MS, additional metalinguistic rule explanations the symbols represented were separately provided on a screen so that the whole MS group could see them at the same time (see Appendix B). A code "*A*" signifying the grammatical category of target structure "article" was provided as information on error for MC (see Appendix C). No explanations of rules were provided through DR or MC. In offering MN, the teacher marked nothing above error in individual writing but presented metalinguistic explanations of rules for the target functions on a screen in the same way as the MS group. Sorts of error-related information contained and delivered in each written CF type are summarized in Table 1.

While rule explanations were shown on a screen in this study, they were provided in the form of handouts in earlier studies (Shintani & Ellis, 2013; Shintani et al., 2014). This difference, however, made no fundamental change in the nature of delivering metalinguistic explanations in that they were accessed simultaneously by all members of

the group receiving them in either way. On-screen delivery was employed in this study as it was more time-efficient in terms of preparation and presentation. No time was needed to make copies of handouts and distribute them to the students.

TABLE 1

Sorts of Information in Four Types of Written CF

Information	DR	MC	MS	MN
Location of error	√	√	√	
Correct form of error	√			
Metalinguistic information				
Grammatical category		√	√	√
Rule explanations			√	√

Note. "√" indicates that information is included in CF.

3.4. Writing Tasks

The learners engaged in four task sessions, in each of which they carried out a dictogloss writing. In the dictogloss activity, they listened to the teacher read aloud a short story of 80-odd words two times (i.e., first time for main idea and second one for specific information) and were each given a writing sheet that had a few key words from the story. They were then asked to reconstruct the story as accurately as possible for five minutes. Upon completing the activity, the teacher collected the learners' writing. Guided writing such as dictogloss was deemed appropriate for the learners' proficiency that was too limited for free writing. To successfully reconstruct a story, capturing and retaining its content was critical. It, however, would require a lot of cognitive resources of even those at higher levels than the participating learners. Providing keywords on a writing sheet was intended to ease such cognitive load.

The teacher provided written CF on the experimental groups' first and second writings only (i.e., those produced in the first two task sessions). No written CF was given to the third and fourth writings as they were used as posttests (for more details on this, see Section 3.5.2. below). During the second and third task sessions, the experimental groups were given back their previous writing with written CF and studied it before performing a new dictogloss.

When studying written CF, the DR and the MC groups only needed to look at their previous writing as all corrective information was contained in it. The MS group first looked over symbols in their prior writing and then looked at the screen to consult metalinguistic explanations associated with them. The MN group, conversely, saw on-screen metalinguistic explanations first and then inspected their earlier intact writing to identify and correct errors themselves. The CO group completed the same dictogloss writings as the experimental groups but received no CF on any of their written texts.

3.5. Measurements for Explicit and Implicit Knowledge

The learners' knowledge of the articles was measured at two separate levels, namely declarative and procedural, as proposed in the skill acquisition theory (DeKeyser, 1998, 2001, 2004; Ellis, 2004). Declarative knowledge is concerned with knowing facts and ideas. It is considered explicit in nature because controlled and conscious cognitive processes that take up a lot of attentional resources are required for its storage and retrieval for use. Procedural knowledge involves being able to put declarative knowledge to use. It is of an implicit nature as it is unconsciously processed for its storage and use, which demands little cognitive resources. Declarative knowledge is gradually proceduralized and further automatized through 'practice' which constitutes its repeated activation for actual use.

It has been a key issue in SLA which type of knowledge (i.e., explicit declarative or implicit procedural) may benefit from written CF. Although a number of studies have shown that written CF can contribute to improving explicit L2 knowledge (Bitchener, 2012; Ferris, 1999, 2006; Sachs & Polio, 2007; Williams, 2012), whether it is also effective for implicit L2 knowledge has yet to be further explored (Ortega, 2012; Shintani & Ellis, 2013). In a bid to bridge this gap, the study investigated the efficacy of written CF for implicit as well as explicit knowledge. The error correction test was adopted to measure explicit knowledge while written texts produced during the dictogloss tasks were used to assess implicit knowledge.

