THE OPTIMAL CONDITIONS FOR FORM-FOCUSED INSTRUCTION: METHOD, TARGET COMPLEXITY, AND TYPES OF KNOWLEDGE

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ABSTRACT

This dissertation investigates optimal conditions for form-focused instruction (FFI) by considering effects of internal (i.e., timing and types of FFI) and external (i.e., complexity and familiarity) variables of FFI when it is offered within a primarily meaning-focused context of adult second language (L2) learning. Ninety-two Korean-speaking learners of English as a foreign language (EFL) participated in the study and were randomly assigned to one of five experimental groups or one control group. The experimental participants were instructed in one simple and one complex targets through (1) deductive FFI followed by meaning-focused instruction (MFI) (DM); (2) deductive FFI preceded by MFI (MD); (3) inductive FFI followed by MFI (IM); (4) inductive FFI preceded by MFI (MI); or (5) MFI-only. No instruction was provided for the controls. Learning was measured by a grammaticality judgment task (GJT), and knowledge types were examined by subjective measures of awareness (i.e., confidence ratings and source attributions), an oral elicited imitation task (OEIT), and a metalinguistic knowledge test (MKT). The results indicate that the combinations of FFI and MFI result in more robust learning effects than the exclusive use of MFI. This was demonstrated by the mixed-method learners’ GJT accuracy rates, which were significantly higher than the controls’ immediately and over time. As for the target complexity and item familiarity, the analyses show that only the mixed-method learners significantly outperformed the controls when the target was more complex and the targets were embedded in unfamiliar syntactic patterns. As for the types of
knowledge, the analyses found confirmative evidence that FFI positively influences the development not only of explicit knowledge but also of implicit knowledge in the long term. The MFI-only group demonstrated evidence of explicit knowledge but not implicit knowledge. The findings suggest that adult L2 learners may benefit considerably more from the combination of FFI and MFI, particularly for complex rule learning and development of rule transfer ability. Moreover, the findings indicate that possession of explicit knowledge may not hinder development of implicit knowledge. Rather, explicit L2 knowledge may offer a foundation for parallel development of implicit knowledge.
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Introduction

The benefits of form-focused instruction (FFI) within a primarily meaning-focused second language (L2) learning context have been demonstrated by an ample amount of second language acquisition (SLA) research. While acknowledging that purely meaning-focused instruction (MFI) can facilitative the learning of functional use and promote communicative skills in an L2, many empirical studies (e.g., Alanen, 1995; Allen, Hendler, & Tate, 1990; Bygate, 1996; Carroll & Swain, 1993; de Graaf, 1997; DeKeyser, 1995, 1998; Doughty, 1991; N. Ellis, 1993; Harley, 1998; Harley & Swain, 1984; Lightbown, 1991, 1998; Lightbown & Spada, 1990; Nagata, 1993; Nagata & Swisher, 1995; Rosa & Leow, 2004a, 2004b; Robinson, 1996, 1997; Skehan, 1996; Spada & Lightbown, 1993; Swain, 1985; Williams & Evans, 1998; Willis, 1996) suggest that MFI is not sufficient for adult L2 learners. These studies have shown that adult learners who learned an L2 exclusively with MFI were less likely to achieve high levels of grammatical competence. Based on this finding, they claimed that instruction methods focusing solely on L2 meaning are inadequate for helping learners develop an accurate knowledge of a language. Furthermore, they suggested that incorporating FFI into MFI can compensate for MFI’s weaknesses (e.g., Laufer & Girsai, 2008; Nassaji & Fotos, 2011; Peters, 2006; Swain, 2005).

The benefits of FFI have been clearly shown in two meta-analysis studies (Norris & Ortega, 2000; Spada & Tomita, 2010), which synthesized data from 49 and 30 published articles, respectively. Norris and Ortega’s (2000) secondary analyses of primary investigations in SLA concluded that explicit types of instruction produce more substantial effects than implicit/incidental instruction, and that the effectiveness of FFI is durable over time. The more recent meta-analysis by Spada and Tomita (2010) reported that FFI is more effective for both
simple and complex target forms, and FFI positively contributes to learners’ spontaneous use as well as controlled knowledge of complex and simple forms. These reported benefits of FFI counter the argument for the Natural Approach, which claims that learning metalinguistic information and pedagogical rules is not an effective way to acquire an L2 and could actually interfere with the natural developmental process (Krashen, 1981, 1982; Krashen & Terrell, 1983; Newmark & Riebel, 1968). Proponents of the Natural Approach contend that any intentional effort to learn an L2 is not useful for L2 acquisition; on this view, any type of FFI that directly or indirectly leads learners’ attention to L2 forms would not be necessary or useful. However, empirical findings from SLA studies indicate that adding a component of FFI to MFI does not interfere with certain aspects of L2 development and, moreover, the combination of FFI and MFI serves as a more effective language teaching method.

The general aim of language learning and teaching the learner’s acquisition of linguistic competence in the L2 (Brown, 2007; Krashen, 1981, 1982; Richards & Rodgers, 2001). Although there are many different explanations of how L2 competence is acquired (e.g., Chomsky, 1976; N. Ellis, 2006; Rumelhart & McClelland, 1986), most theories generally agree that L2 competence primarily consists of implicit knowledge of how to use the L2. Therefore, implicit L2 knowledge is regarded as the primary source of speech production and comprehension, and any method that successfully promotes the acquisition of implicit knowledge is considered an effective teaching method. What is not agreed upon among theorists and researchers is the role of explicit knowledge in developing implicit knowledge. For example, some theorists argue that explicit knowledge plays a peripheral role in the development of implicit knowledge (e.g., Krashen, 1982, 1983; Paradis, 1994, 2004), while others claim that explicit knowledge facilitates it (e.g., N. Ellis, 2008; R. Ellis, 1993, 1994). A more radical
argument states that explicit knowledge can be converted into implicit knowledge (Anderson, 1982; DeKeyser, 1998). Identifying the role of explicit knowledge in the development of implicit knowledge is pedagogically meaningful because it may determine whether FFI methods should be implemented or not. For this reason, further SLA research should examine the interface of explicit knowledge and implicit knowledge in order to suggest pedagogical implications for more effective curricula development in language learning and teaching.

Research in cognitive psychology (e.g., Mathews, Russ, Stanley, Blanchard-Fields, Cho, & Druhan, 1989; Reber, Kassin, Leiw, & Cantor, 1980) may offer a new direction to investigate the interface of explicit and implicit knowledge in SLA. Reber et al. (1980) investigated the interaction of explicit learning and implicit learning, as well as the optimum sequence that produces the best performance by the subjects (in their Experiment 2). By providing an explicit learning condition at different points during the condition for implicit learning, the researchers were able to investigate whether the effect of explicit learning varies depending on the timing of its provision. Subjects learned an artificial grammar (AG) under one of five conditions. The explicit group (E) was instructed in the underlying rules of the AG through an actual schematic diagram of the grammar. The participants received an explanation of the rules for forming strings and were asked to generate three new strings. The implicit subjects (I) closely observed a large set of stimuli and memorized them. Each stimulus on the list was presented three times. Subjects in the other three experimental conditions learned the AG with different combinations of E and I. There was an explicit-implicit group (EI), which learned rules before the instance exposure, and an implicit-explicit group (IE), which learned rules after the instance exposure. The implicit-explicit-implicit group (IEI) learned the rules explicitly in the middle of the exposure to
instances. At the testing phase, learning was measured by a well-formedness task consisting of new, previously unused grammatical and ungrammatical items.

The groups’ accuracy on the well-formedness task in Reber et al. (1980) was, in order from highest to lowest: EI (76%) > IEI (71%) = IE (70%) > E (66%) = I (62%). Depending on the timing of explicit learning, the performance of the subjects varied. When the rules were introduced earlier, better performance was observed. Also, the participants who learned the AG through a combination of E and I performed better than the participants who learned through either E or I alone. While there were group differences in terms of performance, no group difference was found in explicit knowledge of grammar rules. Regardless of the presence or absence of formal, explicit exposure to the schematic diagram of the grammar, none of the subjects was able to verbalize concrete justifications for their decisions during the grammaticality judgment test. Thus, this study provided evidence for the interactive synergistic effect of the blending of explicit learning and implicit learning. And the verbal report data suggests that the combination of learning modes possibly contributes to the development of unconscious knowledge.

Regarding the sequence of learning modes, Mathews et al. (1989) found different results than Reber et al. (1980): in Mathews et al.’s study (Experiment 4), implicit learning preceding explicit learning was more facilitative than the reverse order. In this study, subjects learned biconditional rules through differently sequenced implicit and/or explicit modes. In the implicit mode of learning, subjects were asked to memorize exemplars. They were not informed of the existence of underlying rules. For the condition of explicit instruction, a rule-search task was used. In this task, subjects were presented with an invalid string, and they were asked to search for rules by marking the incorrect letters in each string. Subjects were assigned to one of five
learning conditions: Explicit (E), Implicit (I), Implicit/Explicit (IE), Explicit/Implicit (EI), and Alternation of Implicit/Explicit (Alt). Learning was measured by a well-formedness task, comprised of 50 old, used items from the training phase and 50 new, unused items. The new items were created to measure learners’ ability to generalize their knowledge.

Mathews et al. (1989) found that the IE group performed significantly better than all others, and the E, EI, and Alt groups performed significantly better than the I group. The data for consciousness knowledge of rules were congruent with the performance data. The number of subjects who were able to verbalize the rules was the highest in the IE group (76%) and the lowest in the I group (5%). The data indicate that the remaining 24% of the participants in the IE group, though unable to verbalize the rules, had developed some unconscious knowledge. As for the groups’ ability to generalize their knowledge, the study found the worst performance from the I group, a better performance from the E group, and the best performance from the mixed-method groups. Overall, the results suggest that mixed conditions produce performance superior to that produced by single conditions, especially when the implicit condition precedes the explicit condition. Regarding the synergistic effect of implicit and explicit learning, Mathews et al. (1989) explained that “forming a hypothesis too early may prevent best use of the information available to the person” and “complex tasks are best approached with a period of initial passive observation before formal instruction” (p. 1098).

Both studies concluded that the combination of the explicit condition and the implicit condition produces more effective learning than either one alone. This implies that the effects of explicit learning and implicit learning may interact with each other. Among the various timings of explicit learning during implicit learning, both studies found that one sequence of learning
conditions was more optimal for learning than any of the other sequences. This suggests for SLA that timing may be a significant variable that affects the effectiveness of explicit instruction. However, the results from the two studies differ regarding the timing of explicit instruction; Reber et al. (1980) found that the explicit learning mode before the implicit was more effective, whereas Mathews et al. (1989) found the opposite. These different results might have been driven by the different methodologies, including the distinct types of explicit conditions and stimulus materials. First, the studies operationalized explicit learning modes in different ways. Reber et al. (1980) provided explicit rule presentation as explicit instruction so that the subjects could learn the underlying system before being exposed to particular instances. In contrast, Mathews et al. (1989) asked the subjects to search for rules from instances so that they could discover the rules. In other words, Reber et al. (1980) provided deductive explicit instruction, whereas Mathews et al. (1989) provided inductive explicit instruction. Their contradictory results suggest that different types of instruction might motivate different learning processes, and might result in different learning outcomes. In terms of SLA, this suggests that the effectiveness of explicit instruction might vary depending on whether deductive or inductive learning is promoted.

Second, the studies’ use of different types of stimuli may call upon different levels of target complexity. More specifically, Reber et al. (1980) used a finite artificial grammar system that generates strings of symbols in a left-to-right, nonhierarchical fashion whereas Mathews et al. (1989) used biconditional rules that involve cross-dependency recursion (DFGL.FDLG: letters that appear at each point before and after a central dot depend on each other: D-F and G-L). Unlike the artificial grammar, the biconditional rules do not have specific beginning or ending letter patterns, but symmetry of repetitions across the halves of the string. Thus,
biconditional rules might be more difficult to learn. Similarly, in an SLA context, effectiveness of the same explicit instruction might differ depending on the target complexity. This implies that complexity of the target forms might be a variable that alters the effectiveness of the same instructional method.

Third, the different testing items used in these two studies would have tapped different types of knowledge. While both studies utilized a well-formedness task to measure learner performance, the components of their well-formedness tasks were different. For example, Reber et al. (1980) created a new set of testing items that was not used in the training session in order to test whether the acquired knowledge could be generalized to the items in a new pattern. As the subjects were asked to judge the well-formedness of items that they had not seen before, their performance on the new items can be considered as an indication their rule abstraction ability. Mathews et al. (1989), on the other hand, mixed a new set of items (50%) with the old set of items (50%) that had previously been presented to the subjects. When subjects encounter the same items that they have observed before, they can make judgment not only with the abstract rule knowledge they have acquired during training but also with explicit memory based on item familiarity. Subjects’ understanding of patterns and their familiarity with the items are both variables in assessing the effectiveness of learning conditions because they might draw on different types of knowledge.

In sum, a methodological comparison between the two studies suggests that the effectiveness of explicit instruction can vary depending on the timing of provision (e.g., before vs. after an implicit learning condition), the types of explicit instruction (e.g., deductive vs. inductive explicit instruction), the target complexity (e.g., simple vs. complex targets), and item familiarity (e.g., targets in old vs. new structural patterns).
As VanPatten (1994) has pointed out, dissimilarity between natural language and artificial language (e.g., absence of movement, semantic and pragmatic meanings, and surface vs. deep structures) might impede the applicability of such studies to SLA. However, in general, these studies in cognitive psychology have found that explicit learning combined with implicit learning appears to be beneficial to learning. The results of this previous research motivate this dissertation’s exploration of whether formal instruction of an L2, such as explicit FFI, can play a beneficial role in developing implicit L2 knowledge when it is introduced at some time during an incidental L2 learning condition, such as MFI. Considering the fact that L2 instruction contexts are surrounded by many variables, a study that investigates the optimal structure of a syllabus will contribute greatly to SLA and pedagogy.

Given the theoretical claims and empirical findings that language learning can take place incidentally and that explicit learning may play a facilitative role in L2 learning, it is worthwhile to bring these lines of investigation together. In addition, further investigation of the different levels of effectiveness of explicit FFI depending on various other factors surrounding L2 classrooms could be source of meaningful suggestions for providing an elaborated prescription for L2 classrooms in different contexts.

Therefore, the main goals of this dissertation research are:

(1) To explore and test claims about incidental learning, explicit learning, and interaction between incidental and explicit learning conditions, and to take into consideration research in the areas of incidental learning, explicit learning, MFI, FFI, consciousness, awareness, and implicit L2 competence.

(2) To conduct an empirical study on the effectiveness of explicit instruction when it is added to an incidental learning condition, particularly by considering
a. the timing of FFI, i.e., before or after the incidental MFI condition;

b. the types of FFI, i.e., deductive instruction or inductive instruction;

c. complexity of target forms, i.e., simple and complex forms; and

d. familiarity of items, i.e., targets in old and new structural patterns.

These goals will be discussed in greater detail in the remainder of this dissertation. The following chapters first discuss definitions, characteristics, and benefits of FFI (Chapter I) and the followed by theoretical controversy on the role of FFI in the development of L2 competence (Chapter II). Then, the dissertation study is presented (Chapters III, IV, V, and VI).
Chapter I: Form-focused Instruction in Second Language Research

Definitions and Characteristics of Form-focused Instruction

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” (R. 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 usually teach “the strategies, maxims, and organizational principles that govern […] language” (Celce-Murcia, Dornyei, & Thurrell, 1997, p. 141) but enhances L2 acquisition 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 all metalinguistic information in the L2 input.

Instructional methods and techniques of FFI can be classified by degree of explicitness. The higher the degree of explicitness an FFI method involves, the more attention learners are likely to pay to L2 forms. Therefore, overtness of metalinguistic rule presentation is one of the
key factors determining the degree of explicitness of FFI. For example, delivery of metalinguistic information can be more explicit when explanation of L2 forms is predetermined, when it is presented in isolation from other communicative or meaning-focused activities, when non-target-like errors are corrected explicitly, or when L2 grammar is taught with the use of metalinguistic terminology. Under these conditions, learners can primarily pay attention to L2 target forms so they can build up explicit metalinguistic knowledge. Therefore, FFI methods in these cases involve higher degrees of explicitness. On the other hand, delivery of metalinguistic information can be less explicit when explanation on L2 forms is incorporated with meaning-focused, communication-oriented activities, or when error corrections are made by recasts during natural conversation. This type of FFI encourages learners to pay attention primarily to L2 meaning so they can acquire a sense of L2 structure indirectly while participating in meaning-focused activities. FFI methods in these cases are less explicit.

Housen and Pierrard (2005) categorized the former type as explicit FFI and the latter as implicit FFI. Table 1 illustrates characteristics of these two types of FFI.

Table 1

*Implicit and explicit forms of form-focused instruction (Housen & Pierrard, 2005).*

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<tr>
<th>Implicit FFI</th>
<th>Explicit FFI</th>
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<tr>
<td><em>attracts</em> attention to target form</td>
<td><em>directs</em> attention to target form</td>
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<tr>
<td>is delivered <em>spontaneously</em> (e.g., in an otherwise communication-oriented activity)</td>
<td>is <em>predetermined</em> and <em>planned</em> (e.g., as the main focus and goal of a teaching activity)</td>
</tr>
<tr>
<td>is unobtrusive (minimal interruption of communication of meaning)</td>
<td>is <em>obtrusive</em> (interruption of communicative meaning)</td>
</tr>
<tr>
<td>presents target forms in context</td>
<td>presents target forms in isolation</td>
</tr>
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• makes no use of metalanguage
• encourages free use of the target form
• uses metalinguistic terminology (e.g., rule explanation)
• involves controlled practice of target form

Other researchers also have discussed contrastive characteristics of FFI methods. DeKeyser (1995) mentioned that deductive-explicit instruction (presenting rules before L2 examples) involves a higher degree of explicitness than inductive-implicit instruction (being exposed to L2 examples without knowing the rules) because the “concurrent awareness on what is being learned” (p. 380) occurs in a deductive-explicit instruction setting, while this is not the case in an inductive-implicit instruction setting. A similar distinction was made by Long (1991) but with different terms: focus on forms (FonFs) versus focus on form (FonF). He stated that FonFs differs from FonF as the former explicitly teaches L2 forms in a decontextualized manner whereas the latter “draws students’ attention to linguistic elements as they arise incidentally in lessons whose overriding focus in on meaning or communication” (pp. 45–46). Despite the use of different terms, the classifications are often made with a common focus on whether the method necessarily directs learners’ attention to forms (explicit FFI) or does not (implicit FFI).

