Timing of Form-focused Instruction and Development of Implicit vs. Explicit knowledge

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This study investigates differential effects of form-focused instruction (FFI) on the development of explicit knowledge versus implicit knowledge of a second language (L2) when the FFI is offered within the context of meaning-focused instruction (MFI). Forty-two adult learners of English participated in the study and were randomly assigned to a group who received FFI before MFI (FM), a group who received FFI after MFI (MF), a group who received MFI only (M), or a control group. Learning was measured by an untimed grammaticality judgment task (UGJT), a primary measure for explicit knowledge, and an elicited oral imitation task (EOIT), a primary measure for implicit knowledge. The results illustrate that, despite both FM and MF groups’ improved performance on the UGJT, only the FM group showed a positive developmental trend on the EOIT. No clear learning effect was observed among the M group learners or the controls. Therefore, the findings suggest that FFI prior to MFI supports the development of implicit knowledge more efficiently than FFI delayed until after MFI has begun.

**Key words:** form-focused instruction, meaning-focused instruction, implicit knowledge, explicit knowledge, English as a foreign language

1. INTRODUCTION

A combined use of form-focused instruction (FFI) and meaning-focused instruction (MFI) results in better second language learning outcomes than an exclusive use of MFI. The advantage of combining these instructional methods has been amply demonstrated by empirical studies in second language acquisition (SLA), both in classroom contexts (e.g., Fotos, 1993; Fotos & Ellis, 1991; Scott, 1989, 1990; Spada & Lightbown, 1993; White, Spada, Lightbown, & Ranta, 1991) and in laboratory contexts (e.g., Alanen, 1995; Carroll
& Swain, 1993; De Graaff, 1997; DeKeyser, 1995; N. Ellis, 1993; Robinson, 1995, 1996, 1997; Williams & Evans, 1998). More recently, studies in SLA have empirically shown that learners who were instructed in an L2 through a combination of FFI and MFI gained accurate explicit grammatical knowledge of both simple and complex targets (e.g., De la Fuente, 2006; Fernández, 2008; Housen, Pierrard, & Van Daele, 2005; Laufer, 2006; Muranoi, 2000), developed rule-based, generalizable knowledge (Ellis, Loewen, & Erlam, 2006; Robinson, 2005; Rosa & Leow, 2004a, 2004b; Saito & Lyster, 2012), and acquired fluent, natural, oral production skills (Housen et al., 2005; Spada, Lightbown, & White, 2005; Stafford, Bowden, & Sanz, 2012; Yang & Lyster, 2010) more successfully than learners who were exposed to MFI exclusively (see Norris & Ortega, 2000 and Spada & Tomita, 2010 for meta-analytic reviews).

The previous findings suggest that the inclusion of FFI in a primarily meaning-focused L2 learning condition is beneficial for the development of linguistic knowledge. Recognizing the synergistic effects of FFI and MFI, other studies have attempted to specify the optimal conditions for combining the two methods by considering factors such as types of FFI (e.g., DeKeyser, 1995; Erlam, 2003; Fotos, 1993; Herron & Tomasello, 1992), timing of FFI (e.g., Dabaghi, 2006; Goda, 2004; Henshaw, 2011; Kim & Rebuschat, 2010), and characteristics of targets (e.g., De Graaff, 1997; DeKeyser, 1995; Robinson, 1996). Due to inconsistency in the various studies’ research designs, however, they have not yet provided conclusive answers to questions about the effects of FFI timing, among other issues, in L2 learning. For example, some studies operationalized FFI as explicit rule instruction (Kim & Rebuschat, 2010), and others as explicit/implicit corrective feedback (Dabaghi, 2006; Goda, 2004; Henshaw, 2011); some of them observed FFI timing within the context of MFI (Dabaghi, 2006; Goda, 2004; Kim & Rebuschat, 2010), and others within the context of another type of FFI, i.e., processing instruction (e.g., Henshaw, 2011; Stafford et al., 2012). The effects of FFI timing varied depending on how the FFI methods were operationalized. Moreover, as the previous studies did not utilize separate measures for implicit knowledge versus explicit knowledge, no clear evidence can be found regarding FFI timing and development of L2 competence.

Given such inconsistent results and methodological limitations, the current study focused on investigating differential effects of early and delayed FFI on the acquisition of different types of L2 knowledge (i.e., explicit knowledge versus implicit knowledge) by comparing the learning outcomes of three experimental groups that differed with respect to when FFI (explicit rule instruction) is provided within the context of MFI: one group received FFI prior to MFI; the second group received FFI after MFI; and the third group received no FFI (MFI-only). The MFI-only group was included to determine whether providing FFI itself was beneficial.
2. LITERATURE REVIEW

2.1. Relevance of FFI in Adult SLA: Why is FFI Necessary?

Form-focused instruction (FFI) serves as a cover term for “any planned or incidental instructional activity that is intended to induce language learners to pay attention to linguistic form” (Ellis, 2001, pp. 1-2). Spada (1997) defined FFI as “any pedagogical effort which is used to draw the learners’ attention to language form […] within meaning-based approaches to L2 instruction [and] in which a focus on language is provided in either spontaneous or predetermined ways” (p. 73). Also, Long (2000) noted that FFI is “any pedagogical technique, proactive or reactive, implicit or explicit, used to draw students’ attention to language form” (p. 185). The definitions of FFI by various researchers commonly propose that FFI includes any instructional technique that (1) triggers focal attention to forms, (2) raises metalinguistic awareness of underlying rules, and (3) builds metalinguistic knowledge of the language form (e.g., phonological, lexical, grammatical, semantic and pragmatic). In this respect, the instructional efforts that fall under the category of FFI are distinguished from those under MFI, which does not teach “the strategies, maxims, and organizational principles that govern [the] language” (Celce-Murcia, Dörnyei, & Thurrell, 1997, p. 141), but enhances incidental acquisition of L2 through negotiation “toward mutual comprehension of learners and their interlocutors’ message meaning” (Pica, Kanagy, & Falodun, 1993, p. 11). As a result, unlike learners in an FFI setting, learners in an MFI setting may remain largely unaware of the metalinguistic information in the L2 input.