3.5.1. Error correction test

The test had twenty items. The item format followed the one used in Sheen (2007). Each item consisted of two semantically related sentences, one of which was underlined to indicate that it had a grammatical error (see Appendix D). For each item, the learners were asked to locate an error and rewrite the underlined sentence into the grammatically accurate one.

There was no time limit set to complete the test. This enabled the learners to mobilize as much cognitive resources and existing grammatical knowledge as they wanted, allowing them to consciously analyze the test items. These aspects legitimized the test as measuring learners' explicit knowledge.

Eight items included errors in the target article functions while the other items served as distracters with errors in a range of other grammatical structures such as subject-verb agreement, dative construction and comparison. Only those containing article errors were scored. One point was given to a grammatically rewritten sentence, making eight points the maximum score of the test.

3.5.2. Learners' dictogloss writing

As noted above, five minutes were allowed to complete a dictogloss writing. The learners most likely focused their conscious attention on recalling the content, rather than linguistic form, of a story while reconstructing it. The reasoning is that the given time was arguably not long enough for ones at the learners' proficiency to retrieve both content and form and that content-retrieval took precedence in performing dictogloss. Even though the learners intentionally directed some attention to recalling certain forms while writing, articles were unlikely to receive such attention. Since they are function words of little communicative value, intensive attention to them would not have been helpful for recollecting the content of a story. It can then be said that, with little chances of consciously attending to articles, the learners' use (and non-use) of them in dictogloss writing was a result of their unconscious cognitive processing. This justified the accuracy of articles in the learners' dictogloss writing as a measurement for their implicit knowledge.

The first dictogloss writing served as the pretest since it was completed prior to CF treatments. The third and fourth writings were used as the posttests because they were carried out after the final (i.e., the second) CF treatment. The third writing constituted the immediate posttest as it was produced immediately after the final CF while the fourth one was generated as the delayed posttest two weeks later.

Article accuracy for individual writing was computed as a percentage score following Pica's (1994) formula. The number of articles correctly used was first identified. Then, the combined number of article obligatory and non-obligatory-but-used contexts was obtained. The former number was divided by the latter one to produce the accuracy score. Another EFL expert scored a sample of 30% of the total data to check its reliability and the percentage agreement score was 95.7%.

3.6. Procedure

The four-session experiment was conducted over four weeks. Sessions 1 through 3 took place with five days apart during the first two weeks. In session 1, all the groups produced the first dictogloss writing and completed the error correction test. In session 2, the experimental groups received written CF on their first writing, studied it, and then continued into the second writing. In session 3, the experimental groups received written CF on their second writing, studied it, and conducted the third writing. They then completed the error correction test. The control group went through the same writing tasks and error correction test as did the experimental groups in sessions 2 and 3 but it did not get written CF. In session 4, which was conducted in the fourth week, all the groups completed the fourth writing and the error correction test. Dictogloss writing was

implemented before the error correction test in sessions 1, 3 and 4. As dictogloss writing had a time limit, this arrangement made it possible for all learners in a group to begin simultaneously for the error correction test as well as dictogloss. A brief representation of the whole experiment procedure is shown in Table 2.

TABLE 2

The Entire Procedure of the Experiment

Task Session	Experimental Group	Control Group
Session 1	· Writing 1 · Error correction test 1	· Writing 1 · Error correction test 1
Session 2	· Examining CF on writing 1 · Writing 2	· Writing 2
Session 3	· Examining CF on writing 2 · Writing 3 · Error correction test 2	· Writing 3 · Error correction test 2
Session 4	· Writing 4 · Error correction test 3	· Writing 4 · Error correction test 3

4. RESULTS

An array of factorial repeated measures ANOVAs and Tukey's post-hoc pairwise comparison tests were carried out to analyze the learners' performance on the tests with the alpha level set at $p = .05$. As to effect sizes, partial eta squared (η^2) was estimated for the ANOVAs and Cohen's *d* was computed for the pairwise comparisons.