Due to the different degrees of explicitness involved in explicit FFI and implicit FFI, the superiority of one type over the other can often be an issue. Nevertheless, according to Spada and Lightbown (2008) that both types of FFI are likely to be beneficial when particular attention is paid to language features to be learned, characteristics of learners, and learning conditions.

Relevance of FFI to L2 Instruction

Grammar instruction, one of the classic versions of FFI, used to be considered a core element of L2 instruction. This trend in language instruction is well reflected by the long popularity of the Grammar Translation method. From the beginning of the history of L2
instruction to the 1970s, the Grammar Translation method and its instructional techniques (e.g., instruction on grammar rules, memorization of vocabulary, and translation of texts) were widely adopted by a majority of L2 classrooms (Brown, 2001). Explicit grammar instruction under this method typically encourages learners to understand each linguistic item, one at a time (Long, 2000), with the goal of leading learners to thoroughly comprehend how the components of language operate with each other. However, the drawbacks of the method stem from its decontextualized demonstration of language. While learners can master each part of the language and become proficient in explicit L2 knowledge, explicit grammar instruction does not teach the how to synthesize the parts of the language for interactive communication. Therefore, learners of this method are left to their own devices when attempting to synthesize explicit knowledge into a practical use of language (Wilkins, 1976). As a result, learners’ communicative needs are often ignored under explicit grammar instruction (Jiminez & Murphy, 1984).

The popularity of explicit grammar instruction was maintained until the 1970s, when new theoretical views of language learning started to offer a different basis for language teaching. Influenced by the movement of nativism (Chomsky, 1965, 1976) and the formulation of the concept of “communicative competence” (Canale & Swain, 1980a, 1980b; Hymes, 1972), the classic version of FFI began to be replaced with meaning-focused instruction (MFI) that offered a naturalistic environment for L2 learning. It was in the late 1970s that Communicative Language Teaching (CLT) was first introduced to L2 classrooms with the goal of satisfying L2 learners’ communicative needs and helping them to reach communicative competence (Richards & Rodgers, 1986, 2001). Proponents of CLT believed that learners can make progress and gain L2 competence when they are engaged in meaning-based interaction (Richards, 2002; Richard & Rodgers, 1986; Savignon, 1983, 2002). Therefore, unlike the previously used methods, the
instructional techniques of CLT were “content-based, meaningful, contextualized, and discourse-based” (Celce-Murcia, 1991, p. 462), so purely meaning-focused. Any instructional methods directing learners’ focus toward L2 forms were rejected under this context of L2 learning. Later, the philosophy of CLT inspired Krashen’s Natural Approach (1982, Krashen & Terrell, 1983), which claimed that grammar instruction is not necessary to develop L2 competence, and only the MFI type of instruction is useful.

In the 1980s, inquiry into the role and relevance of FFI became a focus of debate once again. Despite the contribution of MFI to high levels of comprehension skills and fluency in L2 production (Lyster, 1999; Rebuffot, 1993; Swain, 1997), learners’ limited development in grammatical accuracy spurred a resurgence of L2 form instruction. Even though CLT promotes learners’ motivation and satisfies learners’ communicative needs, SLA research (e.g., R. Ellis, 1984, 1994, 2001, 2002; Lightbown, 1983; Long, 1983, 1988; Spada, 1986, 1997) reported that exclusive use of MFI results in low levels of linguistic accuracy. In particular, experimental studies in immersion contexts (e.g., Day & Shapson, 1991; Harley, 1989, 1998, 1993; Lyster, 1994, 2004; Swain, 1988) found that content-based language instruction effectively promotes incidental language learning, but does not necessarily enable students to acquire specific form-function relationships.

Identifying a drastic decline of grammatical accuracy in learners taught through MFI (Harley, Cummins, Swain, & Allen, 1990; Richards, 2002), several studies claimed that naturalistic L2 input alone may not be sufficient for acquisition of certain forms. Furthermore, other studies argued that the addition of FFI to MFI can lead learners to achieve fluency on the basis of accurate use of the L2 (Lightbown, 1991, 1998; Lightbown & Spada, 1990; Long, 1996; Spada & Lightbown, 1993; Swain & Lapkin, 1982; Trahey & White, 1993; White, 1989, 1991).
In these studies, L2 learners who were instructed with integrated FFI and MFI appeared to gain greater accuracy and fluency on target forms than those who were exclusively instructed with MFI. Therefore, these researchers suggested that the addition of FFI during primarily MFI was more facilitative than using MFI in isolation, as the combination of the two methods enabled learners to improve L2 accuracy as well as L2 fluency.

Researchers in SLA (e.g., Garcia Mayo & Perales Haya, 2002; Schmidt, 1990, 1993, 1995; Skehan, 1996, 1998, 2003; VanPatten, 1990, 1994, 2007) argue for the relevance of FFI because of L2 learners’ limited attentional resources and their predisposition to process L2 meaning in preference to forms. Language learning requires simultaneous processing of L2 form and L2 meaning. This dual processing can take place successfully when learners have enough cognitive capacity to attend to form and meaning at the same time. However, L2 learners, especially, at the beginning stages, have limited attentional capacity, which causes a tradeoff effect between form and meaning (Skehan, 1996, 1998, 2003). In other words, form and meaning compete so “the choice to devote attention to one component may well be at the expense of other components” (Foster & Skehan, 1999, p. 216) VanPatten (1990, 1996) argues that the natural priority of L2 learners in communicative activities is towards meaning, with the result that naturalness of communication pushes attention away from form. This tradeoff effect appears more strongly when there is greater pressure on attentional resources (e.g., because of low L2 proficiency, high complexity of tasks, and engagement in multiple tasks at once). On the other hand, attention to form only happens when there is no pressure on attentional resources or there is no need to recover meaning. Therefore, learners, especially beginners, may fail to attend to L2 form within an MFI setting if there is no additional aid to support attention to form.
Additionally, the nature of MFI is another factor that causes neglect of L2 form. In MFI, communicating meaning is greatly emphasized, whereas the exact form that learners use is much less attended to (Kess, 1992). Because the major focus of MFI is the “satisfactoriness of the flow of the conversation,” not “the correctness, or completeness of what is said” (Skehan, 1996, p. 40), strategies of comprehension are predominantly used (Clark & Clark, 1977). Learners thus often depend on partial use of forms as clues of meaning (Anderson & Lynch, 1987), and not much concern is given to the development of an interlanguage system. This pattern of language use under MFI indicates that processing L2 meaning “does not guarantee automatic sensitivity to form” (Skehan, 1996, p. 41), which may cause unsuccessful development of L2 accuracy eventually. Therefore, L2 form can be easily neglected by and large unless there is an additional implementation of classroom activities focusing on form.

In such situations, the addition of FFI methods can be effective because it increases learners’ focus on and awareness of L2 target forms otherwise being neglected in MFI. The importance of focus on L2 form has been addressed by several researchers (using such terms as “noticing” and “consciousness” in Schmidt, 1990, 1993, 1994, 1996; “focal attention” in Robinson, 1995, 2003; “attention” in Tomlin & Villa, 1994; and “awareness” in Leow, 1997, 2001). While there is less agreement on whether learning can take place without awareness or with no conscious attention to form, they commonly propose that conscious attention to L2 form promotes effective learning of L2 structures. As a result, implementation of FFI is encouraged in order to enhance learners’ attention to form, which in turn facilitates an increase of intake from available L2 input and higher accuracy.
Benefits of FFI in Learning Various L2 Forms: Empirical Evidence

A great body of SLA research, in both classroom contexts (e.g., Fotos, 1993; Fotos & R. Ellis, 1991; Scott, 1989, 1990; Spada & Lightbown, 1993; White, Spada, Lightbown, & Ranta, 1991) and in laboratory contexts (e.g., Alanen, 1995; Ammar & Lightbown, 2005; Carroll & Swain, 1993; de Graaff, 1997; DeKeyser, 1995; N. Ellis, 1993; Fernández, 2008; Muranoi, 2000; Robinson, 1995, 1996, 1997; Stafford, Bowden, & Sanz, in press; Williams & Evans, 1998) has empirically shown that FFI promotes L2 learning. More recently, the positive effect of FFI has been identified in learning various specific aspects of L2, namely, morphology, syntax, lexicon, and semantics. This entails that the effectiveness of FFI is not limited to selected linguistic structures, but that it plays a significant role in acquiring various aspects of an L2 overall.

FFI and Acquisition of L2 Morphology

Muranoi (2000) investigated the effectiveness of explicit FFI (i.e., formal debriefing) and MFI (i.e., meaning-focused debriefing) along with enhanced interaction (EI) (i.e., interaction plus implicit negative feedback). The study compared three groups’ acquisition of the English definite (i.e., the) and indefinite (i.e., a/an) articles: (1) EI plus FFI (IEF); (2) EI plus MFI (IEM); and (3) non-EI (NEI) (i.e., interaction without implicit negative feedback). The NEI served as meaning-focused, implicit instruction because it utilized no method directing learners’ attention to form. This study asked (1) whether the IEF and IEM groups would surpass the NIE group in performance with English articles and (2) whether the FFI and MFI added to EI would have different effects on acquisition of the article system. Learning outcomes were measured twice, immediately after the treatment (Posttest 1) and five weeks after the treatment (Posttest 2). In both posttests, the IEF and IEM groups significantly outperformed the NEI group. When the two enhanced interaction groups were compared, the IEF group, who received explicit FFI,
performed significantly better than the IEM group, who received additional MFI. Furthermore, the between-test comparisons found that the IEF and IEM groups showed significant development on both posttests compared to the pretest, suggesting that the IEF and IEM groups had immediate gains maintained at least five weeks. The NEI group’s performance on only Posttest 2 was significantly higher than the pretest, indicating gradual improvement of the NEI group. Because the NEI group showed evidence of gradual development, the researcher argued that enhanced interaction itself has positive effects on acquisition of L2 morphology. However, as shown by the contrastive performance of the IEF and IEM groups, this study illustrates that MFI incorporating a method of explicit FFI has a greater effect on L2 learning than MFI alone.

The English article system is considered to involve functionally and semantically complex rules (Doughty & Williams, 1998; Hulstijn, 1995; Pica, 1985); Muranoi concluded that “the learning of complex rules can be facilitated by explicit instruction when it is provided along with implicit instruction, as in enhanced interaction” (p. 660).

Fernández (2008) investigated the effects of explicit FFI (i.e., explicit rule presentation) when it is incorporated with another method of FFI, processing instruction (PI) (Doughty & Varela, 1998; Doughty & Williams, 1998). By utilizing online measures, her study aimed to observe the possible role of explicit rule presentation during PI. In order to track the behavior of learners during the PI activities, trials to criterion, response times, and accuracy after criterion was reached were measured. The participants learned Spanish verbs with subjunctive inflection (Experiment 2) in one of two conditions: a PI condition, which provided explicit rule explanation and structured input (SI) activities, and an SI condition, which provided SI only, with no rule explanation. The results showed that the participants who learned the target forms (i.e., subjunctive inflection) in the PI condition outperformed those in the SI condition for all
measures (i.e., trials to criterion, response times, and accuracy). That is, the participants who received explicit rule presentation reached the criterion earlier and answered faster and more accurately during the activities. These results differed from those of an earlier experiment (Experiment 1) in her study, which had Spanish word order as a target. In that experiment, she found no significant difference between the PI and SI participants for all measures. Fernández explains the different results by the different characteristics of the target forms. The subjunctive inflection involves a redundant form that is not easy to notice, and hence it is not as salient as word order in Spanish. In addition, it can be processed by using L1 strategies. In other words, while it was necessary for the learners to build new processing strategies to successfully complete the PI activities for Spanish word order, this was not the case for the subjunctive inflection. Because the SI participants could complete the PI activities correctly when relying on their L1 processing strategies for the subjunctive inflection, the SI activities did not necessarily result in the learning of the non-salient target. Based on these results, Fernández stated that explicit instruction helps learners “notice forms that might not have been noticed or that might have taken more trials to notice” (p. 298). In conclusion, the findings of the study suggest that explicit FFI may be more beneficial in L2 processing when the target forms are less salient.

More recently, Yang and Lyster (2010) reported findings of an empirical study that compared the development of the English past tense morpheme (-ed) in two experimental groups who both completed a form-focused task. The first group (Prompts) received corrective feedback by means of prompts, while the second group (Recasts) received feedback via recasts. There was also a control group, which only participated in the form-focused production task, with corrective feedback related to meaning, but not form. The study was originally designed to test differential benefits of prompts versus recasts so comparisons of group performance offer
evidence to examine the effectiveness of FFI with different degrees of explicitness. According to Lyster (2004), prompts aim to elicit learners’ modified output and serve to scaffold opportunities more explicitly than recasts in the context of communicative interaction. Therefore, in this study, it can be claimed that the prompts condition involved higher degree of explicitness than the recast condition. Also, because the control group was encouraged to pay attention not to form but to meaning, the learning condition of the controls was less form-focused. Therefore, the degree of explicitness for the groups can be sequenced as Prompts group > Recasts group > control group. After the instructional treatment, learning was assessed by an oral production test and a written production test. In the analysis of learner performance, significant gains were only identified in the Prompts group on the oral production test (between the pretest and the posttests). No significant group or time difference was shown in the written production test. Examining the superior performance of the Prompts group over the Recasts group, the authors mentioned that the Prompts participants “were pushed to retrieve target forms that already existed in their long-term memory, and the repeated instances of such retrieval strengthened connections between knowledge stored in memory and actual language production” (p. 255). Therefore, the findings of the study suggest that FFI helps “learners gain greater control over already acquired forms and access them in faster ways” (p. 255). In this study, the effect was shown by the learners’ performance on the oral production test more than on the written production test.

**FFI and Acquisition of L2 Syntax**

Radwan (2005) examined whether the degree of explicitness in various instructional conditions differentially affected the learning of the dative alternation in English. This study also looked into the question of whether the level of awareness developed during instructional sessions positively correlated with the learning of L2 syntactic rules. Four conditions with
different degrees of explicitness were employed in this study: (1) a rule-oriented condition
(ROG; meaningful L2 input provided with explicit rule instruction); (2) a textual enhancement
condition (TEG; meaningful L2 input provided with enhanced visual support on target forms);
(3) a content-oriented condition (COG; meaningful L2 input only); and (4) a control group (CG;
no input). Therefore, the first two experimental groups received MFI that incorporated explicit
FFI (ROG) or less explicit FFI (TEG). Because no FFI type of instruction was provided for the
COG group, the COG condition was designed to be an implicit condition. The results of the
study found that the ROG learners, who were instructed with explicit FFI, significantly
outperformed all other learners. In spite of some improvement shown from by the TEG learners,
their performance did not differ much from that of the COG and CG learners. As for the
correlation of awareness and learning, the analysis revealed that the ROG learners, who showed
the best performance on tests, also demonstrated higher levels of awareness. Radwan attributed
the superior performance of the ROG group to the higher levels of awareness built by explicit
FFI, and contended that explicit FFI is “the most effective means of drawing learners’ attention
to the rules regulating a complex linguistic structure, such as dative alternation” (p. 82).

Spada, Lightbown, and White (2005) examined 90 young French-speaking learners’ (age
11–12 years) acquisition of English question formation in an intensive ESL program for a period
of three months. The researchers looked, in particular, at inversion in English wh-questions or
yes/no questions (e.g., Where is the principal’s office? Is John at home? *Where goes the
teacher? *They are Italian?), which belongs to Stage 4 of the developmental stage for English
question formation (Pienemann, Johnston, & Brindley, 1988). Question formation was selected
as a target form due to the contrastive feature in the L1 and the L2; whereas inversion in wh- and
yes/no questions is obligatory in English, questions without inversion are also acceptable in
French. All participants were exposed to the same MFI by means of meaning-focused tasks. However, they received different types of FFI in accordance with the groups they were assigned to. Among 96 learners, 45 received explicit FFI on the target form (i.e., English question formation rules) (Q), and 51 received explicit FFI on a non-target item (i.e., possessive determiners: *his, her*) (PD). The PD group served as a control group of the study. Learning outcomes were measured by grammaticality judgment, written production, and oral production tests. A significant group difference was identified only in the oral production test. In this test, a majority of Q learners was shown to reach the targeted stage (Stage 4). In contrast, a majority of the learners in the PD group appeared to remain at Stage 3 or Stage 2. Therefore, the researchers concluded that explicit FFI is useful “in helping students […] increase their knowledge and use of language features that are difficult in part because of the misleading similarity between the [L1 and L2 forms] to express the same meaning” (p. 227). However, that the significant development was limited to the oral production task illustrates that not all language skills are likely to be equally benefited by FFI.

Housen, Pierrard, and Van Daele (2005) conducted a quasi-experimental study that investigated differential roles for FFI depending on the complexity of L2 syntactic rules (simple versus complex) by observing 69 native speakers of Dutch learning L2 French (age 14–15 years). French sentence negation was chosen for the simple structure and French passive constructions for the complex structure, because the former is more marked, involves more transformational rules, occurs more frequently, is subject to less semantic and syntactic constraints, and requires less mental resources for processing than the latter (Hulstijn & De Graaff, 1994; Robinson, 1996). All learners were exposed to both targets but they received explicit FFI for one of the rules. The first group (Exp1) was taught the complex rule (the
passive), and the second group (Exp2) was taught the simple rule (the negation). There was also a third group (control), which was not instructed in either of the rules. The instructional treatment consisted of (1) explicit grammar explanation (passive for the Exp1, negation for the Exp2, and none for the control); (2) reading text; (3) identification of exemplar in the text; (4) description of these examples; and (5) controlled practice exercise. Relevant posttests were administered to measure learning outcomes. Comparing the scores of the instructed groups (Exp1 and Exp2) and the control group, the study found that the score gains of the instructed groups were greater than those of the control group. When the target complexity was taken into consideration, the analysis revealed that both Exp1 and Exp2 significantly outperformed the control group. Overall, the gap between the instructed groups and the uninstructed group was shown to be greatest in unplanned speech. While some researchers claim that the effects of explicit FFI differs by target complexity (e.g., DeKeyser, 1998; Krashen, 1982), the data of Housen et al. showed “a beneficial effect of [explicit FFI] on learners mastery of two grammatical structures [with different complexity]” (p. 261). Also, because the beneficial effect was even more strongly observed in unplanned speech, the authors suggested that explicit FFI “not only promotes explicit grammatical knowledge, but also implicit knowledge (p. 261),” which is a primary factor comprising for skill in natural speech.