Despite the reported findings of incidental L2 learning (Cleary & Langley, 2007; Leung, 2007; Williams, 2005; Williams & Kuribara, 2008), researchers in SLA (García Mayo & Perales Haya, 2002; Schmidt, 1995; Skehan, 1996, 2003; VanPatten, 2007) argue for the relevance of FFI because of L2 learners’ limited attentional resources and their predisposition to process L2 meaning in preference to L2 form. Language learning requires simultaneous processing of form and meaning. This dual processing can take place successfully only when learners have enough cognitive capacity to attend to form and meaning at the same time. However, L2 learners’ limited attentional capacity causes a tradeoff effect between form and meaning (Foster & Skehan, 1999; Skehan, 2003). According to VanPatten (2007), L2 learners’ natural priority in communicative activities is meaning, so they are more likely to choose to devote their attention to meaning at the expense of form. MFI primarily focuses on the “satisfactoriness of the flow of the conversation,” not “the correctness, or completeness of what is said” (Skehan, 1996, p. 40). Thus, in this context, exchange of meaning would be far more emphasized than the exact form that a learner uses for meaning exchange. Consequently, despite the learners’
successful comprehension of L2 meaning, the processing of L2 form would not be always accurate. The implementation of various FFI interventions can, therefore, be considered beneficial and relevant for L2 learning because such interventions increase learners’ noticing and processing of L2 target forms, which in turn facilitates development of target-like L2 knowledge.

Relevance of FFI in L2 learning is further supported by its positive impacts on the development of unconscious, implicit knowledge, which comprises the primary component of L2 competence. In the context of SLA, implicit knowledge is assumed to develop through the process of incidental learning, which is “learning without the intent to learn or the learning of one thing (e.g., grammar) when the learner’s primary objective is to do something else (e.g., communicate)” (Schmidt, 2003, p. 16). Because MFI is designed to direct learners’ attention to meaning, it supports an environment for incidental learning that may result in implicit knowledge. On the other hand, the goal of FFI classrooms, where students are explicitly taught L2 forms, is to provide the conditions for learners to acquire explicit L2 knowledge by directly or indirectly making learners aware of the targeted linguistic information. For this reason, FFI methods necessarily involve a conscious process of L2 learning that promotes the gain of explicit knowledge.

In fact, recent studies have empirically demonstrated that explicit learning through FFI may support development of L2 implicit knowledge (e.g., N. Ellis, 1993; Ellis, Loewen, & Erlam, 2006; Spada et al., 2005). N. Ellis (1993) showed clear evidence that explicit learning may enhance development of implicit knowledge. The study investigated the interaction of explicit and implicit knowledge under three different types of instruction and language exposure: (1) incidental, naturalistic exposure to a target (Random); (2) explicit instruction in rules (Rule); and (3) incorporated use of naturalistic exposure and explicit rule instruction (Rule & Instances). The Rule & Instances learners performed better than other groups in judging grammaticality and showed faster reaction times in judging. Similar findings were reported by Spada et al. (2005), who observed positive effects from the use of FFI (through explicit rule instruction) in addition to MFI (through meaning-focused tasks). Among the results found by Spada et al. was a significant group difference in the oral production test, which assessed learners’ ability to use an L2 target in a naturalistic context; the learners who received additional FFI performed significantly better than those who only received MFI. Although these studies did not use standardized measures for implicit knowledge, their results show that FFI methods combined with MFI may facilitate learners’ faster access to L2 knowledge and fluent use of the L2, behaviors largely supported by reliable implicit knowledge.

More recently, Ellis and his colleagues (e.g., Ellis et al., 2006; Erlam & Loewen, 2010; Loewen & Erlam, 2006) investigated relationships between FFI methods and implicit knowledge more systematically by employing valid measures of implicit knowledge and
explicit knowledge. These studies did not specifically deal with the differential benefits of MFI versus FFI-MFI. Rather, they investigated whether different degrees of explicitness of corrective feedback (explicit feedback versus implicit feedback) during communicative activities differentially influence the development of implicit versus explicit knowledge. During the communicative tasks, one group of learners received explicit feedback (metalinguistic explanation) and the other received implicit feedback (recasts) on their non-target-like utterances. This research, which is theoretically grounded on earlier work by Ellis (2004, 2005), measured implicit knowledge with an oral imitation test and explicit knowledge with an untimed grammaticality judgment test. The metalinguistic group showed superior performance on the oral imitation test and the untimed grammaticality judgment test compared to the recasts group, suggesting that a higher degree of explicitness better facilitates the development of implicit knowledge as well as explicit knowledge.

2.2. Timing of FFI and L2 Learning: When Should Targets Be Taught?

The effects of explicit learning in relation to the timing of its provision to learners were first examined in cognitive psychology research early in the 1970s. Danks and Gans’s (1975) seminal study investigated whether the presentation of underlying rule structures would differentially affect paired-associate learning if it occurred before, during, or after an incidental exposure phase. The study found lower error rates and faster reaction times among those learners who were informed of the rules prior to the exposure phase. Reber, Kassin, Lewis, and Cantor (1980), who partially replicated Danks and Gans’s (1975) study, found similar results in an experiment using the artificial grammar learning (AGL) paradigm (Experiment 2). They demonstrated that the learners who were informed of the artificial grammar (AG) system prior to the exposure phase gained significantly higher posttest scores than the learners who were informed of the rule system in the middle of or after the exposure phase. The type of knowledge gained after the training phase was considered implicit, as none of the learners were successfully able to verbalize the underlying rule system of the AG. Based on these results, Reber et al. (1980) concluded that the most optimal synergistic effect of the implicit and explicit learning modes occurs when explicit learning precedes implicit learning.