Table 3 exhibits means and standard deviations for the scores of the error correction tests. A factorial repeated measures ANOVA was performed with test scores as the dependent variable and time and group as the independent variables. The ANOVA showed significant main effects for group, $F(4, 88) = 4.974$, $p = .001$, $\eta^2 = .184$, significant main effects for time, $F(2, 176) = 68.308$, $p < .001$, $\eta^2 = .437$, and a significant time × group interaction, $F(8, 176) = 5.243$, $p < .001$, $\eta^2 = .192$.

Tukey's pairwise comparisons showed that there were no significant group differences on the error correction pretest. This means that all the groups were similar in terms of explicit knowledge of the target article functions at the outset of the study. However, group differences were significant on the immediate and the delayed posttests. Specifically, all the experimental groups except for the MC group performed better than the CO group on the immediate posttest. Effect sizes between the CO group and the experimental groups were large ($d = 1.202$ for DR; $d = 1.156$ for MS; $d = 1.204$ for MN). All the experimental groups outperformed the CO group on the delayed posttest with large effect sizes ($d = 1.424$ for DR; $d = 1.115$ for MC; $d = 2.038$ for MS; $d = 1.217$ for MN).

With regard to within-group comparisons, all the experimental groups gained significantly greater scores on both posttests than on the pretest, indicating that there was significant improvement from the pretest to the immediate posttest and that it was sustained on the delayed posttest. All the experimental groups showed large effect sizes between the pretest and the immediate posttest (d = 1.074 for DR; d = .890 for MC; d = .893 for MS; d = 1.170 for MN). They also exhibited large effect sizes between the pretest and the delayed posttest (d = 1.091 for DR; d = 1.243 for MC; d = 1.392 for MS; d = .955 for MN). The CO group did not improve from the pretest to either of the posttests.

TABLE 3

Descriptive Statistics for Error Correction Test Scores

Group	Pretest		Immediate Posttest		Delayed Posttest	
(n)	*M*	*SD*	*M*	*SD*	*M*	*SD*
DR (20)	0.95	0.94	3.40	2.72	3.90	2.94
MC (19)	0.79	1.03	1.90	2.00	3.05	2.66
MS (18)	0.94	0.87	3.28	2.63	4.61	2.43
MN (17)	0.88	1.36	3.18	2.35	3.29	2.64
CO (19)	0.74	0.93	0.90	1.20	0.84	0.90

Table 4 presents means and standard deviations for the writing test scores. A factorial repeated measures ANOVA revealed significant main effects for group, $F(4, 88) = 7.071$, $p < .001$, $\eta^2 = .243$, significant main effects for time, $F(2, 176) = 61.142$, $p < .001$, $\eta^2 = .410$, and a significant time × group interaction, $F(8, 176) = 3.841$, $p < .001$, $\eta^2 = .149$.

Tukey's post-hoc analysis revealed no significant group differences on the pretest, which demonstrates that all the groups were comparable in implicit knowledge of the target structures prior to written CF treatments. However, significant group differences existed on the posttests. All the experimental groups other than the MC group outperformed the CO group on the immediate posttest with large effect sizes (d = 1.527 for DR; d = 1.573 for MS; d = 1.064 for MN). All the experimental groups performed better than the CO group on the delayed posttest. Effect sizes between the CO group and each experimental group were large (d = 1.772 for DR; d = 1.139 for MC; d = 2.112 for MS; d = 1.186 for MN).

As for within-group comparisons, all the experimental groups scored significantly higher on both posttests than on the pretest, indicating that they made a significant improvement between the pretest and the immediate posttest and maintained it on the delayed posttest. Within-group effect sizes between the pretest and the immediate posttest were large for all the experimental groups (d = 1.498 for DR; d = .608 for MC; d = 1.317 for MS; d = .857 for MN). Effect sizes between the pretest and the delayed posttest were large as well for all the experimental groups (d = 1.544 for DR; d = .865 for MC; d = 1.825 for MS; d = .838 for MN). There was no significant improvement in the CO group between

the pretest and either of the posttests. Table 5 presents a summary of significant group differences revealed in the posttest results.