**FFI and Acquisition of L2 Lexicon**

De la Fuente (2006) examined the L2 vocabulary acquisition of 30 native speakers of English learning Spanish as an L2. The effectiveness of three learning conditions was compared in order to identify the most optimal condition for L2 vocabulary learning: (1) traditional Presentation-Practice-Production (PPP); (2) task-based instruction without explicit FFI (TB-NEF); and (3) task-based instruction with explicit FFI (TB-EF). The major difference of the
components of instructional treatment was the absence or presence of explicit FFI and task-based activities. For example, the TB-NEF group and TB-EF group learned the L2 vocabulary with a task-based activity, which was designed to be communicative and meaning-based; they were thus exposed to contextualized L2 vocabulary. On the other hand, the PPP group was presented with L2 vocabulary in mechanical exercises, and thus encountered only decontextualized vocabulary. As for the explicit FFI, the PPP group and the TB-EF group received explicit FFI focusing on morphemes, phonemes, and spellings of the vocabulary while the TB-NEF group did not receive such instruction. Learning outcomes were measured immediately and a week after the instructional treatment. While all three groups appeared to perform equally on the immediate posttest, a significant between-group difference was found in the delayed posttest when the task-based groups (TB-NEF and TB-EF) performed significantly better than the traditional PPP group. No between-group difference was shown for the TB-NEF and TB-EF groups; however, the mean scores indicated that the TB-EF ($M = 8.600, SD = 2.221$) learners scored higher than the TB-NEF ($M = 7.800, SD = 2.936$) learners. From these results, de la Fuente concluded that task-based instruction “with a built-in, planned focus on form seem[s] to be more effective than PPP lessons, due to the fewer opportunities for targeted output production and retrieval that PPP lessons offer, and to its inability to effectively focus students’ attention on target forms” (p. 286). Additionally, it was claimed that task-based vocabulary lessons can benefit from an explicit FFI component because it allows for the noticing of important formal/morphological aspects of words.

Acknowledging the benefits of various types of FFI in vocabulary learning, Laufer (2006) conducted a study comparing differential effects of two types of FFI on English L2 vocabulary learning: FonFs by means of decontextualized vocabulary with translations and
explanations in English versus FonF by means of contextualized vocabulary in text and comprehension questions on the content of the text. Seventy-nine students participated in each of the learning conditions. The results of the study found that the FonFs group gained significantly higher accuracy rates (71.63%) than the FonF group (46.62%) immediately after the treatment instruction. This comparison of learning outcomes from FonFs versus FonF leads to the conclusion that explicit FFI (FonFs, in this study) is relatively more beneficial than less explicit FFI (FonF, in this study) for the acquisition of L2 vocabulary.

More recently, Laufer and Girsai (2008) further examined the effectiveness of explicit FFI in learning L2 single words and collocations by manipulating the degree of explicitness of FFI. Three learning conditions with different degrees of explicitness were employed: (1) FFI with contrastive analysis and translation (CAT: explicit contrastive instruction and translation tasks); (2) FFI without contrastive analysis (FFI: meaning recognition tasks and a text fill-in activity); and (3) MFI (meaning-focused discussion task); CAT involved the highest degree of explicitness, and the MFI task was designed to involve no explicitness. Seventy-five students (ages 15–16) learning L2 English participated in the study. The results of the study showed that the CAT group, who received the most explicit FFI, scored significantly higher than the two other groups on all tests for words and collocations. The MFI group was found to gain almost no vocabulary correctly, indicating that no learning of L2 vocabulary occurred. The researchers attributed the superior performance of the CAT group to the nature of contrastive FFI, “raising [learners’] awareness of interlingual difficulties, stretching their linguistic resources, and engaging in involving tasks” (p. 712) during MFI.
FFI and Acquisition of L2 Semantics

Very few, if any, studies to date have investigated effects of FFI on acquisition of L2 semantic information. While there is no study that directly compares the effects of FFI versus MFI on a semantic aspect of L2 development, one very recent study by Stafford, Bowden, and Sanz (in press) offers indirect evidence showing that additional FFI may be helpful for learning L2 semantics.

Originally, Stafford et al. (in press) attempted to investigate the optimal timing of explicit FFI for morphosyntactic cues in relation to thematic agent/patient role assignment in Latin. Because the morphosyntactic structures of Latin requires understanding of the thematic roles of arguments—which is semantic knowledge at the sentence level—the study provides an example research showing demonstrating of FFI’s effect on the acquisition of L2 semantics. In addition to input-based activities, two types of explicit FFI were utilized in their study: explicit grammar explanation (GE) and explicit feedback (EF). There were four experimental groups, who took part in computerized input-based activities designed to promote initial learning of Latin morphosyntactic structures. In addition to these activities, one group received both GE and EF ([+GE, +EF]), one group only GE ([+GE, -EF]), one group only EF ([GE, +EF]), and one group neither GE nor EF ([GE, -EF]). Their learning of Latin morphosyntax was measured by written and aural interpretation tests, a grammaticality judgment task (GJT), and a written production test. An interesting finding appeared from the written production test. While the aural interpretation test and the GJT did not reveal a significant group differences immediately or over time, the two groups who received GE ([+GE, +EF], [+GE, -EF]) showed significant improvement on the immediate written production test. These findings provide that explicit FFI by means of grammar explanation can promote immediate development in production.
Summary of Recent Empirical Findings

In sum, the recent empirical studies have found that explicit FFI can play a beneficial role in language acquisition. This is in line with the claims of meta-analytical research (i.e., Norris & Ortega, 2000; Spada & Tomita, 2010). To be precise, recent studies indicate that the use of explicit FFI within a primarily meaning-focused course of instruction is beneficial because the explicit FFI facilitates the acquisition of simple as well as non-salient, complex targets (De la Fuente, 2006; Fernández, 2008; Housen et al., 2005; Laufer, 2006; Muranoi, 2000) by increasing learners’ noticing of and attention to L2 forms (Radwan, 2005). The successful noticing of L2 forms appears to contribute an increase of intake and correct use of L2 forms (Spada et al., 2005), which positively impacts planned and unplanned L2 production skills (Housen et al., 2005; Stafford et al., in press; Yang & Lyster, 2010). While MFI produces an immediate L2 learning effect followed by a significant loss of the knowledge, the immediate effects of explicit FFI appear to be sustained over time (Laufer, 2006). As a result, the explicit FFI seems to promote long-term accuracy, which may ultimately raise the level of attainment.
<table>
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<tr>
<th>Study</th>
<th>Participants</th>
<th>Target form(s)</th>
<th>Design</th>
<th>Dependent variables</th>
<th>Reported results</th>
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<tr>
<td>Muranoi (2000)</td>
<td>91 1st year Japanese college EFL students</td>
<td>English definite (the) and indefinite (a) articles</td>
<td>1. IEF: IE + form-focused debriefing 2. IEM: IE + meaning-focused debriefing 3. NIE: Non-IE</td>
<td>Oral story description task, oral picture description task, written picture description task, grammaticality judgment task</td>
<td>1. The IEF and IEM groups performed significantly better than the NIE group on the immediate posttest and the five-week delayed posttest. 2. The IEF group significantly outperformed the IEM group. 3. The IEF and IEM groups showed significant development from the pretest to the immediate and five-week delayed posttest. 4. The NIE group showed significant development from the pretest to the five-week delayed posttest only.</td>
</tr>
<tr>
<td>Fernández (2008)</td>
<td>84 college-level L2 learners of Spanish</td>
<td>Spanish 3rd person present subjunctive in expressions of doubt</td>
<td>1. PI: FFI + input-based activity 2. SI: input-based activity</td>
<td>Trials to criterion, response time, and accuracy after criterion</td>
<td>1. The number of participants reached criterion was considerably higher in the PI group than the SI group. 2. The PI participants took significantly fewer trials to reach criterion than the SI participants. 3. The PI group responded significantly faster than the SI group. 4. The PI group responded significantly more accurately after criterion than the SI group. 5. The PI group showed significant development from the immediate posttest to the five-week delayed posttest.</td>
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Table 2: Recent FFI Studies Comparing Different L2 Forms
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<th>Participants</th>
<th>Treatment</th>
<th>Measures</th>
<th>Findings</th>
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<tr>
<td>Yang &amp; Lyster (2010)</td>
<td>72 undergraduate EFL students in China</td>
<td>English past tense morpheme (-ed)</td>
<td>1. Prompts group, 2. Recasts group, 3. Control group</td>
<td>1. Prompts group showed significant pre-to-post and pre-to-delayed post development. 2. No significant group and time difference in the written production test.</td>
</tr>
<tr>
<td>Radwan (2005)</td>
<td>42 students enrolled in a low-intermediate ESL program</td>
<td>English dative construction</td>
<td>1. ROG: MFI + rule instruction, 2. TEG: MFI + textual enhancement, 3. COG: MFI only, 4. CG: no instruction</td>
<td>1. ROG performed significantly better than all other groups on the immediate and delayed posttests. 2. TEG showed some progress between the pretest and posttest but failed to distinguish itself from CG and COG.</td>
</tr>
<tr>
<td>Spada, Lightbown, &amp; White (2005)</td>
<td>90 young learners in an intensive ESL program</td>
<td>English question format: subject-verb inversion (Stage 4)</td>
<td>1. Q: FFI on target forms, 2. PD: FFI on non-target forms</td>
<td>1. Significant group difference was shown in the oral production task. 2. A majority of Q learners reached the targeted stage (Stage 4). 3. A majority of PD learners did not reach the targeted stage and remained at Stage 2 or Stage 3.</td>
</tr>
<tr>
<td>Housen, Pierrard, and Van Daele (2005)</td>
<td>69 Dutch young learners learning L2 French</td>
<td>Sentence negation, Passive construction</td>
<td>1. Exp1: instruction on simple rule, 2. Exp2: instruction on complex rule, 3. Control: no instruction</td>
<td>1. The gain scores of the instructed groups (Exp1 and Exp2) were significantly higher than the control group. 2. Exp1 significantly outperformed the control group on the tests on the simple rule. 3. Exp2 significantly outperformed the control group on the complex rule.</td>
</tr>
</tbody>
</table>

Note: FFI = first focused instruction, MFI = multiple focused instruction, CG = control group, COG = control only group, TEG = treatment enhancement group, ROG = regular enhancement group.
de la Fuente (2006) 

30 native speakers of English learning Spanish as an L2

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<td>Group 1</td>
<td>All three groups performed equally</td>
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<td>4. GE, EF</td>
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<td>1. PPP: traditional Practice Production</td>
<td>2. TB-NEF: task-based FFI</td>
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<td>Group 3</td>
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<td>2. TB-FF: instruction without explicit FFI</td>
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Laufer (2006) 

158 high-school EFL learners in Israel

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<th>Vocabulary translation task</th>
<th>Discussion task</th>
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<td>Group 2</td>
<td>FFI: Meaning-focused discussion task</td>
<td>2. Group A lower words in English, Group B higher words in English</td>
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<td>Group 3</td>
<td>MFI: Meaning-focused activity</td>
<td>3. Group B lower words in English, Group A higher words in English</td>
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Larter (2008) 

75 EFL students in English single 10th grade

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Larter (2009) 

158 high-school Spanish learners in English single

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de la Fuente et al. (2006) 

30 native speakers of Spanish as an L2

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<td>Group 2</td>
<td>1. TB-NEF: task-based FFI</td>
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<td>1. TB-FF: instruction without explicit FFI</td>
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Laufer et al. (in press) 

65 Spanish-English bilinguals

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Chapter II: Impact of FFI to Development of L2 Competence

Definitions and Characteristics of Implicit and Explicit Knowledge

Many theories distinguish implicit knowledge and explicit knowledge. Implicit knowledge of language is often characterized as intuitive and tacit (Bialystok, 1981). R. Ellis (1994, p. 85) further claims that implicit knowledge is “intuitive, in the sense that the learner is unlikely to be aware of having ever learnt it and is probably unaware of its existence.” In this view, L2 learners are not conscious of the knowledge that they possess. Because implicit knowledge is subconscious, the knowledge cannot be directly reported. Rather, implicit L2 knowledge only becomes apparent when learners are using and producing language. According to Krashen (1981), the acquisition of implicit L2 knowledge is a spontaneous and incidental process of rule internalization that results from natural language use. Therefore, within the context of SLA, implicit knowledge can be developed effectively under MFI such that the learner’s attention is focused on meaning rather than forms. The processing of implicit knowledge is thought to be proceduralized (Anderson, 1983, 1993) and automatized (McLaughlin, Rossman, & McLeod, 1983), so easy and rapid access is possible. Consequently, learners who have implicit knowledge know how to use a language (Ryle, 1949), and it composes the basis of unplanned and fluent communicative language (Krashen, 1982, 1983).

In the context of SLA, implicit knowledge is assumed to develop incidentally. Incidental learning is defined as “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, 1994, p. 16). As Paradis (1994, p. 394) puts it, knowledge can be “acquired incidentally by not focusing attention on what is being internalized as in acquiring form while focusing on the meaning.” This illustrates that incidental learning is defined by the absence of intention to learn. As a result, like implicit learning, incidental learning in L2 classrooms can
develop linguistic knowledge without deliberate effort. Incidental learning does not involve conscious intention to learn, so the knowledge acquired under this condition can be implicit.

Because MFI is designed to direct learners’ attention to meaning, it supports an environment for incidental learning that results in implicit knowledge eventually. Indeed, the studies that examined learning under MFI found that learners would gain L2 knowledge incidentally while focusing on L2 meaning. In particular, a learning effect was found in form-meaning mapping (e.g., Leung, 2007; Leung & Williams, in press; Williams, 2005), syntax learning (e.g., Cleary & Langley, 2007; Rebuschat & Williams, 2006; Robinson, 1996, 2005; Williams & Kuribara, 2008), and vocabulary learning (e.g., Laufer, 1997; Laufer & Hulstijn, 2001; Pulido, 2007) while their attention was directed to other targets. The learning effect in these studies was represented by incidental learners’ higher accuracy in L2 comprehension compared to those learners who did not receive language training. In addition, incidental learners’ inability to verbalize specific rules applying to the testing items indicated that the L2 knowledge they possess is unconscious. Thus, these findings imply that learning can take place incidentally under MFI, and it results in implicit knowledge.

In contrast, explicit knowledge is broadly defined as knowledge about language (Ryle, 1949). It is a more conscious type of knowledge that is learned with intention and deliberate effort (R. Ellis, 1994). Therefore, in the context of SLA, explicit knowledge is gained through formal L2 study (Krashen, 1981) with use of an instructional method directing learners’ attention to forms, namely, FFI. When learners have explicit L2 knowledge, they can verbalize a metalinguistic reason as to why a certain sentence is grammatical or ungrammatical. Unlike implicit knowledge that is accessed through automatized processing, explicit knowledge exists as declarative facts (Anderson, 1983, 1993), and it is generally accessible only through controlled processing (McLaughlin et al., 1983). Therefore, use of explicit knowledge is possible when there is a sufficient amount of time to access the relevant declarative facts. Due to this, explicit
knowledge is not readily available in an unplanned and spontaneous speaking condition (Krashen, 1982, 1983).

FFI classrooms where students are explicitly taught L2 forms is likely to serve as a plausible condition in which learners can acquire explicit L2 knowledge. Because the primary objective of FFI is to build explicit knowledge of the language structure, learners become aware of linguistic information targeted during the instruction. For this reason, use of FFI methods necessarily involves a conscious process of L2 learning that promotes explicit learning of L2. However, this does not imply that acquisition of implicit knowledge is completely impossible because learners may learn a form incidentally that is not the focus of the class. For instance, learners can unconsciously come to acquire L2 word order while focusing on a morphosyntactic rule, such as the rule about the English third person singular –s. In this case, the acquisition of the word order takes place incidentally without learners’ intention to learn. Also, it is possible that implicit knowledge on the target language can further develop over time by the aid of the explicit knowledge learned under FFI. This case also assumes that implicit knowledge could develop from an instructional method focusing on L2 forms.

Although explicit knowledge on L2 is found to contribute to accurate grammatical knowledge of L2, studies in SLA have not reached consensus on the relationship and possible interaction of implicit knowledge and explicit knowledge. At this point, identifying their relationship is a significant task because it offers pedagogical implications of whether the implementation of FFI should be maintained or replaced by other instructional method.

**Interface of Implicit Knowledge and Explicit Knowledge**

Traditionally, the relationship between implicit knowledge and explicit knowledge is discussed with regard to the absence or presence of interface, which enables the interaction between the two types of knowledge. This section offers three very different theoretical answers to the interface question: (i) the non-interface position, (ii) the strong interface position; and (iii)
the weak interface position. These positions agree with the idea that L2 competence comprises automatic and proceduralized processing of implicit knowledge. However, they predict different roles for explicit knowledge in the acquisition of implicit knowledge, and thus, they provide different pedagogical implications for FFI.

**The Non-Interface Position**

The non-interface position views implicit knowledge and explicit knowledge as entirely independent mechanisms that have separate acquisitional processes and storage (Krashen, 1982, 1988, 1993; Paradis, 1994, 2004). Assuming no interaction between the two types of knowledge, it rejects the idea that explicit knowledge can be converted into implicit knowledge, and vice versa. Therefore, according to this position, implicit knowledge of an L2 cannot come into existence as the direct result of explicit knowledge, nor can it indirectly be influenced by explicit knowledge of that language.