The findings in cognitive psychology suggest that learning may be accelerated more effectively when learners have explicit knowledge of the stimuli before exposure to the stimuli. According to Danks and Gans (1975), the facilitative effects of explicit instruction in rules may not appear unless learners have an opportunity to use and practice the rules with example stimuli. This suggestion is in line with Reber et al.’s (1980) claim that gaining schematic knowledge of a grammatical form at the beginning of the learning
process serves to establish cognitive boundaries, and these boundaries enhance learners’ ability to induce appropriate rules from the exemplars during the observation period. Reber et al. further contended that delayed provision of grammatical knowledge may interfere with the rule systems that learners develop for themselves during the observation period, and discrepancies between their own systems and the newly provided system can interfere with the process of learning.

The interaction of explicit learning and implicit (or incidental) learning and their differential effects on learning outcomes have also been investigated in the context of SLA. Motivated by Reber et al.’s (1980) research, Kim and Rebuschat’s (2010) semi-artificial language study looked for different effects of explicit grammar instruction (E) provided at different times: before, in the middle of, or after incidental learning (I). The study found that immediately after the training phase, the learners who learned rules before incidental exposure (EI) performed significantly better (70.0%) than the other groups, who learned rules in the middle of (IEI) (68.1%) or after (IE) (52.1%) incidental exposure to the stimuli. When the types of knowledge gained by the learners were examined by subjective measures of awareness, the EI and the IEI learners showed evidence of reliable explicit and implicit knowledge, whereas the IE learners only showed evidence of reliable explicit knowledge. Therefore, the study concluded that explicit rule instruction is more beneficial when it precedes the incidental learning condition, and that early rule instruction supports the balanced development of explicit and implicit knowledge. These results suggest that findings in cognitive psychology could be applied to SLA to explain the differential benefits of FFI in relation to the timing of its provision. Although Kim and Rebuschat (2010) provided meaningful data implying that FFI has benefits for the acquisition of L2 knowledge, there are some limitations to their study. First, it only measured the acquisition of L2 knowledge by immediate posttests after the learning phase. It remains unclear whether early grammar instruction could provide meaningful benefits for a longer period of time. Therefore, there is a need for research that utilizes delayed posttests in order to test the duration of the effect. Second, as the study used a semi-artificial language as a target, its claims need to be reexamined with a natural language in order to be considered applicable to SLA.

2.3. The Present Study

In light of the inconsistent research designs and conflicting results, the goal of the present study was to investigate effects of FFI timing on L2 learning. The study therefore examined whether timing of FFI by means of explicit rule instruction has an effect on L2 learners’ acquisition of explicit knowledge and implicit knowledge by assessing the constructs of two types of knowledge separately. In order to further explore the impacts of
FFI on the development of implicit knowledge, the present study selected a target, the English *that*-trace filter (Goo, 2012), of which learners had no prior knowledge as they had not learned the rule prescriptively in L2 classrooms and were unlikely to have encountered it consciously and frequently during their learning of the target language.

Two research questions guided this investigation:

1) Does FFI provided at different times, i.e., before MFI versus after MFI, differentially affect development of explicit knowledge of the English *that*-trace filter?

2) Does FFI provided at different times, i.e., before MFI versus after MFI, differentially affect development of implicit knowledge of the English *that*-trace filter?

3. METHOD

3.1. Participants

Forty-two Korean-speaking learners of English as a foreign language (EFL) participated in the present study (male = 12, female = 30). All the participants were majoring in English language and literature at a university in Korea. According to their self-ratings, they all had an intermediate level of English proficiency. Their ages ranged from 20 to 26 (\(M = 21.57, SD = 1.69\)). Their average age when they began learning or studying English was 10.02 years old (\(SD = 2.99\)), and the average length of time they had studied English was 11.43 years (\(SD = 2.04\)).

3.2. Linguistic Target

Motivated by Goo’s (2012) research, the current study chose the English *that*-trace filter as its linguistic target. In his study on working memory and corrective feedback, Goo outlined the advantages of the English *that*-trace filter as a target, namely, its communicative redundancy and the high likelihood that learners would have had rare exposure to the target. According to Goo, the English *that*-trace filter is communicatively redundant because, while it is required syntactically, the failure to use it has no effect on comprehension. Furthermore, ESL/EFL learners are exposed to the target very rarely, as it is “neither specifically dealt with in ESL or FL grammar books nor explicitly taught in classroom contexts” (p. 453). In addition, L2 learners’ exposure to the target in incidental, naturalistic contexts is almost certainly very limited, as “English *wh*-questions involving
wh-movement across two clausal boundaries from the subject position of the embedded clause are not frequently used in everyday conversation” (p. 453). Furthermore, despite its redundancy and low input frequency, the operation of the underlying rule is very regular, so it can be explained clearly and succinctly in metalanguage. Given these characteristics of the English that-trace filter, learning of the target would be substantially aided by the use of FFI.

Example 1
a. *Who do you believe that goes jogging every morning?
   Who do you believe goes jogging every morning?

b. *Who do you think that married Sarah last year?
   Who do you think married Sarah last year?

3.3. Design

There were four groups in this study: the FFI-MFI (FM) group, the MFI-FFI (MF) group, the MFI (M) group, and the control group. The learners were randomly assigned to one of the groups (FM: n = 11; MF: n = 11; M: n = 9; and control: n = 11). The FM group and the MF group served as experimental groups for testing the different effects of the learning conditions sequenced in different ways. The M group served as a trained control group to explore the beneficial effects of FFI and the validity of MFI as an incidental learning condition. The control group served as an untrained control group to examine the effects of any type of L2 instructional method. The study employed a repeated-measures design. The FM, the MF, and the M groups completed a pretest, three days of treatment (Treatment 1, Treatment 2, and Treatment 3), an immediate posttest (Posttest 1), a one-week delayed posttest (Posttest 2), and a one-month delayed posttest (Posttest 3), as well as questionnaires on bio-data information and language background. The control group received no instructional treatment, but participated in the pretest and the posttests and completed the questionnaires.