TABLE 4

Descriptive Statistics for Writing Test Scores

Group (*n*)	Pretest		Immediate Posttest		Delayed Posttest	
	M	*SD*	*M*	*SD*	*M*	*SD*
DR (20)	44.50	23.46	77.82	20.89	77.34	19.90
MC (19)	45.44	24.36	60.50	24.73	67.42	24.78
MS (18)	47.73	17.69	80.84	23.50	81.78	17.35
MN (17)	42.46	22.99	68.41	21.17	69.23	26.24
CO (19)	39.86	19.28	46.38	20.28	41.45	20.61

TABLE 5

Significant Group Differences on Posttests

Posttest	Error Correction Test	Writing Test
Immediate posttest	DR, MS, MN > CO, MC = CO	DR, MS, MN > CO, MC = CO
Delayed posttest	DR, MC, MS, MN > CO	DR, MC, MS, MN > CO

Note. "A > B" means A scoring significantly higher than B.
"A = B" means no significant score difference between A and B.

5. DISCUSSION

The first research question asked whether the three types of metalinguistic CF and direct CF vary in their short and long term efficacy for the development of explicit L2 knowledge. With regard to short-term effectiveness, there was some variation. The results showed that, on the immediate error correction posttest, the DR, the MS and the MN groups performed better than the CO group while the MC group did not show the superiority.

Explicit knowledge of a linguistic structure involves consciously knowing rules that govern its use. They can be learned inductively or deductively. DR, MS and MN were effective because error-related information delivered via them made the learning of rules for the two article functions possible one way or the other. Notably, metalinguistic CF (i.e., MS and MN) and non-metalinguistic CF (i.e., DR) seemed to help different types of learning. DR may have assisted in inductive learning since it provided correct form. Looking through correct forms juxtaposed with errors in their writing, the learners who received DR were able to make direct comparisons between erroneous and corrected forms, which is considered as a necessary cognitive process for L2 acquisition (Doughty, 2001; Long & Robinson, 1998; Sachs & Polio, 2007). Such comparisons may have enabled the learners to work out relevant article rules on their own. On the other hand, MS and MN

most likely promoted deductive learning as they explicitly presented article rule explanations to the learners.

In contrast, MC was of little help to either type of learning in the absence of correct form or rule explanations, resulting in the ineffectiveness of MC. This demonstrates that metalinguistic information consisting of only the grammatical category of error is not detailed enough to promote immediate learning. Overall, the findings showed that metalinguistic CF should contain as concrete information as error-relevant rule explanations to have positive effectiveness equivalent to direct CF for the short-term development of explicit L2 knowledge.

It should be recalled that, although both MS and MN provided rule explanations, what the MS and the MN groups did with them differed. As noted above, when the teacher provided on-screen metalinguistic explanations, he had identified and marked article errors in the MS group's writing but left the MN group's written texts intact. Unlike the MS group, the MN group thus had to identify and correct errors in their writing themselves with reference to the given explanations. Nonetheless, the MN group was not differentiated from the MS group in performance on the immediate posttest. This indicates that, once explicit rule explanations are given, learners are able to locate and repair their own errors even without reliance on the teacher's further assistance (e.g., marking errors as done on the MS group's writing).

Short-term improvements in explicit knowledge were sustained over time. As the results showed, the DR, the MS and the MN groups performed better than the CO group on the delayed error correction posttest as they did on the immediate posttest. The durable effects may have arisen from the fact that written CF focused intensively and exclusively on article errors. Offering written CF twice (i.e., for the first and second writings) could also have been helpful. A number of studies have shown that even a single-shot treatment of written CF can improve accuracy in the use of its targeted grammatical structure (Bitchener & Knoch, 2009a, 2009b; Bitchener, Young, & Cameron, 2005; Ferris & Roberts, 2001; van Beuningen et al., 2012). Double treatments of written CF united with its concentrated focus on articles may have led learners to process article-related CF information at a deeper cognitive level, which resulted in consolidating newly gained knowledge and strengthening its sustainability.