The non-interface position was first proposed by Krashen in his Learning-Acquisition hypothesis (Krashen, 1982, 1988, 1993, 1994). According to Krashen, there are two distinct and independent ways of developing L2 knowledge; one is language acquisition that develops implicit knowledge and the other is language learning that develops explicit knowledge. These two learning processes coexist in adult language learners, but the outcomes are fundamentally different. In Krashen’s work (1982), language acquisition is defined as a process “similar to the way children develop ability in their first language” (p. 10). The process of language acquisition takes place subconsciously, informally, and naturally. In other words, language acquisition is an implicit and incidental process. Therefore, acquisition of implicit knowledge occurs unconsciously in informal environments such as natural conversation. The second way of developing L2 knowledge is language learning. In contrast to language acquisition, language learning is a conscious and intentional process that results in explicit L2 knowledge. For
instance, explicit processes of learning take place in formal L2 learning contexts by means of explicit correction and grammar instruction.

Krashen (1982, 1988, 1993, 1994) separates the roles of implicit knowledge and explicit knowledge in L2 competence (see Figure 1). According to Krashen (1982, 1988, 1993, 1994), implicit knowledge dominates in the competence of L2 performance, while explicit knowledge is used only as a monitor (i.e., an editor to correct output after it has been initiated by the acquired system). Thus, the implicit knowledge is the utterance initiator, while explicit knowledge performs the role of a planning, editing, and correction function. Krashen mentions that explicit knowledge, unlike implicit knowledge, acts only under a specific condition; when the L2 learner has sufficient time at her disposal, focuses on form or thinks about correctness, and uses explicit knowledge of grammar rules. As a result, in Krashen’s proposal, the role of explicit learning and instruction is minor in L2 competence because it is used only to correct deviations from grammatical speech.

Figure 1. Input hypothesis model of L2 learning and production (Krashen, 1982, p. 16)

Krashen’s distinction between implicit and explicit knowledge is further discussed in Paradis (1994, 2004). By conceptualizing different memory, processing, and neurofunctional systems of implicit and explicit knowledge, Paradis (1994) provided a neurolinguistic argument supporting the dissociation of acquisition and learning. According to him, implicit knowledge is
stored in procedural memory, which contributes to automatic performance. In contrast, explicit knowledge is stored in declarative memory, which has controlled performance at the conscious level. The dissociation of implicit procedural memory and explicit declarative memory has been shown by previous studies with patients who suffer from Alzheimer’s Disease (Gabrieli, Reminger, Grosse, & Wilson, 1992), alcoholic Korsakoff’s syndrome (Cavanan, Hömberg, & Stelmach, 1992; Parker, 1992), anterograde amnesia (Corkin, 1992; Keane, Clarke, & Corkin, 1992), Parkinson’s Disease (Saint-Cyr, Taylor, & Lang, 1987), and aphasia and apraxia (Cork, Kihlstrom, & Hameroff, 1992). These patients showed impairment of one type of memory without loss of another type of memory. Based on these findings, Paradis (1994) suggested that “implicit and explicit memories are subserved by neurofunctionally different systems” (p. 397).

In the context of SLA, implicit L2 knowledge is available automatically in the unconscious process whereas explicit L2 knowledge is controlled and can only be used consciously. Therefore, implicit L2 knowledge is considered to be stored in procedural memory while explicit L2 knowledge from deliberate learning is thought to be stored in declarative memory. Paradis (1994, 2004) agrees with the theoretical claim that explicit metalinguistic knowledge does not become implicit procedural knowledge. He argues that “what becomes automatic is not what the learners focus their attention on, or are even aware of” (p. 402) so even “practice does not convert explicit knowledge to implicit competence” (p. 403). From his perspective, automatic use of language, or implicit language competence, is not developed from explicit rule knowledge. Rather, learners develop the implicit competence, through practice, independently from explicit knowledge. Thus, what gradually changes into automatic skilled processes is not knowledge of metalinguistic rules itself but the application of the rules. In sum, as a proponent of the non-interface position, Paradis (1994) states that not only are implicit and explicit knowledge of language subserved by different cerebral memory systems, but they have
different contents, and hence one cannot become the other, or be converted and transferred to the other.

According to the non-interface position, implicit knowledge cannot be acquired through the acquisition of explicit knowledge. As a result, formal instruction, such as explicit FFI, has little or no effect on acquisition of implicit L2 knowledge. Incidental or implicit L2 learning plays a considerable role in acquiring implicit knowledge and L2 competence. Therefore, under this claim, such pedagogical practices as natural L2 exposure and meaning-focused instruction are promoted as effective instructional methods because these methods permit learners to learn an L2 incidentally while their focus is on meaning. In contrast, explicit formal instruction, such as form-focused methods including grammar explanation and error correction, which delivers explicit rule knowledge, is not considered to be an effective pedagogical method in developing L2 competence, as explicitly learned knowledge does not influence the acquisition of implicit L2 knowledge.

The Strong Interface Position

The strong interface position argues for a direct interface of implicit knowledge and explicit knowledge (e.g., Bialystok, 1978, 1979; DeKeyser, 1995, 1997, 1998, 2003; Sharwood Smith, 1981); implicit knowledge emerges from explicit knowledge directly. This position draws on the literature on skill acquisition discussed in Anderson’s Adaptive Character of Thought (ACT) theory (Anderson, 1982, 1983, 1993; Anderson & Fincham, 1994; Anderson, Fincham, & Douglass, 1997). This theory views skill learning as involving the development of procedures that transform declarative knowledge into procedural knowledge. According to Anderson (1982, p. 369), this transition takes place in three stages: (i) the declarative stage with factual knowledge, (ii) the proceduralized stage where general rules can be applied to particular instances, and (iii) the automatized stage in which procedures become increasingly efficient and automatic.
Anderson notes that declarative facts disappear entirely when the last stage is reached, and automatization of knowledge can be facilitated by repetitive practice. Accordingly, learners who arrive at the automatized stage may lose the ability to verbalize knowledge. This implies that initially declarative representations of knowledge can be converted into procedural representations by the effort of practice. The significance of practice in skill acquisition, in other words, proceduralization of memory, is emphasized by Temple (1995). He explains the development of procedural memory as the result of changes in neuronal structure that happen through repetition of the same experience or repetitive practice. This suggests that practice is a key factor that enables explicit knowledge existing as declarative facts to be converted into proceduralized implicit knowledge. This position implies that explicit declarative facts of linguistic information, just like any other type of acquirable skill, can be transferred to implicit procedural knowledge that can be accessed automatically by repetitive practice. Hence, this position assumes a direct interface between implicit and explicit knowledge.

In SLA, the application of the ACT model can be found in Bialystok’s early work (1978; see also 1979 for discussion of empirical evidence). As shown in Figure 2 below, Bialystok’s model illustrates implicit and explicit knowledge directly interacting with each other. While these two sources of knowledge are separated from each other in this model, it assumes that formal practice (the broken line in the model) permits explicit knowledge to become implicit knowledge via automatization (Bialystok, 1978, p. 77). As a result, Bialystok’s model supports the existence of a strong interface between the two sources of knowledge by claiming that explicit knowledge can be converted into implicit linguistic knowledge, and practice (such as pedagogical activities in an L2 class) makes the conversion possible.

*Figure 2. Model of second language learning (Bialystok, 1978, p. 71)*
The strong interface position was formally advanced by Sharwood Smith (1981), who argues that “most spontaneous performance is attained by dint of practice” (p. 166). He defines practice as planned activities that learners participate in repeatedly. By performing the activity in the target language and putting together utterances in a completely conscious manner, the learner gains the necessary control over the structures that the learner can access quickly without reflection.

Figure 3 below illustrates the process through which implicit knowledge can be developed from a basis of explicit knowledge. Sharwood Smith (1981) suggests that the interaction of explicit knowledge and implicit knowledge (Arrow 2 in Figure 3) takes place as explicitly learned knowledge provides feedback for implicit knowledge (Arrow 1). The broken lines in the diagram indicate that explicit knowledge can be produced as output, and this output can become auto-input, which in turn contributes to implicit learning mechanisms. Thus, this position implies that not only can explicit knowledge be derived from implicit knowledge, but also explicit and declarative facts synthesize to become implicit proceduralized facts through practice. In this model, explicit knowledge does not negatively affect the acquisition of implicit knowledge. Nevertheless, explicit knowledge positively influences implicit knowledge development.
The strong interface position has been subsequently promoted by DeKeyser (1998; see also 1997 for empirical discussion). DeKeyser (1998) defines declarative knowledge as factual knowledge, such as knowing that most English verbs take an –s in the third person of the present tense when the subject is singular. In contrast, proceduralized knowledge encodes behavior, for example, condition-action pairs that state what is to be done under certain circumstances or with certain data. When learners acquire fully automatized procedural knowledge, they can use a third person –s for singular verbs without thinking about it. According to DeKeyser (1998), repeated behaviors allow the restructuring (e.g., Cheng, 1985; McLaughlin, 1990) of declarative knowledge “in ways that make it easier to proceduralize and allow the combination of co-occurring elements into larger chunks that reduce the working memory load” (DeKeyser, 1998, p. 45). Thus, learners may experience development of implicit procedural knowledge and loss of explicit declarative knowledge at the final stage of language learning. The strong interface position views this phenomenon as knowledge transfer of explicit knowledge to implicit knowledge.

Within the context of SLA, this position suggests that the acquisition of implicit L2 knowledge can be driven by explicit knowledge. The conversion of knowledge is facilitated
when plentiful practice opportunities are given. In SLA, practice refers to “engaging in an activity with the goal of becoming better at it” (DeKeyser, 1998, p. 50). In other words, by producing targeted structures in controlled and free language use, learners can proceduralize explicit facts of linguistic knowledge. Pedagogically, this indicates that explicit FFI may prompt the development of implicit knowledge by allowing for an ample amount of practice opportunities. As a result, the strong interface position views formal instruction not as a fruitless procedure, but as one that can promote acquisition of implicit knowledge.

The Weak Interface Position

While assuming the possibility that explicit knowledge can support the acquisition of implicit knowledge, the weak interface position posits conditional constraints on when and how it can take place. According to the weak interface position, explicit knowledge may take part in the acquisition of implicit knowledge when learners are ready to accommodate the new knowledge in their interlanguage system. As a result, this position assumes that explicit knowledge is useful in developing implicit knowledge only if learners are developmentally ready to acquire the linguistic form (R. Ellis, 1993). This claim seems to be triggered by the learnability issue suggested by Pienemann (1989). Pienemann’s (1989) Processability Theory proposes that learners might not be able to internalize new structural knowledge unless they are ready to do so. Based on this idea, the weak interface position emphasizes that explicit knowledge can only facilitate the acquisition of implicit knowledge when it is provided at the stage at which learners can process the particular linguistic targets. Otherwise, the explicit linguistic knowledge would not be useful. As a result, explicit knowledge cannot be incorporated into their interlanguage system unless the learners are developmentally ready.

The facilitative role of explicit knowledge in acquiring implicit knowledge is further discussed by R. Ellis (2003). In his view, explicit knowledge about L2 forms makes “relevant features [become] salient” and enables learners “to notice them and to notice the gap between the
input and their existing competence” (p. 144). In other words, explicit knowledge helps learners compare what they currently know and do not know, notice the gap between them, and comprehend and produce L2 input correctly through their own cognition (R. Ellis, 2003). In this way, the weak interface position suggests that explicit learning processes facilitate the implicit process of learning.

*Figure 4.* A model of L2 acquisition incorporating a weak interface position (R. Ellis, 1993, p. 97)

\[\text{IL = interlanguage; broken lines (---) represent the process is not always guaranteed.}\]

This model was conceptualized in an SLA context by R. Ellis (1993). According to his conceptualization (Figure 4), implicit knowledge can be internalized (i) by deriving intake from the input and (ii) by obtaining explicit knowledge. More specifically, as seen in Figure 4, in addition to the monitoring function, explicit knowledge provided by formal instruction can help learners to notice features and meaning in the input (see R. Ellis, 2006 for empirical discussion). Furthermore, explicit knowledge may help learners to incorporate linguistic features into their implicit interlanguage grammar by facilitating the process; this process may involve learners’
comparison between their existing representations of a grammatical feature with what they actually observed in the input.

Pedagogically, the weak interface position argues that the acquisition of implicit knowledge of an L2 can be facilitated by explicit knowledge. Proponents of this position believe that explicit FFI may help L2 processing by drawing learners’ attention to targets, by helping learners establish robust L2 form-meaning connections, and by promoting rule generalizability in different contexts. Eventually, it may facilitate acquisition of implicit knowledge. While the use of explicit instruction is encouraged in L2 classrooms, it is still unclear how much explicit instruction can influence the acquisition of implicit L2 knowledge, and how their symbiosis can be optimized.

**Roles of FFI in Development of Implicit Knowledge: Controversial Evidence**

While the SLA studies contend FFI promotes faster and successful L2 learning, it is claimed that FFI “often fails to teach learners specific linguistic features” (R. Ellis, 1994, p. 107). This suggests that explicit instruction is not always effective, but its effectiveness can be influenced by other variables surrounding learning contexts. Indeed, the subsequent experimental studies found that explicit instruction is not beneficial at all times. These studies observed that effectiveness of FFI differs depending on learning contexts that involve a variety of factors. For instance, research has shown that the effect of FFI differs depending on when explicit instruction is provided (e.g., Henry, Culman, & VanPatten, 2009; Kim & Rebuschat, in prep; Sanz & Morgan-Short, 2004; Stafford et al., 2011), what types of explicit FFI are offered (e.g., DeKeyser, 1995; Erlam, 2003; Fotos, 1991, 1993; Fotos & R. Ellis, 1994, Herron & Tomosello, 1992; Robinson, 1996; Rosa & O’Neill, 1999), and complex the target linguistic features are (e.g., De Graaff, 1997; DeKeyser, 1994; 1995, 1996; DeKeyser & Sokalski, 2001; Doughty & Williams, 1998; N. Ellis, 1993; Fernández, 2008; Housen, Pierrard, & Daele, 2005; Lyster, 1994; Robinson, 1996), and whether the contexts of the targets are familiar or unfamiliar (e.g., Hama &
Leow, 2011, Robinson, 1997, Rosa, 1999; Rosa & O’Neill, 1999). As each factor may interact with the others, it is likely that the interactions among the variables may produce complicating outcomes in any attempt at defining the effectiveness of explicit instruction.

There are not many studies that have systematically isolated the variables surrounding FFI. Norris and Ortega (2000) have pointed out that “instructional contexts, number and characteristics of learner participants, and amount and intensity of instruction, [are] all factors potentially contributing to heterogeneity in observed instructional effectiveness” (p. 501). These kinds of differences in variables can produce wide variation among the studies, but studies do not rigidly control for these factors. Because of this, it is not easy to directly compare the results from the previous studies. Consequently, there is a need for more research that specifically considers the different conditions surrounding the instructional method when investigating the effectiveness of explicit FFI. In order to be able to specify under what conditions explicit instruction of grammar rules does further L2 acquisition, previous findings on explicit FFI from different learning contexts must be considered in detail. Motivated by Reber et al. (1980) and Mathews et al. (1989), the dissertation research selected three influential factors—timing of explicit instruction, types of explicit instruction, and target complexity—as significant variables that may affect the benefits of FFI.

Timing of FFI: Before versus After MFI

As summarized in the previous section, studies in cognitive psychology (e.g., Mathews et al., 1989; Reber et al., 1980) imply that the effect of explicit FFI can differ depending on when the FFI is provided during the course of MFI. While most SLA studies (e.g., Alanen, 1995; De Graaff, 1997; DeKeyser, 1995; Robinson, 1996, 1997) have observed the beneficial role of FFI when it was provided before MFI, no studies of SLA to date have explored the different benefits of explicit FFI offered at different times (Kim & Rebuschat, in prep, is an exception).
Acknowledging a research gap in SLA, Kim and Rebuschat (in prep) attempted to observe different effects of an explicit learning condition by means of form-focused instruction provided at different times during the course of incidental learning with a meaning-focused task. The linguistic focus was verb placement rules of a semi-artificial language. In each condition, metalinguistic rules were presented at different times: before (EI), in between (IEI), or after (IE) the meaning-focused task. Another group (I) did not receive explicit rule explanation but only participated in the meaning-focused task. The control group did not receive any training.

Learning was measured by performance on a GJT. The study found that the EI-Group performed the best (70.0%), followed by the IEI-Group (68.1%), the I-Group (55.8%), the IE-Group (52.1%) and the control group (42.9%). The EI, IEI, and I-Groups performed significantly better than the control group. Regarding knowledge development, confidence ratings and source attributions showed that EI and IEI learners obtained both implicit and explicit L2 knowledge while learners in the I-Group developed implicit L2 knowledge only. The results indicated that L2 syntax learning can occur incidentally (as shown by the I-Group), and learning can be facilitated by the addition of explicit instruction (as shown by the EI and IEI-Groups). However, positive effects of explicit instruction can only appear when it precedes the incidental learning condition. The explicit instruction provided after the incidental condition does not appear to be beneficial in L2 syntax learning (as shown by the IE-Group).

Although Kim and Rebuschat (in prep) provide meaningful data relating benefits of explicit FFI to acquisition of explicit as well as implicit L2 knowledge, there are some limitations in their study. First, the observations of the study are limited to early acquisition of L2 shown by immediate posttests after one hour of language instruction. It is unclear how much knowledge can be sustained in the long term with extended periods of instruction. Stafford et al. (2011) found that the benefit of explicit instruction was limited to early acquisition and its effect did not last in the long term. As a result, a further study should utilize delayed posttests in order
to test the duration of the effect. Second, as the study used the semi-artificial language as a target, its applicability to SLA can be doubted. Regarding this issue, the study should be replicated with a natural language under similar learning contexts to enhance its applicability and to offer pedagogical implications.

**Types of FFI: Deductive versus Inductive FFI**

The interface position assumes that explicit knowledge assists the acquisition of implicit L2 knowledge; therefore, how the explicit knowledge can be best presented is an important issue. While various types of FFI (see Doughty & Williams, 1998 for examples) were developed for instructing rules explicitly and are currently used in L2 classrooms, no studies so far have clarified these various FFI methods’ different levels of effectiveness. The FFI methods can be classified as either deductive or inductive explicit instruction. In deductive instruction, grammar rules are presented initially and then practiced. The initial presentation of grammar rules is recognized as the first P in the Present-Practice-Produce (PPP) sequence. Unlike deductive instruction, inductive instruction provides the exemplars of the grammar rules, and asks learners to reach metalinguistic generalizations by themselves. Learners can be guided by questions helping them search for rules.