3.4. Treatment

3.4.1. Form-focused instruction

FFI in the learners’ L1 (Korean) was employed to explicitly teach the L2 target rule. The rule was presented with three example sentences so that the learners would be able to notice how the rule operates in the language. In order to ensure that the learners understood the rules, a comprehension check-up quiz followed. In this check-up quiz, the learners
were asked to change three original statement sentences into question sentences complying with the target rule. The FFI session was computerized and individualized. Each individual participant spent approximately, but not longer than, five minutes to complete this session.

3.4.2. Meaning-focused instruction

The learners were exposed to 60 auditory target question sentences by means of a picture-selection task. The picture-selection task was designed to offer an incidental L2 learning condition by directing learners’ primary attention to L2 meaning. In this task, the learners were first asked to view a picture illustrating a scene (e.g., a woman roasting beef in a kitchen) for a few seconds. They were then required to listen to a question sentence (e.g., *Who do you think cooks the beef?*) and repeat the sentence. Next, three pictures (e.g., pictures of a woman, a man, and a baby) were presented to the learners so they could select one picture as the best answer for the question. The order of the sentences was randomized. The MFI session, which was also individualized and computerized, lasted approximately 20 minutes.

3.5. Test Battery

A total of three tests were utilized to measure implicit knowledge and explicit knowledge separately: an elicited oral imitation task (EOIT), which primarily measured implicit knowledge, an untimed grammaticality judgment task (UGJT), and a metalinguistic knowledge test (MKT), which primarily measured explicit knowledge. All tests were computerized and individualized (for theoretical grounds of test utilization, see Ellis, 2004, 2005). All tests utilized new items that had not been used in the treatment sessions.

3.5.1. Elicited oral imitation test (EOIT)

This test consisted of 24 sentences, comprising 12 target items and 12 filler items. They were then evenly divided between grammatical and ungrammatical sentences. In this task, relevant background information (e.g., *You believe that John met his aunt.*) was presented visually before the learners listened to a target question sentence (e.g., *Who do you believe that met his aunt?*). After listening to the target question sentence, the learners were required to answer the question orally based on the previous information (e.g., *his aunt*). This procedure was intended to focus their attention on meaning. Next, the learners were asked to repeat the question sentence orally in correct English (e.g., *Who do you believe met his aunt?*). The test items were randomized. Each learner spent approximately 10–15
3.5.2. Untimed grammaticality judgment test (UGJT)

The test items of the UGJT were created in the same manner as the EOIT items. There were 24 testing items, consisting of 12 target items and 12 filler items, and they were evenly divided between grammatical and ungrammatical sentences. In this test, the learners were asked to listen to each sentence and to indicate whether the sentence was grammatical or ungrammatical by pressing the designated keys on the keyboard. No time pressure was utilized, so the learners were allowed to think as long as they wanted before they made a decision. The test items were randomly presented. Each learner took approximately 10-15 minutes to complete the UGJT.

3.5.3. Metalinguistic knowledge test (MKT)

This test consisted of eight sentences, evenly divided into four target items and four filler items. Of the four target and four filler items, two of each were grammatical and two were ungrammatical. In this test, the learners were asked to identify whether the sentences were grammatical or ungrammatical, provide a metalinguistic explanation of the ungrammatical sentences, and correct the ungrammatical sentences into correct sentences. The test items were randomized, and no time pressure was utilized. Each learner took approximately 15–20 minutes to complete the MKT.

3.6. Procedure

Data were collected over five experimental sessions. In the first meeting (Session 1 in Week 1), all participants signed consent forms, filled out the biodata and language background questionnaires, and then participated in the pretest session in the order of EOIT, UGJT, and MKT. Once the participants completed these, only those who were randomly assigned to the FM, the MF, and the M groups proceeded to Treatment 1. However, the participants who were assigned to the control group were asked to return to the lab two days later in order to participate in Posttest 1. Two experimental groups, FM and MF, received different types of instructional treatment. In Treatment 1 (Session 1 in Week 1), the learners in the FM group were taught the target rule through FFI, and this was followed by MFI. In Treatment 2 (Session 2 in Week 1) and Treatment 3 (Session 3 in Week 1), the FM learners received MFI. On the other hand, the MF group participated in MFI in Treatment 1 (Session 1 in Week 1) and in Treatment 2 (Session 2 in Week 1). In Treatment 3 (Session 3 in Week 1), the MF learners received FFI followed by MFI. The M
learners engaged in MFI for Treatment 1 (Session 1 in Week 1), Treatment 2 (Session 2 in Week 1), and Treatment 3 (Session 3 in Week 1). The M learners did not receive FFI on any day. Immediately after Treatment 3, the learners in these three groups took Posttest 1 (Session 3 in Week 1) in the order of EOIT, UGJT, and MKT. On this day, the control group also returned to the lab and completed Posttest 1 in the same manner. For all groups, Posttest 2 was administered one week later (Session 4 in Week 2), and Posttest 3 one month after the third session (Session 5 in Week 4).

3.7. Scoring and Analyses

All of the learners’ oral responses were audio recorded, but learners’ responses to the 12 target sentences were only scored and analyzed. As the EOIT was designed to assess whether the learners could reproduce the target sentences without violating what they had learned while focusing on meaning, the answers were scored as correct if and only if their answer to a background question was correct and they reproduced the question sentence in correct English. If a learner reproduced the question sentence in correct English that did not involve an obligatory occasion for the use of the target structure, it was scored as incorrect. All correct answers were given one point and all incorrect answers were given zero points. Scores were then expressed as percentage correct. In terms of the UGJT, the learners’ judgments on the 12 target sentences were analyzed. Their correct endorsement/rejection was given one point, and all incorrect endorsements/rejections were given zero points. Scores were then expressed as percentage correct. The MKT was designed to observe metalinguistic knowledge in the learners’ rule-based analysis of target sentences. Therefore, only learners’ answers in response to two ungrammatical sentences were analyzed. The learners received one point when their answers satisfied all of these four criteria: (1) accurately identifying an ungrammatical sentence as ungrammatical; (2) pointing out an erroneous segment of the sentence; (3) providing an appropriate reason why the part was erroneous; and (4) correcting the part to make the sentence grammatical. When their answers did not satisfy any one of the four criteria, zero points were awarded. Due to the low number of items, scores were not expressed as percentages. Instead, the number of learners who earned the possible scores (0, 1, or 2) was counted.