It is notable that, unlike on the immediate error correction posttest, the MC group also outperformed the CO group on the delayed posttest, showing that MC facilitated the development of explicit L2 knowledge, if not instantly, in the long run as did the other CF types. The result implies that, given only the grammatical category of error from CF, the MC group was eventually able to capture relevant rules. It could be that the MC group simply needed more time to process CF for learning because information in MC was more meager and less specific than that in the other CF types, which may have made the

immediate L2 development difficult. In fact, SLA researchers warned of equating the absence of immediate CF positive effects with the non-existence of its long-term benefits (Brock, Crookes, Day, & Long, 1986; Gass, 1997; Lightbown, 1994; Mackey & Philp, 1998).

The second research question investigated whether the three metalinguistic CF types and direct CF have short and long term differential effects on developing implicit L2 knowledge. There was variation in short-term efficacy. The results indicated that the DR, the MS and the MN groups outperformed the CO group on the immediate writing posttest while the MC group did not. It should be recalled that only the DR, the MS and the MN groups were superior to the CO group on the immediate error correction posttest as well. This demonstrates that all of the improved explicit declarative knowledge was turned into implicit procedural knowledge in the short term.

As noted earlier, explicit declarative knowledge is proceduralized and automatized into implicit knowledge by practicing it, namely activating it repeatedly for meaningful purposes or uses (DeKeyser, 1998, 2001). When did the DR, the MS and the MN groups practice explicit knowledge gained via written CF for implicit procedural knowledge exhibited on the immediate writing posttest? It was assuredly during the second dictogloss writing as it was the only writing conducted after receiving written CF yet before engaging in the third writing (i.e., immediate posttest). Conceivably, while doing the second writing, the DR, the MS and the MN groups retrieved and utilized (i.e., activated) declarative knowledge of article rules gained through examining CF on errors in their first written texts in order to reconstruct the second story at a higher level of accuracy (i.e., for meaningful purpose). It should then be noted that offering not only written CF but also subsequent opportunities for writing is required to develop learners' implicit knowledge beyond explicit knowledge.

Timing of written CF has been shown to affect L2 grammar acquisition (Li, Zhu, & Ellis, 2016; Shintani & Aubrey, 2016). Likewise, contribution of post-CF writing for implicit knowledge may be restricted by its timing. Chandler (2003) pointed to the importance of immediacy for post-CF writing experience, reporting an empirical finding that learners improved accuracy in CF-targeted structures only when they did a new piece of writing immediately after receiving written CF. The second dictogloss writing was carried out right after the learners' examination of written CF on their first writing in this study. It seems clear that such timely engagement in the post-CF writing was crucially responsible for the gains in implicit knowledge observed in the DR, the MS and the MN groups.

The MC group's failure to improve implicit knowledge in the short term is not surprising. Implicit procedural knowledge cannot be acquired without explicit declarative knowledge as the former is built upon the latter through practice (DeKeyser, 1998, 2001).

Since the MC group made no short-term progress in explicit knowledge, it is natural that the group did not achieve short-term gains in implicit knowledge.

Implicit knowledge improved in the short term was maintained over time. The results revealed that the DR, the MS and the MN groups performed better than the CO group on the delayed writing posttest as they did on the immediate writing posttest. The enduring effects may have resulted from the third dictogloss writing. Despite being taken as the immediate posttest, the third writing was conducted right after the learners examined written CF on their second written texts. Arguably, just like the second writing, it provided opportunities to practice what had been learned from the preceding written CF. Additional practice during the third writing may have reinforced the increased short-term implicit knowledge to make it last over time.

Unlike on the immediate writing posttest, the MC group performed better than the CO group and was comparable to the other CF groups on the delayed writing posttest. This suggests that, only with such brief CF information as the grammatical category of error, learners are eventually able to not only develop explicit knowledge of relevant rules but further proceduralize it into implicit knowledge as long as they are given sufficient time to process CF and multiple opportunities to practice what has been learned from it.