A number of studies (e.g., DeKeyser, 1995; Erlam, 2003; Fotos, 1991, 1993; Fotos & R. Ellis, 1994; Herron & Tomasello, 1992; Robinson, 1996; Rosa & O’Neill, 1999; see Erlam, 2003 for a review) have examined the relative effectiveness of deductive and inductive instructional methods. The studies produced mixed results. Herron and Tomasello (1992) tested the acquisition of 10 French grammatical structures with 26 L2 students of French. The students learned the 10 target forms under either the Deduction condition or the Guided Induction condition led by their L2 instructors. Learning of the target structures was tested twice with written quizzes (one immediate posttest and one posttest a week later) in a fill-in-the-blank format (e.g., *Au cinéma, on peut _______*). The results showed that the Guided Induction group
performed significantly better than the Deduction group on both tests. The researchers concluded that inductive learning “involves more active learning than the deductive one in the sense that students are actively forming the hypotheses for themselves” (p. 716). As a result, this classroom study provided data that suggest a clear advantage for inductive instruction. Students learn best when they produce a hypothesis by themselves.

Unlike the study by Herron and Tomasello (1992), another classroom study by Erlam (2003) reported a significant advantage of deductive instruction over inductive instruction. Erlam (2003) examined the relative effectiveness of deductive instruction and inductive instruction in developing learners’ L2 comprehension and production. The linguistic focus was direct object pronouns in French. The participants were students at a secondary school in New Zealand. The instruction was given to the learners either deductively (explicit rule presentation) or inductively (rule-search task) by their language teachers. The control group was not exposed to the targets at all but was taught the French partitive articles. After the treatment, the participants’ L2 knowledge was tested by an oral production test, a reading comprehension test, and a listening comprehension test. The analysis of test scores showed a clear advantage of deductive instruction for both comprehension and production. The Deductive group significantly outperformed the Inductive group and the control group on oral production and listening comprehension. The results of this study provided evidence in support of the effectiveness of deductive language instruction in a teacher-centered classroom language learning environment with school-aged learners.

Regarding the relative effectiveness of deductive vs. inductive methods, these two classroom studies produced inconsistent results. Therefore, the discussion on the effectiveness of deductive and inductive instruction remains open. The mixed results might have been produced by different measures of learning utilized in these two studies. According to Norris and Ortega (2000), there is a close relationship between the observed effectiveness of L2 instruction and the
way it is tested. Therefore, the different types of tests utilized in the studies might have contributed to the current controversy over the effectiveness of deductive and inductive instruction. Additionally, the different degrees of complexity of the grammatical structures have increased the difficulty of resolving the controversy. Simple rules may best be taught deductively, while more complex rules may best be taught inductively (R. Ellis, 2006). There has been no study that examined relative effectiveness of instruction types on L2 targets of different complexities. Further research in SLA is needed to ascertain whether the results of any of the previous studies can be replicated when other moderating variables are controlled for.

**Complexity of Target Forms: Simple versus Complex Targets**

Complexity of target forms is another moderating factor that influences the effectiveness of FFI. Some target forms may be more amenable to instruction, or easier for students to learn, than others, but it is unclear what the relevant constraints are. Some theoretical frameworks discuss how forms with different levels of complexity can be best taught. Some researchers (e.g., Krashen, 1982, 1994; Reber, 1989) argue that only the learning of easy rules can benefit from explicit instruction; hard rules are considered to be best learned implicitly through meaning-focused practice. The argument is that hard rules are too complex to be successfully taught, and therefore, are difficult to learn through traditional rule explanation and practice pedagogy. Others claim the opposite. Hulstijn and De Graaff (1994) proposed that learning of simple morphosyntactic rules is best accomplished under implicit conditions, and complex rules are best learned under explicit instruction. When features are complex and contextualized, the underlying rules are difficult to notice, so explicit instruction is necessary to assist learners in discovering complex rules (Hulstijn & De Graaff, 1994). However, there are very few empirical studies (e.g., De Graaff, 1997; Fernandez, 2008; Robinson, 1996) that directly compare the effects of instructional methods on different target forms of varying complexity.
A few studies have shown that not every type of grammatical feature makes an equally good candidate for FFI. Differential effects of FFI on simple versus complex rules were observed in Robinson (1996). This study compared the learning of easy syntactic rules to the learning of difficult syntactic rules using a semi-artificial language under four different exposure conditions: implicit, incidental, rule-search, and instructed conditions. Expert L2 teachers were asked to identify a list of grammatical structures that they thought to be the most difficult for their students. In training, implicit participants were asked to memorize sentences with a focus on word order in the stimuli. The incidental participants were required to read sentences and understand the meaning of the stimuli. The rule-search group was instructed to identify the rules illustrated by the stimulus sentences. The instructed participants received formal rule explanation before viewing the sentences. Learning was measured by a GJT. In terms of overall accuracy rates, the instructed condition outperformed all other groups. There were no clear advantages for the implicit condition with complex rules. As a result, Robinson (1996) found evidence contradicting the claims of Krashen (1982, 1994) and Reber (1989) but similar to the findings of DeKeyser (1995). In DeKeyser’s (1995) laboratory study, explicit instruction was found to be more effective for easily-stated categorical grammar rules. Furthermore, implicit instruction did not appear to be clearly more effective than explicit instruction for prototypical rules. The advantage of implicit learning for complex rules was not confirmed.

De Graaff (1997) investigated the interaction between the presence or absence of explicit FFI, rule complexity (simple vs. complex), and rule type (morphology vs. syntax) in the acquisition of eXperanto, a modified version of Esperanto. All learners were asked to learn four types of target structures (simple morphological, complex morphological, simple syntactic, and complex syntactic) under either explicit or implicit learning conditions. The explicit learners received explicit rule explanation after a practice activity, whereas the implicit learners did not receive the rule explanation after the activities. Learners’ proficiency was measured by a GJT, a
gap-filling task, a contextualized eXperanto vocabulary task, and a sentence judgment and correction task. The results showed that the participants who received explicit rule explanation performed significantly better on tests than participants in the implicit condition. Regarding the target structure variables, the explicit learners scored significantly higher on the simple morphological and complex syntactic structures than the implicit learners. No significant effect from explicit learning was found regarding the complex morphological and simple syntactic rules. Consequently, the results indicated that explicit instruction added to practice activities is beneficial to L2 processing, and its effectiveness can be differentiated by rule complexity and type.

These previous studies have shown that FFI is effective when learning complex forms as well as simple forms. This seems to suggest that FFI is beneficial regardless of target complexity. However, the results are not completely generalizable because the previous studies used different criteria to define simple vs. complex rules. The term “target complexity” is conceptualized in different ways from psycholinguistic, linguistic, and pedagogical perspectives (for an overview see Spada & Tomita, pp. 266–269). Given the lack of consensus on the conceptualization and operational definition of complexity in the L2 literature, it is not easy to decide how to deal with target complexity in SLA. This vagueness in the way rule complexity is understood increases the theoretical controversies over the differential benefits of FFI.

**Familiarity of Items: Old versus New Structural Patterns**

Rule abstraction is considered to be a product of learning, which enables learners to apply the underlying rule system to a new structural pattern. In various studies in cognitive psychology (Knowlton & Squire, 1994, 1996; Reber, 1989, 1993; Vokey & Brooks, 1992) and SLA (Leow, 2000; Robinson, 1997; Rosa, 1999; Rosa & O’Neill, 1999), rule abstraction ability has been empirically shown by learners’ successful performance on transfer grammaticality judgment tasks, comprised of unfamiliar items that the learners were not exposed to in training but that
utilize the same rule system. While the studies in cognitive psychology suggest that unconscious rule abstraction is possible through exposure to targets, studies in SLA argue that rule abstraction and successful transfer of knowledge can be supported by the use of FFI, which leads learners’ attention and awareness to target forms (e.g., Hama & Leow, 2011; Leow, 1997; Robinson, 1995; Schmidt, 1990, 1993, 1994, 1995). They claim that, as a result, FFI may play a crucial role in subsequent processing of the L2 in unfamiliar as well as familiar contexts.

Robinson (1997) examined the differential effects of four learning conditions (e.g., implicit, incidental, enhanced, instructed) on rule abstractions and transfer of rule knowledge by observing whether the learners could correctly judge grammaticality of new sentences in which the target rules were employed. English dative alternation was selected as a target rule; but in order to control for prior knowledge, novel artificial verbs were created for this construction (e.g., Mary donked a car to the old man; Bob pogged Julie a silver box). The learner groups received different instructions in accordance with the learning conditions and were visually presented with 55 target sentences. The implicit group was instructed to memorize the sentences, while the incidental group received a meaning-focused comprehension task. For the enhanced group and the instructed group, FFI methods were offered. The enhanced group learners were presented enhanced sentences in which the different sentence elements were marked in distinct ways (e.g., Mary donked a car to the old man) in addition to the meaning-focused comprehension task, so they could focus on form and meaning simultaneously. The instructed group learners were presented with metalinguistic rule instruction, and the target sentences were presented with questions focusing on form (e.g., “Was an object with ‘to’ used?”). After training, learning outcomes were measured by a GJT consisting of 10 old grammatical (familiar), 10 new grammatical (unfamiliar), and 10 new ungrammatical (unfamiliar) sentences. Because the learners were tested with new and old items together, the study enabled to comparison of the influence of MFI (incidental condition) and FFI (enhanced and instructed) on the development of
rule transfer ability. As the instructed groups receive explicit rule instruction while the enhanced group did not, the explicitness of FFI was higher for the instructed group.

The analysis found a significant main effect on unfamiliar items but no main effect on familiar items. To be precise, while all learners performed equally well in judging familiar items, the instructed groups performed significantly better than the other groups in judging unfamiliar grammatical and unfamiliar ungrammatical items. As for the enhanced group, they significantly outperformed the incidental and implicit groups on unfamiliar ungrammatical items, but not on unfamiliar grammatical items. The higher accuracy rates of the instructed and enhanced groups suggest that those groups who received a type of FFI gained “more ability to generalize knowledge learned during training” (Robinson, 1997, p. 236). Also, as the enhanced group did not perform better than the incidental and implicit groups on unfamiliar grammatical items, the study may also illustrate that the facilitative effects of FFI on rule abstraction and generalizability of knowledge differ depending on its type.

Unlike the studies that claiming that the combined use of FFI and MFI is more beneficial than the isolated use of either one of the methods, this study showed that exclusive use of FFI (instructed group) benefits the ability of learners to generalize rule knowledge more effectively than a combination of FFI and MFI (enhanced group) or MFI alone (incidental condition). However, the study provided the learners with only very brief exposure to L2 target sentences (55 sentences), so it would be difficult to conclude that a combination of FFI and MFI is less facilitative. As N. Ellis (1993) puts it, implicit (or incidental) L2 learning from exposure is “laboriously slow,” because it requires many instances to be encountered and noticed in input. As L2 exposure in this study took the form of the presentation of 55 sentences, it does not serve as a reasonable condition for MFI. Therefore, and given the findings that FFI can facilitate transfer of L2 knowledge, a further study is needed to identify whether any interactive effect could occur when a certain type of FFI is offered in combination with MFI.
Summary of Limitations and Future Research

Three important limitations of existing studies have been identified; most studies (1) did not utilize separate measures for implicit knowledge and explicit knowledge; (2) did not rigidly control for the variables (i.e., timing of FFI, types of FFI, target complexity, item familiarity) that might influence the impact of FFI; (3) did not measure early acquisition and knowledge retention by using both immediate and delayed posttests. Due to these limitations, it is not yet clear whether explicit FFI facilitates acquiring both implicit and explicit L2 knowledge, and furthermore, under what conditions FFI may be facilitate in gaining L2 knowledge.
Chapter III: The Experiment

Research Questions

A primary goal of this dissertation study is to fill gaps between the previous empirical findings and theoretical hypotheses. Given the fact that the effectiveness of FFI can be affected by FFI-internal (i.e., timing and types of FFI) and/or external variables (i.e., target complexity and item familiarity), the present study seeks to identify an optimal condition in which FFI can best promote adult L2 acquisition. In order to address the theoretical controversies and limitations of the previous studies, this dissertation study asked four main research questions. In addition to observing the overall impact of the incorporated use of FFI and MFI (Research Question 1), the study also looked into whether each of the two internal variables of FFI (i.e., timing of FFI and types of FFI) would differentially influences the effectiveness of FFI when the target items involve different degrees of complexity (Research Question 2) and familiarity (Research Question 3). Moreover, because only a few studies have explored the issue of the interface of implicit and explicit knowledge, the current study attempted to identify any role of FFI in facilitating development of implicit L2 knowledge. In order to offer better pedagogical suggestions for the utilization of FFI, the study examined whether different timing and different types of FFI differentially impact development of implicit L2 knowledge (Research Question 4).

The specific research questions are:

1. Overall: Does the combination of FFI and MFI promote acquisition of L2 targets more effectively than the exclusive use of MFI?

2. Target complexity: Does FFI promote acquisition of L2 knowledge of a simple target and a complex target?
2.1. Timing of FFI: If so, does a particular timing of FFI (i.e., early FFI versus delayed FFI) promote acquisition of the simple target and/or the complex target more effectively?

2.2. Types of FFI: If so, does a particular type of FFI (i.e., deductive FFI versus inductive FFI) promote acquisition of the simple target and/or the complex target more effectively?

3. Item familiarity: Does FFI promote acquisition of L2 knowledge of familiar items as well as unfamiliar items?

3.1. Timing of FFI: If so, does a particular timing of FFI (i.e., early FFI versus delayed FFI) promote acquisition of the familiar items and/or the unfamiliar items more effectively?

3.2. Types of FFI: If so, does a particular type of FFI (i.e., deductive FFI versus inductive FFI) promote acquisition of the familiar items and/or the unfamiliar items more effectively?

4. Types of knowledge: Does FFI promote acquisition of explicit knowledge as well as implicit knowledge of the L2?

4.1. Timing of FFI: If so, does a particular timing of FFI (i.e., early FFI versus delayed FFI) promote acquisition of the implicit and/or the explicit knowledge more effectively?

4.2. Types of FFI: If so, does a particular type of FFI (i.e., deductive FFI versus inductive FFI) promote acquisition of the implicit and/or the explicit knowledge more effectively?

Method

Participants

A total of ninety-two Korean-speaking learners of English as a foreign language (EFL) participated in the present study (20 male, 72 female). All of the participants were majoring in English language and literature at Yeungnam University in Daegu, Korea. On a background
questionnaire administered on the first day of the experiment, all participants reported only Korean as a native language. Of these ninety-two learners, eighty-two participants (89.13%) have learned English only in a formal classroom context in Korea, and ten participants (10.87%) had been to English-speaking countries such as the U.S. \((n = 2)\), U.K. \((n = 3)\), Canada \((n = 1)\), Philippines \((n = 3)\), and Australia \((n = 1)\), mostly for traveling and/or short-term language courses (one or twelve months at the longest). Also, eighty-eight participants (95.65%) had studied one or more foreign languages other than English, such as Chinese \((n = 41)\), Japanese \((n = 56)\), German \((n = 26)\), Spanish \((n = 3)\), and French \((n = 7)\) during their high school years.

All participants were randomly assigned to one of the six groups, DM \((n = 16)\), MD \((n = 14)\), IM \((n = 16)\), MI \((n = 16)\), M \((n = 16)\), or Control \((n = 15)\). The age of the participants ranged from eighteen to thirty-two \((M = 21.38, SD = 2.12)\). They began learning/studying English at age of 10.02 \((SD = 2.99)\) and studied English for 11.34 years \((SD = 2.18)\) on average.

Table 3

Learner Characteristics by Group

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age</th>
<th>Onset</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Female</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>DM</td>
<td>16</td>
<td>4 12</td>
<td>21.80</td>
</tr>
<tr>
<td>MD</td>
<td>14</td>
<td>1 13</td>
<td>20.38</td>
</tr>
<tr>
<td>IM</td>
<td>16</td>
<td>4 12</td>
<td>20.73</td>
</tr>
<tr>
<td>MI</td>
<td>15</td>
<td>3 12</td>
<td>22.29</td>
</tr>
<tr>
<td>M</td>
<td>16</td>
<td>4 12</td>
<td>21.33</td>
</tr>
<tr>
<td>Control</td>
<td>15</td>
<td>4 11</td>
<td>22.13</td>
</tr>
<tr>
<td>Total</td>
<td>92</td>
<td>20 72</td>
<td>21.38</td>
</tr>
</tbody>
</table>

\(^{a}\) Onset means the age when they first began to learn English either at school or at home.

\(^{b}\) Length means the number of years they have studied English.
The self-rated English proficiency measured by the five-point Likert scale (0 = beginner; 1 = low intermediate; 2 = intermediate; 3 = high intermediate; 4 = advanced; 5 = near native) indicated that the participants have an intermediate or high intermediate level of proficiency in English.

Table 4

Self-rated English Proficiency by Group

<table>
<thead>
<tr>
<th></th>
<th>Listening</th>
<th>Speaking</th>
<th>Reading</th>
<th>Writing</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM</td>
<td>3.06</td>
<td>2.50</td>
<td>3.50</td>
<td>2.63</td>
</tr>
<tr>
<td>MD</td>
<td>3.07</td>
<td>2.29</td>
<td>3.36</td>
<td>2.64</td>
</tr>
<tr>
<td>IM</td>
<td>2.75</td>
<td>2.50</td>
<td>3.31</td>
<td>2.55</td>
</tr>
<tr>
<td>MI</td>
<td>3.33</td>
<td>2.87</td>
<td>3.73</td>
<td>2.40</td>
</tr>
<tr>
<td>M</td>
<td>2.75</td>
<td>2.19</td>
<td>3.19</td>
<td>2.63</td>
</tr>
<tr>
<td>Control</td>
<td>2.87</td>
<td>2.33</td>
<td>3.27</td>
<td>2.67</td>
</tr>
<tr>
<td>Total</td>
<td>2.98</td>
<td>2.45</td>
<td>3.39</td>
<td>2.57</td>
</tr>
</tbody>
</table>

0 = beginner; 1 = low intermediate; 2 = intermediate; 3 = high intermediate; 4 = advanced; 5 = near native

Linguistic Targets

Targets. Two syntactic rules that involve different levels of complexity (simple versus complex) were selected as linguistic targets of the current dissertation study. Among the various perspectives that characterize rule complexity, the current research adopted definition by De Graaff and Hulstijn (1994). According to De Graaff and Hulstijn (1994, p. 103), degree of rule complexity is contingent “on the number (and/or the type) of criteria to be applied in order to arrive at the correct form.” This indicates that a rule is considered to be more complex when the rule requires a greater number of grammatical concepts compared to other rules. In other words,
a rule that involves multiple grammatical concepts is likely to be more difficult to acquire because of the increased demand on cognitive process. In this viewpoint, therefore, cognitive demand of language processing is discussed as a main factor for rule complexity.