4. RESULTS

4.1. Untimed Grammaticality Judgment Test

Table 1 shows the FM, the MF, the M, and the control groups’ scores on the UGJT. First,
a one-way ANOVA was conducted for the learners’ pretest scores in order to detect any group difference prior to the treatment. The one-way ANOVA for the pretest scores found no significant differences among groups, $F(3, 38) = .400, p > .05$. Additionally, a one-sample $t$-test revealed that all groups’ pretest performances were significantly below chance (FM, $t(10) = -3.130, p < .05$; MF, $t(10) = -3.317, p < .05$; M, $t(8) = -3.319, p < .05$; control, $t(10) = -3.806, p < .05$). Therefore, any group differences and above-chance performances found on the posttests can be attributed to the instructional treatment.

### TABLE 1

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<tr>
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<th>Pretest</th>
<th>Posttest 1</th>
<th>Posttest 2</th>
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<td>$M$ (SD)</td>
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<tr>
<td>FM ($n=11$)</td>
<td>40.09* (10.49)</td>
<td>66.64* (17.54)</td>
<td>68.45* (22.96)</td>
<td>69.91* (16.97)</td>
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<tr>
<td>MF ($n=11$)</td>
<td>40.18* (9.79)</td>
<td>65.82* (14.25)</td>
<td>69.73* (16.41)</td>
<td>71.64* (21.50)</td>
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<tr>
<td>M ($n=9$)</td>
<td>39.78* (9.22)</td>
<td>53.67 (14.68)</td>
<td>45.33 (13.70)</td>
<td>48.00 (14.35)</td>
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<tr>
<td>Control ($n=11$)</td>
<td>34.18* (13.76)</td>
<td>54.64 (18.61)</td>
<td>50.09 (13.04)</td>
<td>44.64 (19.29)</td>
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*Significantly different from chance ($p < .05$)

The accuracy rates on the UGJT were analyzed across all groups and four test sessions. The descriptive statistics illustrate that all groups gained higher scores on the posttests than on the pretest. When the learners’ accuracy rates were compared to the chance level, the one-sample $t$-tests found that the FM group and the MF group performed significantly above chance on Posttest 1 (FM, $t(10) = 3.145, p < .05$; MF, $t(10) = 3.688, p < .05$), Posttest 2 (FM, $t(10) = 3.221, p < .05$; MF, $t(10) = 3.988, p < .05$), and Posttest 3 (FM, $t(10) = 3.082, p < .05$; MF, $t(10) = 3.338, p < .05$). The M group’s and the control group’s performances, on the other hand, were not statistically different from chance on Posttest 1 (M, $t(8) = 0.756, p > .05$; control, $t(10) = 0.820, p > .05$), Posttest 2 (M, $t(8) = -1.029, p > .05$; control, $t(10) = 0.025, p > .05$) and Posttest 3 (M, $t(8) = -0.418, p > .05$; control, $t(10) = -0.928, p > .05$). The results illustrate a clear learning effect for the FM group and the MF group, but no learning effect for the M group and the control group.

Next, a four (Time: pretest, Posttest 1, Posttest 2, and Posttest 3) x four (Group: FM, MF, M, and control) repeated-measures (RM) ANOVA was run for the UGJT scores. The RM ANOVA revealed significant main effects for Time, $F(3, 114) = 18.407, p < .001$, $\eta_p^2 = .326$, and for Group, $F(3, 38) = 6.357, p < .01$, $\eta_p^2 = .334$, but no significant Time x Group interaction effects, $F(9, 114) = 1.390, p > .05$, $\eta_p^2 = .099$. Further pairwise contrasts found that the FM and the MF groups’ scores on Posttest 1, Posttest 2, and Posttest 3 were significantly higher than their pretest scores ($p < .05$ for all). Although the scores themselves were not significantly higher than the chance level, the M group and the control group showed significant pretest to posttest improvement on Posttest 1 ($p < .05$). However,
their scores on Posttest 2 and Posttest 3 were not statistically different from their pretest performance \((p > .05)\).

The locus of the significant group effects was further computed by a separate one-way ANOVA across the three posttests. The one-way ANOVA revealed no significant group difference for Posttest 1, \(F(3, 38) = 1.876, p > .05\), but a significant group difference for Posttest 2, \(F(3, 38) = 4.015, p < .05\) and Posttest 3, \(F(3, 38) = 4.770, p < .01\). As for the significant group difference in Posttest 2 and Posttest 3, a Tukey post hoc analysis found that the FM group and the MF group performed significantly better than the M and the control groups on Posttest 2 and Posttest 3 \((p < .05)\). The M and the control groups’ performances did not appear to differ from each other \((p > .05)\).

Given the statistical analyses yielded by the one-sample \(t\)-test and the ANOVAs, the analyses for the UGJT scores, a primary measure of explicit knowledge, demonstrated a clear, substantial improvement in the FM group and the MF group over time.

### 3.2. Oral Elicited Imitation Test

Table 2 shows the FM, the MF, the M, and the control groups’ scores on the EOIT. First, a one-way ANOVA was run for the learners’ pretest scores to observe any group difference before the treatment. The one-way ANOVA for the pretest scores found no significant differences among groups, \(F(3, 38) = .400, p > .05\). In addition, a one-sample \(t\)-test revealed that their pretest performances were significantly below chance (FM, \(t(10) = -6.675, p < .05\); MF, \(t(10) = -6.698, p < .05\); M, \(t(8) = -6.281, p < .05\); Control, \(t(10) = -11.576, p < .05\)). Therefore, any group differences and above-chance performances found on the posttests can be attributed to the instructional treatment.