Another important point to note from the results is that the beneficial effects of metalinguistic CF were not greater but equivalent to those of DR, which contrasts with previous studies showing the superiority of metalinguistic CF. The conflicting outcome may be caused by differences in implementing metalinguistic CF. As mentioned earlier, metalinguistic CF contained correct form of error as well as metalinguistic information in previous research. On the other hand, correct form was provided only via DR and was not included in metalinguistic CF in the present study.

The disparity between the current and earlier research makes clear a few aspects relating to the relative effectiveness of metalinguistic CF and non-metalinguistic CF. First, the superiority of metalinguistic CF shown in previous CF research is not due to metalinguistic information alone but to the combination of metalinguistic information and correct form. Second, the efficacy of metalinguistic CF is not greater but tantamount to non-metalinguistic CF such as DR. Third, metalinguistic CF may be less effective than non-metalinguistic CF if metalinguistic information provided is not specific enough, as seen in the ineffectiveness of MC on short-term knowledge.

The study's findings on metalinguistic CF provide some pedagogical insights into its effective implementation. First, since MC was as effective for long-term explicit knowledge as MS and MN, the teacher might not need to give such direct and specific information as metalinguistic rule explanations unless his or her written CF aims for deductive and/or short-term learning. Second, considering that immediate practice was crucial for implicit knowledge, the teacher might want to make sure that learners engage in

instant post-CF meaningful writing to practice CF-targeted structures. Third, providing written CF in the form of DR, MC and MS is practically time-consuming and onerous for teachers as it involves identifying and marking errors (and correcting them in the case of DR) in individual learner written texts. The teacher could resolve this practical concern to some extent by preferring MN. The study provided evidence that MN has effects comparable, if not superior, to DR and the other metalinguistic CF types in developing long-term L2 knowledge. Besides, MN has some advantages over them when it comes to easing teachers' CF-related workload. The teacher does not need to prepare and give MN separately for each individual written text as it offers the same information to the whole group simultaneously. The teacher does not have to identify and correct errors since MN is provided with learners' original writing intact and induces learners to do the jobs. What is more, the teacher can use MN repeatedly to other learners who make the same error in the grammatical structure it targets (Shintani et al., 2014).

6. CONCLUSION

The study compared three types of metalinguistic CF among themselves and with direct CF in their efficacy for developing explicit and implicit L2 knowledge. As for explicit knowledge, all CF types but MC had short-term beneficial effects by providing specific information to enable the learners' inductive or deductive learning. The short-term gains were sustained over time as a result of the learners' deep cognitive processing prompted by repeated intensive and exclusive focus of written CF on the target structures. With regard to implicit knowledge, all CF types but MC again showed positive short-term effects, confirming successful conversion of improved explicit knowledge into implicit knowledge by virtue of practice in the first immediate post-CF writing. The short-term improvements were held over time due to additional practice in the second post-CF writing. Despite its short-term ineffectiveness, MC exhibited long-term benefits for both explicit and implicit knowledge, suggesting that metalinguistic information in written CF, even if not so concrete, could ultimately be facilitative of L2 acquisition. In short, metalinguistic CF was as effective as direct CF for long-term knowledge regardless of its type. However, as to short-term knowledge, it was similarly effective only if it offered as specific information as rule explanations.

The study admittedly has some demerits that limit generalizing its findings to other contexts yet could signpost future research. The groups were rather small in size and all low-intermediate in proficiency. Research with larger samples of learners at varied proficiency levels has yet to be conducted for more comprehensive and reliable findings. The focus of written CF was limited to errors in the articles. Ferris (1999) made the