In this study, wh-movement from (1) the object position and (2) the subject position were used as a simple rule and a complex syntactic rule, respectively. Both forms involve long-distance movement of wh-words, but the movement starts from different positions. For the wh-movement from the object position, wh-words are extracted from the object position in the embedded clause (object extraction) whereas for wh-movement from the subject position, wh-words are extracted from the subject position in the embedded clause (subject extraction). The complexity of the rules was determined by considering the number of criteria to be applied in order to arrive at the correct form (De Graaff & Hulstijn, 1994). For the Object extraction, only two criteria, that is (1) do-support and (2) wh-movement, are applied while for the Subject extraction three criteria are applied: (1) do-support, (2) wh-movement, and (3) deletion of the complementizer that. Whereas deletion of the complementizer that is optional in the wh-movement from the object position, it is obligatory in the one from the subject position. As more transformational rules are applied to the long-distance subject extraction, it can be argued that the long-distance subject extraction (SE) is cognitively more complex than the long-distance object extraction (OE). Few studies in SLA (Juffs & Harrington, 1995; Schachter & Yip, 1990) have dealt with processing patterns of English OE and SE constructions in relation to English L2 learners’ language background (wh-moving languages versus wh-in-situ languages).

The examples and transformational features of long-distance OE and long-distance SE are described below (Table 5). In government-binding theory (Chomsky, 1981), movement leaves a trace ($t$) which is coindexed with a wh-word ($t_i$ and $who_i$). In the long-distance wh-
movement, there is further coindexation between the moved wh-word and the specifier (SPEC) of the complementizer phrase (CP) (e.g., $[\text{CP SPEC } t_i] \text{ that } [\text{IP Subject Verb } t_i]$). Both OE and SE are defined as long-distance wh-movement because the moved wh-element leaves its trace at the SPEC position of CP. The difference in rule complexity of the two structures arises from *that*-deletion. In addition to the criterion of *do*-support in the main clause, the transformation of OE involves *wh*-movement only whereas SE involves *wh*-movement and *that*-deletion. As a result, SE is regarded as more complex because a greater number of criteria are applied when processing the structure. Example sentences (1b) and (1c) indicate that the presence and absence of the complementizer *that* does not incur violation of the grammaticality. In other words, the null complementizer does not affect the grammaticality of OE sentence, so the complementizer *that* can appear (or disappear) optionally. For OE, therefore, the learners are not required to decide what they should do with the complementizer *that*. Unlike OE, *that*-deletion is not optional but obligatory for SE. For instance, the ungrammaticality of (2b) appears from the presence of complementizer *that*. After deleting *that*, as shown in (2c), the sentence becomes grammatical. As a result, the criterion of *that*-deletion should be processed additionally for SE.

Table 5

*Simple and Complex Rules: Object Extraction and Subject Extraction*

<table>
<thead>
<tr>
<th>Original Sentence</th>
<th>Example Sentences</th>
<th>Transformational Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mary believes that John teaches math.</td>
<td>1a. Does Mary believe $[\text{CP that } [\text{IP John teaches math}]]$?</td>
<td>1. <em>do</em>-support</td>
</tr>
<tr>
<td></td>
<td>1b. <em>What</em>$_i$ does Mary believe $[\text{CP that } [\text{IP John teaches } t_i]]$?</td>
<td>2. <em>wh</em>-movement</td>
</tr>
<tr>
<td></td>
<td>1c. <em>What</em>$_i$ does Mary believe $[\text{CP } t_i \text{ } \text{ } [\text{IP John teaches } t_i]]$?</td>
<td>3. (that-deletion$^a$)</td>
</tr>
</tbody>
</table>
Complex: Subject Extraction

| 2a. Does Mary believe \([CP \, t_i \, that \, [IP \, John \, teaches \, t_i]]\)? | 1. do-support |
| 2b. *Who* does Mary believe \([CP \, t_i \, that \, [IP \, t_i \, teaches \, math]]\)? | 2. wh-movement |
| 2c. *Who* does Mary believe \([CP \, t_i \, \_\_ \, [IP \, t_i \, teaches \, math]]\)? | 3. *that*-deletiona |

* The *that*-deletion criterion is optional in case of OE whereas it is obligatory in SE.

**On Targets.** Different complexity levels of the two syntactic rules are incurred by optional or obligatory *that*-deletion that is differentially applied to English OE and SE interrogative sentences. In syntax, the obligatory *that*-deletion of English SE sentences is interpreted as *that*-trace filter, and its theoretical explanation is derived from the Empty Category Principle (ECP). According to the ECP, an empty category (or a trace, in this case) must be either theta-governed (governed and theta-marked by a head) or antecedent-governed (governed by a co-indexed XP) (Chomsky, 1986, cited in Haegeman, 1994). In other words, a trace not governed by a proper governor violates ECP, and it makes the sentence ungrammatical.
Figure 5. Partial Tree Diagram Representation: Subordinate clauses of OE sentences

Figure 6. Partial Tree Diagram Representation: Subordinate clauses of SE sentences
Because the \textit{wh}-movements of OE and SE are originates from different positions, the proper governors of the lowest trace \((t_1\text{ in Figure 5 and Figures 6})\) are different. In case of OE (Figure 5), the proper governor of the lowest trace is a verb of the subordinate clause, and the government is achieved by theta-government. For example, the lowest traces \((t_1)\) in (1b’) and (1c’) is theta-governed by the verb \textit{teach} by which it is also theta-marked. The government is achieved within the domain of subordinate clause, thus, the existence of the complementizer \textit{that} has no relationship with the issue of ECP in this case. As a result, regardless of presence or absence of the complementizer \textit{that}, the lowest traces in (1b’) and (1c’) satisfy the requirement of ECP by achieving theta-government by the preceding verb. Therefore, use or deletion of the complementizer \textit{that} is optional as far as OE sentences are concerned.

In case of SE sentences (Figure 6), on the other hand, the lowest traces in (1b’) and (1c’) are not placed where they can be theta-governed by the verb \textit{teach} in the subordinate clauses. Not to violate ECP, the traces need to be antecedent-governed. While the lowest trace in (2c’) can be antecendent-governed by its antecedent (or co-indexed trace) in [Spec, CP], the one in (2b’) is not successfully governed by its antecedent due to the presence of the complementizer \textit{that}. In other words, in (2b’), complementizer \textit{that} intervenes between the lowest trace \((t_1’)\) in the subject position and the co-indexed trace \((t_1’)\) in [Spec, CP] and blocks the lowest one from being governed by its antecedent unless the complementizer \textit{that} is deleted. Therefore, the example sentences of SE illustrate that the sequence of an overt complementizer followed by a trace is ungrammatical, and it is called \textit{that}-trace filter (Haegeman, 1994). Consequently, for SE sentences, deletion of the complementizer \textit{that} is obligatory to allow the lowest trace to be antecedent-governed by its co-indexed governor.
Although the targets are one of the frequently used interrogative forms in the real-life situation, *that*-deletion in the SE structure is neither taught in ESL/EFL grammar books nor explicitly instructed in L2 classroom contexts. Therefore, the use of the OE and SE structures may control for learners’ prior knowledge while maintaining ecological validity and pedagogical benefits.

**Experimental Design**

There were five experimental groups in this study who received either deductive or inductive type of FFI in addition to MFI. The experimental groups were named by the sequence of the instructional intervention they received, for example, (1) the DM group (Deductive FFI and MFI), (2) the MD group (MFI and Deductive FFI), (3) the IM group (Inductive FFI and MFI), (4) the MI group (MFI and Inductive MFI), and (5) the M group (MFI only) (Table 6).

The study employed a repeated-measures design. All experimental participants completed a pretest, three sessions of treatment, an immediate posttest, a one-week delayed posttest, and a one-month delayed posttest for the linguistic targets, as well as questionnaires for bio-data information and language background. There was one group who did not receive any treatment sessions but the pretests and the immediate, one-week, and one-month posttests in addition to the questionnaires. This group of participants served as a control group. The participants were randomly assigned to one of the five experimental groups or the control group. All tests and treatments in this research were computerized and individualized.

Table 6

*Experimental Treatment Design*

<table>
<thead>
<tr>
<th></th>
<th>Treatment 1</th>
<th>Treatment 2</th>
<th>Treatment 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM (n = 16)</td>
<td>Deductive FFI</td>
<td>MFI</td>
<td>MFI</td>
</tr>
</tbody>
</table>

63
The difference between DM versus MD and IM post MI is timing of deductive/inductive FFI. There was no difference in the content of instruction for prior versus post FFIs.

While all of the five experimental groups were exposed to MFI for three consecutive days, FFI was provided for only four experimental groups: DM, MD, IM, and MI. Among these four mixed-method groups, DM and MD received deductive FFI identically, but at different timing. DM received the deductive FFI on the first day (Treatment 1) and MD received it on the third day (Treatment 3). In case of IM and MI, they received inductive FFI. IM was instructed from the inductive FFI on the first day (Treatment 1) and MI was offered with it on the third day (Treatment 3). The M-participants were not instructed from either deductive or inductive type of FFI, but participated in the MFI only.

**Procedure**

Data were collected over five experimental sessions (see Figure 7). On the first day of meeting (Session 1 in Week 1), all participants signed on the consent form, filled out the biodata and language background questionnaire, and then participated in the pretest session in the order of the OEIT, GJT, and MKT. It took approximately 10 minutes to complete the consent form and the questionnaire and another 20–30 minutes to finish the pretest. Once the participants agreed to participate in this experimental study and completed the pretest, only those participants who were randomly assigned to the experimental groups (e.g., DM, MD, IM, MI, and M) preceded to the treatment 1. However, the control participants did proceed further than the pretest, and were asked to return to the lab a day after tomorrow in order to participate in the immediate posttest.
In the treatment 1, the experimental participants were taught the two target rules in different instructional conditions in accordance to the groups they were assigned to. For example, the DM and IM groups received either deductive or inductive type of FFI and then engaged in the MFI. On the other hand, the MI, MD and M groups received only MFI. The deductive/inductive FFI took approximately 10–20 minutes and the MFI approximately 30–40 minutes for each participant to complete. The experimental participants who completed the treatment 1 were asked to return to the computer lab on the next day to continue to the treatment 2. On the second day (Session 2 in Week 1), all experimental groups returned, and they received MFI. On the following day (Session 3 in Week 1), the experimental participants received either/both MFI and/or either deductive or inductive type of FFI. The DM, IM and M groups were instructed with MFI only (30–40 minutes) while the MD and MI groups were instructed with either deductive or inductive FFI (10–20 minutes) prior to the MFI (30–40 minutes). Consequently, all experimental groups were instructed approximately for 1.5–2.0 hours for three consecutive days. The treatment 3 was followed by the immediate posttest, consisting of the OEIT, GJT, and MKT (20–30 minutes). On this day, the controls also returned to the lab and completed the immediate posttest. The delayed posttests were administered two times; one was administered after a week (Session 4 in Week 2) and the other one after a month (Session 5 in Week 5) from the day for the treatment 3. The same assessment tasks were employed for the delayed posttests. The entire experimental procedure was closely monitored by the researcher.
Figure 7. Experimental Procedure

**Session 1 (Week 1)**
1. Consent form, Biodata Questionnaire
2. Pretest (experimental and control groups)
   - OEIT
   - GJT
   - MKT
3. Treatment 1 (experimental groups only)
   - DM: Deductive FFI → MFI
   - MD: MFI
   - IM: Inductive FFI → MFI
   - MI: MFI
   - M: MFI

**Session 2 (Week 1)**
1. Treatment 2 (experimental groups only)
   - DM: MFI
   - MD: MFI
   - IM: MFI
   - MI: MFI
   - M: MFI

**Session 3 (Week 1)**
1. Treatment 3 (experimental groups only)
   - DM: MFI
   - MD: Deductive FFI → MFI
   - IM: MFI
   - MI: Inductive FFI → MFI
   - M: MFI
2. Immediate posttest (experimental and control groups)
   - OEIT
   - GJT
   - MKT

**Session 4 (Week 2)**
1. One-week delayed posttest (experimental and control groups)
   - OEIT
   - GJT
   - MKT

**Session 5 (Week 5)**
1. One-month delayed posttest (experimental and control groups)
   - OEIT
   - GJT
   - MKT
Tasks and Materials

**Treatment materials.** The treatment session consisted of two components: FFI and MFI. For FFI, either deductive or inductive type of instruction was provided for the experimental participants. Both deductive and inductive FFIs were designed to draw learners’ attention to L2 forms. In MFI, on the other hand, learners were exposed to L2 examples by means of the picture-selection task. The picture-selection task was designed to offer an incidental L2 learning condition by directing participants’ primary attention to meaning.

**Deductive Form-focused Instruction.** In deductive FFI, the participants were explicitly instructed with the two English syntactic rules on wh-movement. The rules were presented with example sentences so that the participants were able to notice how the rules work in the language (see Example 1 and Appendix A).

Example 1 (translated in English)

STEP 1: Insert do/does and change the main clause into a form of interrogative sentence.

- You think that John likes English → DO you think that John like English

STEP 2: Find out an appropriate wh-word for the object.

- Do you think that John likes English → Do you think that John likes WHAT.

STEP 3: Move the wh-word to the sentence front (completed)

- WHAT do you think that John likes? = WHAT do you think John likes?

>> Use of “that” is optional in this case.

In order to ensure that the participants understood the rules, they were asked to change three original declarative sentences into interrogative sentences complying with the rules (see Example 2). If they were not able to complete the comprehension task successfully, the rules...
were taught again individually until they could complete the comprehension task. The instruction was delivered in learners’ L1 (Korean).

Example 2 (translated in English)

COMPREHENSION CHECK: Change the complex declarative sentences into interrogative forms that the underlined word to be the answer.

1. You think that Mary makes dinner.
2. He believes that John drives the bus.
3. She guesses that Sarah visited her grandmother.

**Inductive Form-focused Instruction.** In inductive FFI, the participants were asked to compare original declarative sentences to transformed sentences and find out transformational rules by themselves. Thus, inductive FFI was less explicit because learners were required to find out underlying rules without any explicit grammar instruction. The multiple steps of syntactic transformational rules were guided by step-by-step example sentences so the participants could find out one rule at a time (see Example 3 and Appendix B). After completing the rule-searching task, the comprehension task was provided in the same manner and their comprehension was checked by the comprehension questions.

Example 3 (translated in English)

**STEP 1:** Find out the difference between the sentences in Group A and the ones in Group B.

What rule can you induce from them?

<table>
<thead>
<tr>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>You think that John likes her.</td>
<td>DO you think that John likes her.</td>
</tr>
<tr>
<td>He believes that Mary reads books.</td>
<td>DOES he believe that Mary reads books.</td>
</tr>
<tr>
<td>She guess that Tom rides a bike.</td>
<td>DOES she guess that Tom rides a bike.</td>
</tr>
</tbody>
</table>
Meaning-focused Instruction. In MFI, the participants completed an auditory meaning-focused task. In this task, the participants were asked to listen to a question and select a picture that could be the best answer for the question. The task consisted of 120 grammatical sentences, and they were evenly divided among the target forms; 60 sentences employed the simple target structure (60 OE sentences: 30 OEs with/without the complementizer *that*) and the rest 60 employed the complex target structure (60 SE sentences) (see Appendix C for all 120 sentences used for treatment). The same 120 question sentences were used for the three treatment sessions. In order to reduce fatigue caused by task repetition, different pictures were used from treatment to treatment. The sentences were read out by a female native speaker of American English, and digitally recorded on Praat. The syntactic templates of the target sentences are illustrated in Table 7 below.

Table 7

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Template</th>
<th>Number of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>OE + that</td>
<td>wh-word &gt; do-verb &gt; [NP]<em>{subj} &gt; [VP] &gt; [that]</em>{comp} &gt; [NP]_{subj} &gt; [VP]?</td>
<td>(30)</td>
</tr>
<tr>
<td>OE – that</td>
<td>wh-word &gt; do-verb &gt; [NP]<em>{subj} &gt; [VP] &gt; [NP]</em>{subj} &gt; [VP]?</td>
<td>(30)</td>
</tr>
<tr>
<td>SE – that</td>
<td>wh-word &gt; do-verb &gt; [NP]<em>{subj} &gt; [VP] &gt; [NP]</em>{subj} &gt; [NP]_{obj}?</td>
<td>(60)</td>
</tr>
</tbody>
</table>

Example 1) What do you think that David teaches?
Example 2) Who does he believe that Sarah saw?

Example 1) What do you think Jessica bought?
Example 2) Who does she guess Sarah talks to?

Example 1) What do you believe watched Jerry?
Example 2) Who does he think married Sarah?

In the treatment task, the verbs *believe*, *guess*, and *think* were used in the main clause.

In the auditory picture-selection task, the participants were first visually presented with a picture illustrating a scene (e.g., a woman roasting a beef steak in the kitchen). The picture was accompanied with an auditory question sentence asking about the scene (e.g., *What does he*
believe that Jessica cooked?). After listening the question sentence, the participants were asked to repeat the question sentence, and then, choose a correct answer from the three options provided in pictures (e.g., pictures of steak, chicken, and fish). When selected a correct picture (e.g., a picture of beef steak), the participants were moved to the next question. If the participants chose an incorrect picture (e.g., a picture of chicken or fish), the same item was repeated until they selected a correct one (see Figure 8 and Appendix D for a sample presentation). The picture-selection task was preceded by a brief introduction on the task and four practice items. The participants were told that the main focus of the task is accurate processing of meaning so they could primarily focus on L2 meaning than forms.