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<tr>
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<th>Pretest</th>
<th>Posttest 1</th>
<th>Posttest 2</th>
<th>Posttest 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(M (SD))</td>
<td>(M (SD))</td>
<td>(M (SD))</td>
<td>(M (SD))</td>
</tr>
<tr>
<td>FM ((n = 11))</td>
<td>15.09* (17.34)</td>
<td>47.00 (33.92)</td>
<td>45.55 (26.14)</td>
<td>52.18 (27.20)</td>
</tr>
<tr>
<td>MF ((n = 11))</td>
<td>18.82* (15.45)</td>
<td>36.27 (27.62)</td>
<td>31.18 (22.68)</td>
<td>43.91 (21.65)</td>
</tr>
<tr>
<td>M ((n = 9))</td>
<td>12.89* (17.72)</td>
<td>25.00* (12.42)</td>
<td>20.22* (19.05)</td>
<td>33.33 (24.96)</td>
</tr>
<tr>
<td>Control ((n = 11))</td>
<td>12.18* (10.83)</td>
<td>16.55* (16.65)</td>
<td>15.82* (25.92)</td>
<td>21.18* (19.07)</td>
</tr>
</tbody>
</table>

*Significantly different from chance \((p < .05)\)

The accuracy rates on the EOIT were analyzed across all groups and four test sessions. The descriptive statistics indicate that all groups tended to score higher on the posttests than the pretest. However, the one-sample \(t\)-tests on the mean accuracy rates indicate that learners’ performances were indistinguishable from chance on Posttest 1 (FM, \(t(10) = -\))
0.293, \( p > .05 \); MF, \( t(10) = -1.645, p > .05 \), Posttest 2 (FM, \( t(10) = -0.571, p > .05 \), and Posttest 3 (FM, \( t(10) = 0.268, p > .05 \); MF, \( t(10) = -0.935, p > .05 \), M, \( t(8) = -2.007, p > .05 \)) or significantly below chance on Posttest 1 (M, \( t(8) = -6.039, p < .05 \); control, \( t(10) = -6.673, p < .05 \), Posttest 2 (MF, \( t(10) = -2.749, p < .05 \); M, \( t(8) = -4.692, p < .05 \); control, \( t(10) = -4.376, p < .05 \), and Posttest 3 (control, \( t(10) = -5.008, p < .05 \)). None of the groups showed significant above-chance performances on the EOIT posttests, indicating no clear learning effect in the short term or in the long term.

Next, a four (Time: pretest, Posttest 1, Posttest 2, and Posttest 3) x four (Group: FM, MF, M, and control) RM ANOVA was run for the EOIT scores. The RM ANOVA revealed significant main effects for Time, \( F(3, 114) = 16.378, p < .001, \eta_p^2 = .301 \), and for Group, \( F(3, 38) = 3.740, p < .05, \eta_p^2 = .228 \), but no significant Time x Group interaction effects, \( F(9, 114) = 1.667, p > .05, \eta_p^2 = .116 \). Further pairwise contrasts revealed that the FM group’s scores on Posttest 1, Posttest 2, and Posttest 3 were significantly higher than their pretest scores (\( p < .05 \)). The same analysis found that the MF group performed significantly better on Posttest 1 and Posttest 3 (\( p < .05 \)). The MF group’s Posttest 2 score, however, was not distinguishable from their pretest score (\( p > .05 \)). As for the M and the control groups, on the other hand, none of their posttest scores were significantly higher than their pretest scores (\( p > .05 \)).

The locus of the significant group effects was further computed by a separate one-way ANOVA across the three posttests. The one-way ANOVA revealed a significant group difference for Posttest 1, \( F(3, 38) = 3.139, p < .05 \), for Posttest 2, \( F(3, 38) = 3.320, p < .05 \), and for Posttest 3, \( F(3, 38) = 3.611, p < .05 \). A Tukey post hoc analysis found that the FM group performed significantly better than the control group on Posttest 1, Posttest 2, and Posttest 3 (\( p < .05 \)), while their posttest performances were not statistically different from the MF and the M groups’ posttest scores (\( p > .05 \)). The similarity of the performances of the FM group and of the MF and M groups is discussed in the following discussion section. As for the MF, M, and control groups, there was no statistical difference between any of their posttest scores (\( p > .05 \) for all).

In summing up, the results yielded by the one-sample \( t \)-test and the ANOVAs, the analyses of the EOIT, which is primarily a measure of implicit knowledge, indicate that a trend in development more clearly appeared in the FM group.

3.3. Metalinguistic Knowledge Test

There were two ungrammatical sentences in each MKT, so the maximum available score gain was two points. When learners gained two points on the test, this was considered an indication of reliable metalinguistic knowledge of the target rule (Table 3). The analysis of the MKT pretest revealed that all participants gained zero points,
illustrating that no participants had metalinguistic knowledge of the target prior to the treatment. Immediately after the treatment, the results of the MKT showed that eight FM learners and seven MF learners had gained reliable metalinguistic knowledge of the target. More than or nearly half of the FM learners and the MF learners sustained their metalinguistic rule knowledge over a week (FM = 6; MF = 6) and over a month (FM = 5; MF = 6). As for the M group, on the other hand, none of the learners showed any gain in metalinguistic knowledge across all posttests. Therefore, the analyses of the MKT confirmed that the two experimental groups who received FFI, that is, the FM and the MF groups, noticed the metalinguistic rule, while this was not the case for the group that only received MFI. Furthermore, this finding indicates that the learners in the MFI-only condition were not able to arrive at explicit, metalinguistic rules for the target form without the support of FFI. This suggests that the MFI offered a proper condition for incidental L2 learning. No learning effect was shown for the control group, either.