distinction between treatable and untreatable structures and maintained that written CF is only effective for treatable structures, which refer to those that occur "in a patterned and rule-governed way" (p. 6). Ferris's (1999) claim was supported in previous studies (Bitchener et al., 2005; Frear, 2012) and this study also confirmed it with the English articles which belong to a treatable category. Shintani et al. (2014) further noted that treatable structures vary in complexity and it could influence metalinguistic CF efficacy. Multiple grammatical structures of different complexities need to be comparatively explored in future research to empirically clarify whether the effectiveness of metalinguistic CF is associated with the linguistic complexity of its target structure. Given that individual difference factors such as language aptitude (Sheen, 2007; Shintani & Ellis, 2015; Stefanou & Révész, 2015), language anxiety (Jang, 2013) and the extent of learner engagement with written CF (Han & Hyland, 2015) were found to mediate the effectiveness of general written CF in previous studies, a more specific direction for future research would be to investigate the extent to which these factors mediate the efficacy of metalinguistic CF in comparison with other types of CF. The present study explained gains in implicit knowledge in the framework of skill acquisition theory. Since there is disagreement on how implicit knowledge can be obtained in the literature, future research needs to consider other perspectives. These lines of future research will help to build more precise theoretical accounts of how learners respond to and interact with metalinguistic CF for their L2 development. In so doing, they can also provide diverse pedagogical aids in deciding and implementing metalinguistic CF optimal for specific learners in different contexts.

Applicable levels: Tertiary

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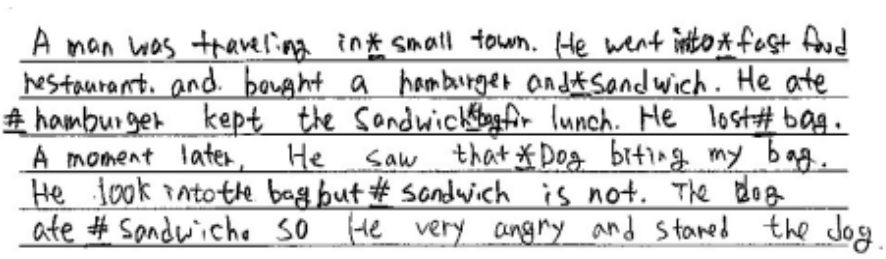
APPENDIX A

A Student's Writing with Symbols


A man was traveling in* small town. He went into* fast food
restaurant. and bought a hamburger and* Sandwich. He ate
hamburger kept the Sandwich for lunch. He lost# bag.
A moment later, He saw that* Dog biting my bag.
He look into the bag but # sandwich is not. The dog
ate # Sandwiche so He very angry and stared the dog.

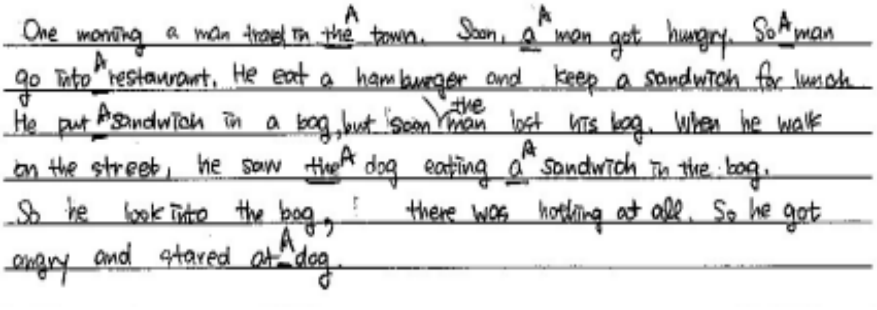
APPENDIX B

Metalinguistic Explanations Offered to the MS Group

*	: Indefinite article "a" is used before a noun to indicate that the noun is being mentioned for the first time.
#	: Definite article "the" is used before a noun to indicate that the noun has been previously mentioned.

APPENDIX C

A Student's Writing with Code


One morning a man travel in the town. Soon, a man got hungry. So man go into restaurant. He eat a hamburger and keep a sandwich for lunch. He put sandwich in a bag, but soon the man lost his bag. When he walk on the street, he saw the dog eating a sandwich in the bag. So he look into the bag, there was nothing at all. So he got angry and stared at dog.

APPENDIX D

Sample Items of Error Correction Test

- Steve has a big desk. His father gave desk to him five years ago.
  → _____ .
- Jennis was reading book in her room. It was written in German.
  → _____ .
- Kelly bought a car for his wife. She drives car to go to work every day.
  → _____ .