Figure 8. Sample presentation of the picture-selection task

Test materials. The difficulties pertaining in designing a pure measure of implicit and explicit knowledge (De Jong, 2005) could be reduced when developmental trends of implicit and explicit knowledge are measured and triangulated by multiple assessment tasks. For this reason, the current study utilized more than one assessment measure to capture a more reliable evidence of implicit and explicit knowledge development. First of all, as following the tradition of cognitive psychology and psycholinguistics, the current study employed the GJT incorporated with subjective measures of awareness (e.g., confidence ratings and source attributions) as a primary assessment tool to examine acquisition of linguistic knowledge and natures of the knowledge. Furthermore, the present study utilized additional assessment tasks, such as the oral
elicited imitation task (OEIT) and the metalinguistic knowledge test (MKT), for data triangulation purposes. As were used in the previous SLA studies, which dealt with methodology on the measures of implicit and explicit linguistic knowledge (R. Ellis, 2005; R. Ellis et al., 2009; Erlam, 2007), the current study employed the OEIT primarily to measure implicit knowledge and the MKT to assess explicit knowledge (Table 8).

Table 8

*Summary of Characteristics of Assessment Tasks*

<table>
<thead>
<tr>
<th></th>
<th>Nature of knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Implicit</td>
</tr>
<tr>
<td><strong>OEIT</strong></td>
<td>Oral production</td>
</tr>
<tr>
<td><strong>GJT</strong></td>
<td>Grammaticality judgments</td>
</tr>
<tr>
<td></td>
<td>Confidence ratings</td>
</tr>
<tr>
<td></td>
<td>Source attributions</td>
</tr>
<tr>
<td><strong>MKT</strong></td>
<td>Metalinguistic analysis</td>
</tr>
</tbody>
</table>

The same test batteries were employed for the pretest, the immediate posttest, and two delayed posttests (e.g., one-week and one-month). The tests employed new sentences that were not used in the treatment sessions. To minimize learning effects, the tests were administered in the order of (1) the OEIT; (2) the GJT incorporated with the subjective measures of awareness (e.g., confidence ratings and source attributions); and (3) MKT.

**Oral Elicited Imitation Task.** 24 sentences (12 OEs vs. 12 SEs) were created for this task (see Appendix E). The 12 OE and 12 SE structures were then equally distributed across
the grammaticality (6 grammatical and 6 ungrammatical sentences) and the familiarity (6 familiar and 6 unfamiliar items) (Table 9).

Table 9

<table>
<thead>
<tr>
<th>Types and Number of Sentences Used in the OEIT</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th></th>
<th>OE</th>
<th>SE</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gram</td>
<td>Ungram</td>
<td>Gram</td>
</tr>
<tr>
<td>OE</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Familiar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unfamiliar</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>SE</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Familiar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unfamiliar</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

The grammatical sentences in the assessment tasks followed the same three syntactic templates utilized in the treatment task. The ungrammatical sentences were created based on the four syntactic templates that the primary criteria of transformational rules were violated, for example, OE (with/without the complementizer *that*) with the object resumed, SE (without the complementizer *that*) with the subject resumed, and SE with the complementizer *that*. The familiarity of items was manipulated by syntactic patterns and words used in the sentences while the underlying rules were identical. For example, the familiar items utilized the same syntactic pattern and the same *wh*-word (e.g., *who* and *what*) and verbs in the main clauses (e.g., *believe*, *guess* and *think*) and the subordinate clauses so the sentences looked very similar with the ones in the treatment task. However, the unfamiliar items employed different syntactic patterns by replacing the single *wh*-word (e.g., *who*, *what*) with the *which* + noun structure (e.g., *which*
author, which book) and by using new, unused verbs in the main clauses (e.g., assume, imagine, and suppose)/subordinate clauses (Table 10). The test items were read out by a female native speaker of American English, and digitally recorded on Praat.

Table 10

Syntactic Templates and Examples for the Sentences in Assessment Tasks.

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Template</th>
</tr>
</thead>
<tbody>
<tr>
<td>OE + that</td>
<td>wh-word &gt; do-verb &gt; [NP]<em>{subj} &gt; [VP] &gt; [that]</em>{comp} &gt; [NP]_{subj} &gt; [VP]</td>
</tr>
<tr>
<td></td>
<td>Example 1: *What do you think that David throws it?</td>
</tr>
<tr>
<td></td>
<td>Example 2: *Which lecture does he imagine that David understands it?</td>
</tr>
<tr>
<td>OE – that</td>
<td>wh-word &gt; do-verb &gt; [NP]<em>{subj} &gt; [VP] &gt; [NP]</em>{subj} &gt; [VP]</td>
</tr>
<tr>
<td></td>
<td>Example 1: Who does he guess John respected?</td>
</tr>
<tr>
<td></td>
<td>Example 2: Which animal do you assume Jessica protected?</td>
</tr>
<tr>
<td>SE – that</td>
<td>wh-word &gt; do-verb &gt; [NP]<em>{subj} &gt; [VP] &gt; [NP]</em>{subj} &gt; [VP]</td>
</tr>
<tr>
<td></td>
<td>Example 1: What does he think raised her reputation?</td>
</tr>
<tr>
<td></td>
<td>Example 2: Which group does he suppose causes trouble?</td>
</tr>
<tr>
<td>*OE + that + Obj</td>
<td>wh-word &gt; do-verb &gt; [NP]<em>{subj} &gt; [VP] &gt; [that]</em>{comp} &gt; [NP]<em>{subj} &gt; [VP] &gt; [NP]</em>{obj}</td>
</tr>
<tr>
<td></td>
<td>Example 1: *Who does he guess Sarah tore it?</td>
</tr>
<tr>
<td></td>
<td>Example 2: *Which nurse do you suppose she found your name?</td>
</tr>
<tr>
<td>*OE – that + Obj</td>
<td>wh-word &gt; do-verb &gt; [NP]<em>{subj} &gt; [VP] &gt; [NP]</em>{subj} &gt; [VP] &gt; [NP]_{obj}</td>
</tr>
<tr>
<td></td>
<td>Example 1: *Who does he believe that holds the door?</td>
</tr>
<tr>
<td></td>
<td>Example 2: *Which skill does he suppose that develops well?</td>
</tr>
<tr>
<td>*SE + that</td>
<td>wh-word &gt; do-verb &gt; [NP]<em>{subj} &gt; [VP] &gt; [that]</em>{comp} &gt; [VP] &gt; [NP]_{obj}</td>
</tr>
<tr>
<td></td>
<td>Example 1: *Who do you guess the school sued him?</td>
</tr>
<tr>
<td></td>
<td>Example 2: *Which author does she imagine he edited the book?</td>
</tr>
</tbody>
</table>

For familiar items (Example 1s), the verbs believe, guess, and think were used in the main clause; for unfamiliar items (Example 2s), the verbs assume, imagine, and suppose were used in the main clause.
In the OEIT, the 24 sentences were coupled with relevant background information, and they were presented to the participants in the following manners. The background information was presented visually (e.g., You believe that John met his aunt), and the target sentences were presented aurally either in a grammatical or ungrammatical structure (e.g., Who do you guess that John met? or *Who do you guess that John met her?). In this task, the participants were required to answer the content-based question (e.g., his aunt) orally first so they could focus on meaning of L2 sentences. After providing an answer, they were asked to repeat the question sentences in correct English (e.g., Who do you guess that John met?) (see Figure 9 and Appendix F for a sample presentation). All of the participants’ responses were audiorecorded.

*Figure 9. Sample presentation of the OEIT*

![Diagram showing the process of OEIT]

**Grammaticality Judgment Task.** 24 sentences (12 OEs vs. 12 SEs) were created for this task (see Appendix G). The sentences were created in the same method as the OEIT (Table 10 and Table 11). In the GJT, learners were asked to listening to each sentence and judge the grammaticality of the sentence as quickly as possible by pressing one of the designated keys (“/” for grammatical; “z” for ungrammatical) in the keyboard.

**Table 11**

Types and Number of Sentences Used in the GJT

<table>
<thead>
<tr>
<th></th>
<th>OE</th>
<th></th>
<th>SE</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gram</td>
<td>Ungram</td>
<td>Gram</td>
<td>Ungram</td>
<td></td>
</tr>
<tr>
<td>OE</td>
<td>Familiar</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>
Confidence Ratings and Source Attributions. Dienes (2007) distinguished structural knowledge and judgment knowledge when discussing knowledge and awareness. He suggested that, when a learner is exposed to strings from the artificial grammar, the learner learns about the structure of the strings. Thus, the structural knowledge can consist of whole exemplars, knowledge of fragments or knowledge of rules. In the testing phase, the structural knowledge is used to judge whether the test items have the same underlying structures as the training items. It was labeled as judgment knowledge. It is assumed that conscious structural knowledge leads to conscious judgment knowledge. However, as stated by Dienes, when the structural knowledge is unconscious, judgment knowledge can be conscious (e.g., “pure guess”) or unconscious (e.g., native speaker’s “intuition”) (Dienes, 2007, p. 24).

In order to determine to what extent participants’ judgment and structural knowledge was conscious (Dienes, 2008; Dienes & Scott, 2005) while judging grammaticality of sentences, the current study incorporated confidence ratings and source attributions to the GJT. The confidence ratings were utilized to measure consciousness of the judgment knowledge by asking how confident they were in their judgment (not confident, somewhat confident, quite confident, or extremely confident). The source attributions were employed to measure consciousness of the structural knowledge by asking learners to report on what the basis of their judgment was (guess, intuition, memory and rule knowledge) (Rebuschat, 2008). The guess and intuition were cases of

<table>
<thead>
<tr>
<th></th>
<th>Unfamiliar</th>
<th>3</th>
<th>3</th>
<th>3</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Familiar</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>Unfamiliar</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
unconscious structural knowledge and *rules knowledge* and *memory* were cases of conscious structural knowledge.

In this study, the subjective measures of awareness were incorporated into GJT. For each grammaticality judgment, participants were asked to report and to indicate. In confidence ratings, the learners were asked to indicate the degree of confidence of their judgment (0 for not at all confident, 1 for somewhat confident, 2 for quite confident, and 3 for extremely confident). In source attributions, they were asked to (3) indicate the basis of their judgment (*g* for guessing, *i* for intuition, *m* for memory, and *r* for rule knowledge) (see Figure 10 and Appendix H for a sample presentation). That is, for each of the 24 test items, subjects entered a grammaticality judgment, a confidence rating, and a source attribution.

*Figure 10. Sample presentation of the GJT and measures of awareness*

![Flowchart](image)

**Metalinguistic Knowledge Test.** Eight sentences (4 OEs vs. 4 SEs) were created for this task (see Appendix I). The sentences were created in the same method as the OEIT and the GJT (Table 10 and Table 12). In this test, the participants were asked to decide whether the provided sentences are grammatical or ungrammatical, and underline the part of the sentence that makes it ungrammatical. The participants were then asked to correct the errors to make a grammatical sentence and provide a reason for their correction (see Example 4 and Appendix J for a sample of the test).

**Table 12**

Types and Number of Sentences Used in the MKT
<table>
<thead>
<tr>
<th></th>
<th>OE</th>
<th>SE</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gram</td>
<td>Ungram</td>
<td>Gram</td>
</tr>
<tr>
<td>Familiar</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Unfamiliar</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Familiar</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Unfamiliar</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

Example 4 (translated in English)

Among the eight sentences, four of them are grammatical and four of them are ungrammatical. After reading each sentence, please answer the questions below. If you do not know the answer, you can skip the question.

1. Which officer does he suppose reported it?
   a. Is the sentence grammatical?
   b. Which part of the sentence is ungrammatical? Please underline.
   c. Why is the underlined part ungrammatical?
   d. Change the sentence into a grammatical sentence.

2. Who do you guess that the cat saw her?
   a. Is the sentence grammatical?
   b. Which part of the sentence is ungrammatical? Please underline.
   c. Why is the underlined part ungrammatical?
   d. Change the sentence into a grammatical sentence.
Coding and Scoring

**Oral Elicited Imitation Task.** The analysis of the OEIT replicated Ellis (2005). The participants’ responses were analyzed by identifying obligatory occasions for the use of the target structures. As the OEIT was designed to assess whether learners can reproduce target sentences without violating what they have learned while focusing on meaning, the answers were scored as correct (1 point) as far as the answer on a background question was correct and the primary grammatical points of those two targets (e.g., do-support, wh-movement, and obligatory/optional that-deletion) were not violated. Therefore, learners’ use of *do* instead of *does* (or vice versa), use of *think* instead of *guess* (or vice versa) and use/deletion of optional *that* in the OE structure was considered as correct as long as they are placed correctly. The errors on non-targeted L2 forms, such as tense, third person singular –s morpheme, and definite/indefinite articles, were not counted, either. Also, slight alternation of non-targeted content words, for example, using *light* for *lamp* (e.g., (original) *Which lamp does he assume that Jessica turned on?*  → (learner) *Which light does he think Jessica turn on?*), *couch* instead of *sofa* (e.g., (original) *Which sofa do you think smells bad?*  → (learner) *Which couch do you think smell bad?*), *Sarah* instead of *Jessica* ((original) *Who does he believe Sarah trusts?*  → (learner) *Who does he assume Jessica trusts?*), were all considered as correct answers because main meanings of the original sentences are still maintained in what they produced.

On the other hand, participants’ failure to answer background questions and imitate a sentence at all or reproduce it with one or more violations on primary grammar points ((original) *What do you believe Sarah drinks?*  → (learner) *What do you believe?* or *What you believe Sarah drinks?*) were coded as incorrect (0 point). Scores were later computed as percentage correct.
**Grammaticality Judgment Task.** The analysis on the grammaticality judgment was run across all groups (experimental and control groups) because performance of the experimental versus control groups provides the evidence of learning effect. The participants’ endorsement of grammatical sentences and rejection of ungrammatical sentences were considered as correct answers. On the other hand, learners’ rejection of grammatical items and endorsement of ungrammatical items were coded as incorrect answers. All correct answers were given 1 point and all incorrect answers were given 0 points. As the present study aims to observe impact of various combinations of instructional methods to adult L2 learners acquisition of different types of target forms, scores across simple/complex targets and familiar/unfamiliar targets were calculated in addition to the scores on overall items. The scores were then converted into a percentage value that represents accuracy rate.

**Confidence Ratings and Source Attributions.** The analyses on confidence ratings and source attributions were run for the experimental groups only because these data offers a behavioral aspect of learning outcomes from those who show an indication of L2 learning. In these tasks, proportion and accuracy rates were analyzed across confidence levels and different types of sources. Regarding the proportion, the number of responses for guessing (0), somewhat confident (1), quite confident (2) and extremely confident (3) were counted and converted into percentage (%). Then, the percentage of accurate judgments out of all judgments was calculated for each confidence level. If the accuracy rates of the judgments are above chance but the learners believes they are guessing (guessing criterion), it was regarded as an indication of unconscious judgment knowledge. On the other hand, if the accuracy is above chance and the learners report they are confident, it was considered as an indication of conscious judgment knowledge. The same method was applied to the source attributions to calculate the proportion
of guessing (g), intuition (i), memory (m), and rule knowledge (r) and accuracy rates. Above chance accuracy rates basing on guessing and intuition was considered as evidence of unconscious structural knowledge, whereas the one basing on rule knowledge and memory as evidence of conscious structural knowledge.

Metalinguistic Knowledge Test. MKT was designed to observe metalinguistic knowledge from their rule-based analysis on target sentences. Thus, only learners’ answers on ungrammatical sentences were analyzed. The participants received a full credit (1 point) when the answer satisfied all of the four criteria: (1) accurately identifying an ungrammatical sentence as ungrammatical, (2) pointing out an erroneous part of the sentence, (3) providing an appropriate reason why the part is erroneous, and (4) correcting the part to make the sentence grammatical. When the answers did not satisfy any one of the four criteria, no point (0 point) was credited. In other words, either 1 point or 0 point was assigned to each item, and no partial fractional points were credited. As there were four ungrammatical sentences in this test, a maximum score a participant could get was four points.

Analysis

In order to control for any moderating effect of prior knowledge, the current study screened the data from those who showed explicit rule knowledge on either or both of the target rule(s). Prior explicit rule knowledge was identified by the MKT pretest scores. It was considered as an indication of prior knowledge when, for any of the two rules, a participant was able to (1) classify grammatical and ungrammatical sentences correctly, (2) provide relevant reasons why the two ungrammatical sentences are ungrammatical, and (3) correct each of the ungrammatical parts into grammatical. In other words, when a participant obtained a maximum score (two points for grammatical sentences; two points for ungrammatical sentences) on any of
the two rules, it was considered prior knowledge, and the data from the participant were excluded from the pool of the data.

**Oral Elicited Imitation Task and Grammaticality Judgment Task.** First of all, participants’ performance on the OEIT pretest and the GJT pretest were checked by using a one-sample t-test and a one-way analysis of variance (ANOVA) in order to observe any significant difference among the groups before participating in instructional treatments. After identifying no significant group difference in their performances before instruction, their gain scores on the GJT posttests and OEIT posttests were computed by a one-sample t-test and a mixed ANOVA. The one-sample t-test was utilized to compare learner performance to the 50% chance level. When a one-sample t-test revealed that the participants’ gain scores are significant higher than 50%, it was regarded as a clear learning effect. The mixed ANOVA was employed to measure the main effect of Time and Group. In case when the assumption of sphericity was violated, the Greenhouse-Geisser procedure was selected to obtain an $F$ value and its significance. When a significant group effect was found, a one-way ANOVA was run to observe any possible significant difference among the groups at different points of testing. For a post-hoc analysis, the Bonferroni correction was utilized to compare the groups and to identify statistically significant mean differences. When a one-way ANOVA reported that the assumption of equal variances was violated, the Brown-Forsythe procedure was selected for $F$ value and its significance. The post-hoc analysis was carried on by the Games-Howell post hoc comparisons.