<table>
<thead>
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<th>TABLE 3</th>
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<tbody>
<tr>
<td>Number of Learners who Gained Possible Points on Metalinguistic Knowledge Test</td>
</tr>
<tr>
<td>Pretest</td>
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<tr>
<td>---------</td>
</tr>
<tr>
<td>FM (n = 11)</td>
</tr>
<tr>
<td>MF (n = 11)</td>
</tr>
<tr>
<td>M (n = 9)</td>
</tr>
<tr>
<td>Control (n = 11)</td>
</tr>
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</table>

5. DISCUSSION

The first research question asks if FFI provided at different times (before MFI versus after MFI) differentially affects learning of the English that-trace filter, as assessed by a measure of explicit knowledge. The study found that the two learning conditions (FFI-MFI sequence and MFI-FFI sequence) equally led to improved performance on the measure of explicit language knowledge, as shown by the FM and the MF groups’ significant development in the short term and in the long term. Although the M group and the control group showed significant development from the pretest to Posttest 1, their scores on Posttest 1 were not significantly above chance. Therefore, it cannot be concluded that these groups showed any clear learning effect. In contrast, the study observed a significant development from the pretest to each posttest for the FM group and the MF group, and their posttest gains were significantly higher than the chance level. The MKT scores confirm that explicit knowledge of the target rule was gained only among the FM and the MF participants, and not among the M participants. These results indicate that, regardless
of the timing of FFI, those learners who received FFI at any time gained reliable explicit knowledge of the less salient L2 target. The benefit of FFI, in this study, was shown immediately after the instructional treatment and was sustained successfully for a month.

The second research question asks if FFI provided at different times (before MFI versus after MFI) differentially affects learning of the English *that*-trace filter, as assessed by a measure of implicit language knowledge. The study found that the FFI-MFI sequence led to greater gains on the measure of implicit knowledge than the MFI-FFI sequence, as shown by the superiority of the FM group’s EOIT performance to that of the MF group. Despite the lack of performance significantly superior to the chance level by any group on the EOIT posttests, the analysis found that the FM group’s scores on Posttests 1, 2, and 3 were statistically different from the control group. On the other hand, no posttest scores of the MF group and the M group were statistically distinguishable from the control group. As acquisition of implicit knowledge is a laborious and slow process (N. Ellis, 1993), three days of treatment might not have offered a reasonable condition to observe a significant development of implicit knowledge. Nevertheless, the FM group’s superior performance compared to the control group’s may illustrate a gradual trend in implicit knowledge development, which would suggest that instructional treatment provided for an extended period of time could lead to a substantial learning effect. Furthermore, the FM group’s superior posttest performances imply that early FFI prior to MFI facilitates the efficient development of implicit L2 knowledge, while FFI delayed until after MFI is not as efficient.

While the FM group and the MF group received L2 instruction consisting of the same instructional methods (FFI and MFI), the results of the current study demonstrate that the timing of FFI in relation to MFI differentially affects learners’ development of implicit knowledge. Although the two groups received identical amounts of L2 exposure through MFI, the results indicate that acquisition of implicit knowledge can be accelerated when learners learn metalinguistic rules before they receive extensive amount of meaningful L2 exposure. Implicit knowledge is the primary component of L2 competence, which is the basis of unplanned and fluent communicative language ability (Ellis, 2005). It can be concluded, therefore, that goals of L2 instruction can be reached more effectively when learners do have metalinguistic knowledge of target forms before they are exposed to meaningful L2 instances of the forms’ use. This study found beneficial effects of early FFI, provided prior to MFI, on the development of implicit knowledge. These results are in line with the results of Kim and Rebuschat’s (2010) semi-artificial language study, which found that explicit learning preceding implicit learning contributes to the development of unconscious L2 knowledge (intuition) as well as the development of conscious L2 knowledge (rule knowledge and memory), when these were measured by subjective measures of awareness.
Returning to the issue of the interface between explicit knowledge and implicit knowledge, the FM learners’ positive developmental pattern in their EOIT scores illustrates that the process of implicit knowledge development can take place more efficiently when learners do have metalinguistic knowledge of the target form before they receive much linguistic input. According to R. Ellis (1993, 1994, 2005), who supports the weak interface position, explicit knowledge of L2 forms makes relevant features salient and enables learners to notice them and to notice the gap between the input and their existing competence. Later, explicit knowledge obtained through formal instruction helps learners incorporate linguistic features into their implicit interlanguage grammar. In their corrective feedback study, Ellis et al. (2006) suggested that implicit knowledge should be gained more efficiently when the method of FFI generates higher levels of awareness.

In this study, the target was not likely to be noticed explicitly in a purely meaning-focused L2 learning context, as indicated by the M learners’ scores of zero on the MKT. On the other hand, the FM learners’ gain of implicit knowledge that was observed in this study seems to have been facilitated because the explicit knowledge they gained through FFI helped them make comparisons between their existing representations of the target form’s grammatical features and what they actually observed in the input during MFI. Such a process may positively affect the restructuring of interlanguage grammar, which in turn would promote correct L2 comprehension and production. It is noteworthy that the MF learners, who did not have their attention drawn to the relevant L2 features until the last day of treatment and thus had very limited opportunity to make such comparisons and restructuring of interlanguage grammar, did not show a similar gain in implicit knowledge.

Cognitive theory of skill acquisition and information processing provides a developmental perspective on how explicit knowledge may provide a basis for the fluent processing of L2 knowledge. In the literature on skill acquisition, Anderson’s Adaptive Character of Thought (ACT) model views skill learning as the development of procedures that transform declarative knowledge into procedural knowledge (Anderson, 1982, 1983). According to him (1982, p. 369), this transition takes place in three stages: (1) the declarative stage with factual knowledge, (2) the proceduralized stage where general rules can be applied to particular instances, and (3) the automatized stage in which procedures become increasingly efficient and automatic. In this model, qualitative transformation of knowledge is accelerated by the effort of repetitive practice. Anderson explains that repetition of the same experience by means of practice results in changes in the neuronal structure of memory, and this allows faster and more efficient retrieval and use of knowledge with lower error rates (Anderson, 2000; Logan, 2002; Palmeri, 1999; Rickard, 2004).

Drawing on the ACT model, the proponents of the strong interface position (DeKeyser, 1998, 2007a; Sharwood Smith, 1981) provide a developmental perspective on how explicit
knowledge may offer the basis of fluent processing of L2 knowledge. According to this position, declarative, factual knowledge, which may correspond to knowledge of language items, can be converted into procedural knowledge, which may correspond to knowledge about how to operate linguistic knowledge, through repetitive engagement in pedagogical practice. In other words, repetitive practice in putting L2 utterances together in a conscious manner leads to the restructuring of L2 knowledge in such a way that the learners become able to access the knowledge quickly and without reflection. From this perspective, repeated practice is of pivotal importance in transforming declarative knowledge into procedural knowledge. SLA research has documented evidence that declarative knowledge can be transformed into procedural knowledge by the effort of practice (e.g., DeKeyser, 1995, 2007b; N. Ellis, 1993; Larsen-Freeman, 2003; Muranoi, 2007; Segalowitz & Freed, 2004; VanPatten, 1996, 2003; VanPatten & Oikkenon, 1996).

From this perspective, the FM learners’ trend in development on the EOIT can be seen as indicative of a fast and efficient process of gaining L2 knowledge. Note that the EOIT asked learners to reproduce a sentence in correct English under time pressure. Thus, the more spontaneously and effortlessly the learners accessed their L2 target knowledge, the higher they scored. Although the MKT scores of the FM group and the MF group showed both immediate gain and retention over a month of metalinguistic knowledge of the target rule, only the FM learners showed a significant developmental trend on the EOIT. It is possible that the large amount of L2 input after FFI provided plentiful opportunities to practice the use of declarative L2 rules, which in turn promoted the FM group’s rapid and efficient skill in accessing the relevant L2 knowledge. In contrast, the MF group had only one session of MFI in which to practice the declarative rule knowledge presented in the FFI. The MF group’s lack of development in the EOIT, therefore, seems to be attributable to the delayed FFI and the reduced amount of opportunity to practice after the FFI, which apparently did not optimally support the proceduralization of their declarative knowledge.

6. CONCLUSIONS, LIMITATIONS, AND FUTURE RESEARCH

The current study aimed to identify differential effects of FFI on the development of explicit knowledge and implicit knowledge when the FFI is provided at different times within the context of MFI. The target form utilized in this study had low salience, so it was not likely that learners would identify the metalinguistic rule within the pure MFI context without the help of FFI. The results illustrate that early and delayed FFI in relation to MFI are equally beneficial for the development of explicit knowledge. On the other hand, the results suggest that FFI offered prior to MFI contributes to the development of implicit knowledge more efficiently than FFI delayed until later in the course of the MFI. The
benefits of early FFI followed by MFI can be explained by FFI’s role in enhancing learners’ recognition of gaps between their interlanguage grammar and the target language grammar before they are exposed to sufficient L2 input. Once the learners know the critical elements that they need to focus on, the following MFI positively influences the restructuring and proceduralization of their L2 knowledge, supporting the development of implicit knowledge. Because the same positive effects were not observed when FFI was provided later or not at all, it may be that MFI itself does not fully support the development of implicit knowledge when the target form is not salient and is not easily noticed.

In conclusion, the results of the present study illustrate that providing early FFI is more beneficial than delayed FFI, as it provides a better condition for adult L2 learners to develop implicit L2 knowledge. This study supports the argument that restructuring and proceduralization of knowledge within a meaning-focused learning condition can occur more effectively when learners possess metalinguistic knowledge. Thus, although early and delayed FFI have equivalent benefits for gaining explicit knowledge, delayed FFI does not efficiently support the development of implicit knowledge because it provides relatively less time for the restructuring and proceduralization of L2 knowledge. Pedagogically, this finding is noteworthy because it implies that learners’ fluent use of the L2 and automatic access to L2 knowledge can be facilitated when learners know what forms they need to focus on during meaningful exposure to L2 input. This study might therefore encourage language teachers who combine FFI and MFI methods to use FFI before MFI, thus allowing learners to first develop a cognitive understanding of the target rule in order to support the more efficient development of their implicit knowledge.

This study does have some limitations that should be noted. First, different types of FFI methods, such as explicit rule instruction, processing instruction, task-based language teaching, and providing corrective feedback during communicative interaction, among others, were not considered in this study. Different degrees of explicitness in the instructional methods may draw different levels of awareness (Rosa & Leow, 2004a, 2004b) to the target forms. Thus, they could contribute to the development of explicit versus implicit knowledge with different degrees of efficiency. Therefore, a future study that addressed this issue by looking into how different degrees of explicitness in the instructional methods might affect the gain of different types of knowledge would be interesting.

Second, strictly speaking, the duration of L2 exposure was not identical across participants, although all learners were exposed to a similar amount of L2 input. In addition to the MFI condition, the FM and the MF groups received FFI for another five minutes with three example sentences and a check-up quiz. Although FFI took a very brief period of time and the number of example sentences was small, the extra five minutes of exposure to positive input could result in unexpected changes in learners’ cognition, which
might facilitate or impede their learning of targets. In addition, recall that the meaning-focused task for MFI asked learners to listen to and repeat the sentence until they arrive at the correct answer. This means that some learners would have received more positive input when they made more errors in the task. Therefore, a future study needs to be conducted in order to observe whether the current results can be replicated when the duration of L2 exposure is rigidly controlled.

Fourth, only one type of assessment tool was utilized to measure explicit versus implicit knowledge, and thus, it was not possible to triangulate the data in order to provide further interpretations of the results. While increasing the number of test items might lead to testing effects, the addition of subjective measures of awareness or reaction times to the existing assessment tools would enhance the validity and reliability of the results. In addition, utilization of an oral narrative test would be useful in triangulating results of the study.

Lastly, this study only looked at L2 syntax learning, limiting the possibility of making generalizations about other aspects of linguistic knowledge. A study might have different results if the target forms involved different aspects of language (e.g., morphological rules, semantic rules, vocabulary). To address this limitation, a future study could investigate whether the sequence of learning conditions that this study identifies as optimal has the same effect when the L2 targets are different.

REFERENCES


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Applicable levels: Secondary, college, higher

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