**Metalinguistic Knowledge Test.** In this analysis, the learners’ answers on the four ungrammatical sentences (two sentences employed a simple rule and two employed a complex rule; two sentences in a familiar syntactic pattern and two in an unfamiliar syntactic pattern) were only analyzed as an indication of metalinguistic knowledge. The analysis of metalinguistic
knowledge employed a frequency analysis that computes the number of learners who gained each possible score (e.g., 0–4 for all ungrammatical items; 0–2 for simple/complex rules and familiar/unfamiliar items). This method of analysis was chosen to identify distributions of learners who developed reliable metalinguistic knowledge at the moment of testing. The metalinguistic knowledge was considered reliable when the learners gained perfect scores (e.g., 4 points for all ungrammatical rules; 2 points for the simple/complex rules; 2 points for the familiar/unfamiliar items).

**Confidence Ratings and Source Attributions.** Descriptive statistics (means, standard deviation) was used to analyze proportion of each confidence level (e.g., guessing, somewhat confident, quite confident, extremely confident) and source (e.g., guess, intuition, memory, rule knowledge) across the pretest, immediate posttest, one-week delayed posttest, and one-month delayed posttest. In addition, a binominal test was utilized in order to compare the participants’ accuracy rates to the 50% chance level. For example, a binominal test computed whether the groups of learners’ accuracy rates were significantly above chance (50%) when they reported they were guessing, somewhat confident, quite confident, or extremely confident. Also, a binominal test examined whether accuracy rates of the groups of the participants were significantly higher than the chance level (50%) when their judgment was made on the basis of guess, intuition, memory, or rule knowledge. When the accuracy rates were significantly higher than 50%, it was considered as a clear learning effect.
Chapter IV: Results

In the MKT pretest, six (DM = 1; MD = 1; IM = 2; MI = 1; M = 1) of the ninety-two participants showed metalinguistic knowledge on either or both of the target rules so the data from these participants were removed from the pool. Only the data from the remaining eighty-six participants (DM = 15; MD = 13; IM = 14; MI = 14; M = 15; Control = 15) were used in the following statistical analyses.

In this chapter, results are presented in the following order: (1) overall analyses of the learners’ performances on the GJT, OEIT, and MKT; (2) separate analyses of the learners’ performances on the GJT, OEIT, and MKT for two levels of target complexity (i.e., simple target versus complex target); and (3) separate analyses of the learners’ performances on the GJT, OEIT, and MKT for two kinds of item familiarity (i.e., familiar items versus unfamiliar items). The analyses of the learners’ performances are followed by analyses of the learners’ reports for (4) the confidence ratings and (5) the source attributions. As the confidence ratings and source attributions were embedded in the GJT, learners’ reports were analyzed separately for the pretest, the immediate posttest, the one-week delayed posttest, and the one-month delayed posttest.

Overall Performance

Grammaticality Judgment

First of all, a one-way ANOVA and a one-sample t-test were run for the pretest accuracy rates to examine if there was any significant between-group difference or a significant difference from a 50% chance level prior to the treatment. The one-way ANOVA found a significant between-group difference, $F(5, 80) = 2.451, p < .05, \eta^2_p = .056$. Bonferroni post-hoc pairwise comparisons showed that the M group performed significantly better than the control group on the pretest ($p < .05$). No significant difference was found among the accuracy rates of the other
experimental groups ($p > .05$). The one-sample $t$-test revealed that none of the groups performed significantly above chance ($M$ significantly below chance, $p < .05$; all other groups, $p > .05$), suggesting that learner development can be attributed to the instructional treatment.

The accuracy rates on the GJT posttests were analyzed across all groups (i.e., DM, MD, IM, MI, M, and control) and four test sessions (i.e., pretest, immediate posttest, one-week posttest, and one-month posttest). The descriptive statistics (Table 13 and Figure 11) illustrate that all groups tended to score higher on the posttests than the pretest. The one-sample $t$-tests for the mean accuracy rates indicated that all experimental groups were likely to perform significantly above chance on the immediate posttest (DM, $t(14) = 4.889$, $p < .05$; MD, $t(12) = 5.385$, $p < .05$; IM, $t(13) = 5.556$, $p < .05$; MI, $t(13) = 4.443$, $p < .05$; M, $t(14) = 3.693$, $p < .05$), the one-week delayed posttest (DM, $t(14) = 4.338$, $p < .05$; MD, $t(12) = 4.226$, $p < .05$; IM, $t(13) = 6.244$, $p < .05$; MI, $t(13) = 2.958$, $p < .05$; M, $t(14) = 1.699$, $p < .05$), and the one-month delayed posttest (DM, $t(14) = 4.157$, $p < .05$; MD, $t(12) = 5.445$, $p < .05$; IM, $t(13) = 3.299$, $p < .05$; MI, $t(13) = 2.689$, $p < .05$; M, $t(14) = 2.293$, $p < .05$). However, the control group’s performances on the immediate posttest, $t(14)= .418$, $p > .05$, one-week delayed posttest, $t(14)= 1.699$, $p > .05$, and one-month delayed posttest, $t(14)= -1.209$, $p > .05$, were not distinguishable from chance.

Table 13

*Mean accuracy rate (%) and standard deviation (SD) value on the GJT*

<table>
<thead>
<tr>
<th></th>
<th>Pretest</th>
<th>Immediate</th>
<th>1 Week</th>
<th>1 Month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>DM ($n = 15$)</td>
<td>50.53</td>
<td>11.16</td>
<td>69.87**</td>
<td>15.73</td>
</tr>
<tr>
<td>MD ($n = 13$)</td>
<td>46.69*</td>
<td>8.74</td>
<td>70.38**</td>
<td>13.64</td>
</tr>
<tr>
<td>IM ($n = 14$)</td>
<td>51.86</td>
<td>9.51</td>
<td>68.00**</td>
<td>12.12</td>
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</table>

84
Next, a mixed ANOVA was conducted for the GJT data with Time as a within-subjects variable and Group as a between-subjects variable. A four (Time: pretest, immediate, one-week delayed, and one-month delayed posttest) x six (Group: DM, MD, IM, MI, M, control) ANOVA was performed on the GJT accuracy rates. In this analysis, the assumption of sphericity ($p < .001$) was violated, so the Greenhouse-Geisser correction was made to the degrees of freedom. The mixed ANOVA revealed significant main effects for Time, $F(2.454, 161.946) = 34.598, p < .001, \eta_p^2 = .344$, for Group $F(5, 80) = 5.796, p < .001, \eta_p^2 = .266$, and for the Time x Group interaction, $F(9.815, 161.946) = 1.693, p < .05, \eta_p^2 = .093$. 

**Figure 11.** Accuracy rates (%) on the GJT
A repeated-measures ANOVA was then carried out to observe the locus of the significant main effect for Time. First, a significant difference was found in the performances of all mixed-method experimental groups (DM, $F(2.073, 29.015) = 9.552, p < .05; \eta_p^2 = .406$; MD, $F (1.804, 21.648) = 14.316, p < .001, \eta_p^2 = .544$; IM, $F(3, 39) = 8.941, p < .001, \eta_p^2 = .408$; and MI, $F(3, 39) = 4.985, p < .05, \eta_p^2 = .277$), but not in the performances of the M group, $F(1.895, 26.523) = .920, p > .05, \eta_p^2 = .062$, or the control group, $F(3, 42) = 2.365, p > .05, \eta_p^2 = .145$. These results indicate that only the DM, MD, IM and MI participants who were instructed in both FFI and MFI showed significant development between the pretest and the posttests. For the DM, MD, IM and MI groups, any significant development from the pretest scores was then observed by pairwise contrasts. The analysis indicated that their scores on the immediate posttest and the one-week delayed posttest were significantly higher than the pretest scores ($p < .05$). Comparing the pretest scores and the one-month delayed posttest scores, the analysis revealed that only DM, MD, and IM groups’ scores were significantly higher than their pretest scores ($p < .05$), and this was not the case for the MI group ($p > .05$). These results indicate that only DM, MD and IM learners were able to maintain their significant development on the GJT over a month.

The main effect of Group was further investigated by Bonferroni post-hoc pairwise comparisons. The results of the post-hoc pairwise comparisons indicated that the DM, DM, IM and MI groups significantly outperformed the control group on the immediate posttest and the one-month delayed posttests ($p < .05$). The DM and IM groups significantly outperformed the controls ($p < .05$) on the one-week delayed posttest. The M group never outperformed the control group on any posttest ($p > .05$). The results suggest that only those groups that were instructed in a combination of FFI and MFI were able to outperform the control group significantly. The same learning effect was not found in the M group, which was taught exclusively by the MFI method.
**Summary of Results.** The overall analyses for the GJT performances found that all experimental groups that did or did not receive FFI (i.e., DM, MD, IM, MI, M) performed significantly above chance on all posttests. This indicates that learning could take place through simple exposure through MFI. However, the DM, MD, IM, and MI groups’ significant development in the short term and the long term and their distinguishable performance from the control group’s suggest that inclusion of FFI in a primarily MFI method facilitated accurate performance on the GJT.

**Oral Elicited Imitation**

A one-way ANOVA and a one-sample $t$-test were run for the pretest accuracy rates to examine if there was any significant between-subjects difference or a significant difference from a 50% chance level prior to the treatment. The one-way ANOVA on the pretest scores found no significant group difference, $F(5, 80) = .949, p > .05, \eta_p^2 = .056$, and the one-sample $t$-test showed that none of the groups performed significantly above chance on the OEIT pretest. All groups performed significantly below chance (DM, $t(14) = -6.218, p < .05$; MD, $t(12) = -6.058, p < .05$; IM, $t(13) = -8.471, p < .05$; MI, $t(13) = -9.154, p < .05$; M, $t(14) = -10.766, p < .05$; Control, $t(14) = -9.992, p < .05$). As a result, development of all groups can be attributed to the effect of instructional treatment.

The accuracy rates on the OEIT were analyzed across all groups (i.e., DM, MD, IM, MI, M, and control) and four test sessions (i.e., pretest, immediate posttest, one-week delayed posttest, one-month delayed posttest). The descriptive statistics (Table 14 and Figure 12) illustrate that all groups gained higher scores on the posttests than the pretest. However, the one-sample $t$-tests on the mean accuracy rates indicated that none of the groups performed significantly above chance on the immediate posttest (DM, $t(14) = .478, p > .05$; MD, $t(12) = -
1.863, \( p > .05 \); IM, \( t(13) = -1.104, p > .05 \); MI, \( t(13) = -2.295, p < .05 \); M, \( t(14) = -5.215, p < .05 \); Control, \( t(14) = -5.436, p < .05 \), one-week delayed posttest (DM, \( t(14) = .723, p > .05 \); MD, \( t(12) = -1.014, p > .05 \); IM, \( t(13) = 1.554, p > .05 \); MI, \( t(13) = -1.018, p > .05 \); M, \( t(14) = -5.215, p < .05 \); Control, \( t(14) = -4.715, p < .05 \), and one-month delayed posttest (DM, \( t(14) = 1.601, p > .05 \); MD, \( t(12) = .457, p > .05 \); IM, \( t(13) = .423, p > .05 \); MI, \( t(13) = .419, p > .05 \); M, \( t(14) = -.586, p > .05 \); Control, \( t(14) = -4.375, p < .05 \). The participants’ low accuracy scores and high standard deviations on the OEIT seem to be attributable to higher task complexity. According to Robinson (2001), task complexity can increase when a task involves greater demands on attention and working memory due to limited planning time (± planning), no prior knowledge (± prior knowledge), and engagement in more than one task at the same time (± single task). In the OEIT, learners are asked to complete multiple sub-tasks (e.g., reading visual input, listening, memorizing and correcting auditory input) (± single task) as fast as they can (± planning); these two factors create greater demands on attention and working memory during task completion, which may eventually increase task complexity.

Table 14

<table>
<thead>
<tr>
<th></th>
<th>Pretest</th>
<th>Immediate</th>
<th>1 Week</th>
<th>1 Month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>DM (( n = 15 ))</td>
<td>21.67**</td>
<td>17.41</td>
<td>46.73</td>
<td>26.45</td>
</tr>
<tr>
<td>MD (( n = 13 ))</td>
<td>21.62**</td>
<td>16.89</td>
<td>39.23</td>
<td>20.84</td>
</tr>
<tr>
<td>IM (( n = 14 ))</td>
<td>19.93**</td>
<td>13.28</td>
<td>45.07</td>
<td>16.70</td>
</tr>
<tr>
<td>MI (( n = 14 ))</td>
<td>13.50**</td>
<td>14.91</td>
<td>37.79*</td>
<td>19.92</td>
</tr>
<tr>
<td>M (( n = 15 ))</td>
<td>13.73**</td>
<td>13.04</td>
<td>31.67**</td>
<td>13.62</td>
</tr>
<tr>
<td>Control (( n = 15 ))</td>
<td>19.80**</td>
<td>11.70</td>
<td>25.60**</td>
<td>17.39</td>
</tr>
</tbody>
</table>
Significance from chance: * $p < .05$. ** $p < .001$.

Figure 12. Accuracy rate (%) on all items in OEIT

A mixed ANOVA was performed for the OEIT data with Time as a within-subjects variable and Group as a between-subjects variable. A four (Time: pretest, immediate, one-week delayed, and one-month delayed posttest) x six (Group: DM, MD, IM, MI, M, control) ANOVA was thus carried out for the OEIT accuracy rates. In this analysis, the assumption of sphericity ($p < .05$) was violated, so the Greenhouse-Geisser correction was made to the degrees of freedom. The mixed ANOVA revealed a significant main effect for Time, $F(2.505, 197.864) = 86.658, p < .001$, $\eta^2_p = .523$, for Group, $F(5, 79) = 2.908, p < .05$, $\eta^2_p = .155$, and for the Time x Group interaction, $F(12.523, 197.864) = 2.816, p < .05$, $\eta^2_p = .151$.

A repeated-measures ANOVA was conducted to observe the locus of the significant main effect for Time. A significant difference was found in the performances of all experimental groups: the DM group, $F(3, 42) = 23.242, p < .001$, $\eta^2_p = .624$; the MD group, $F(3, 33) = 14.444$,
The analysis for the OEIT across Time indicated that a significant improvement may be present in the posttest scores. Compared to the pretest scores, (1) all mixed-method experimental groups (i.e., DM, MD, IM, MI) as well as the M group scored significantly higher on all posttests. Therefore, the results of the OEIT performances indicate that learning could take place through a simple exposure to L2, without FFI. However, in the further analysis, (2) only the DM group outperformed the control group significantly across all posttests, and (3) a similar result was found which the IM group on the one-week delayed posttest but not
on the immediate and one-month delayed posttests. Thus, the analyses suggest that the addition of FFI to MFI may facilitate learners’ performance on the OEIT more effectively, especially when FFI is provided in a deductive way prior to MFI.

**Metalinguistic Knowledge**

Only the learners’ performance on the ungrammatical items was analyzed in this section. There were four ungrammatical sentences in each test, so the maximum achievable score was four points and the minimum was zero. In this analysis, gaining four points was considered an indication of reliable metalinguistic knowledge on the target rules. The frequency analysis for the learners’ overall performance on the MKT (Table 15) indicated that the majority of learners gained zero point on the pretest, suggesting that they had no prior metalinguistic knowledge before instruction. The frequency analysis for the immediate posttests found that most of the DM, MD, IM, and MI participants were able to analyze ungrammatical items correctly and gain the full four points on the test. Considering that none of the M learners gained four points on the same items, the superior performance of the DM, MD, IM and MI groups is attributed to FFI instruction provided deductively or inductively. The impact of deductive and inductive FFI was sustained over a week and a month as shown by the number of learners who gained full points in both the one-week and one-month delayed posttests. Among the four mixed-method groups, more of the DM participants gained the maximum points on the one-week posttest (9 participants) and one-month delayed posttest (8 participants) than the MD, IM, and MI participants. No clear learning effect in metalinguistic knowledge was found for the M group or the control group across the delayed posttests.

Table 15

*Number of learners who gained all possible points on all ungrammatical items*
Performance on Simple vs. Complex Targets

Grammaticality Judgment

For this section, the learners’ GJT scores were analyzed by target complexity (i.e., simple target versus complex target) as an independent variable. First of all, the learners’ prior GJT performances on the simple target and the complex target were observed by a one-way ANOVA and a one-sample t-test. The one-way ANOVA found no significant between-group difference either for the simple target, $F(5, 80) = 1.430, p > .05, \eta^2 = .076$, or for the complex target, $F(5, 80) = 1.438, p > .05, \eta^2 = .032$. In the analyses using the one-sample t-test, IM, $t(13) = 1.274, p < .05$, and M, $t(14) = 2.860, p < .05$, appeared to perform significantly above chance on the simple target while other groups did not (DM, $t(14) = -.193, p > .05$; MD, $t(12) = .267, p > .05$; MI, $t(13) = 1.274, p > .05$; Control, $t(14) = -.823, p > .05$). The issues related to the IM and M groups’ distinguishable performances on the simple items are addressed in the following section.

In terms of the learners’ performances on the complex target, all of the groups scored significantly higher than the 50% chance level (DM, $t(14) = -.193, p > .05$; MD, $t(12) = -.2934, p < .05$; IM, $t(13) = -2.515, p < .05$; MI, $t(13) = -.125, p > .05$; M, $t(14) = .337, p < .05$; Control, $t(14) = -2.044, p > .05$).
**Simple Target.** The descriptive statistics (Table 16 and Figure 13) showed that all groups scored higher on the posttests than the pretest. The one-sample t-tests showed that all experimental groups performed significantly above chance on the simple target in the immediate posttest (DM, $t(14) = 4.550, p < .05$; MD, $t(12) = 5.494, p < .05$; IM, $t(13) = 4.133, p < .05$; MI, $t(13) = 4.346, p < .05$; M, $t(14) = 3.740, p < .05$), the one-week delayed posttest (DM, $t(14) = 6.994, p < .05$; MD, $t(12) = 3.201, p < .05$; IM, $t(13) = 5.879, p < .05$; MI, $t(13) = 3.775, p < .05$; M, $t(14) = 4.612, p < .05$), and the one-month delayed posttest (DM, $t(14) = 4.157, p < .05$; MD, $t(12) = 5.445, p < .05$; IM, $t(13) = 3.229, p < .05$; MI, $t(13) = 2.689, p < .05$; M, $t(14) = 2.293, p < .05$). The control group did not significantly outperform the chance level on the immediate posttest, $t(14) = -.150, p > .05$, the one-week delayed posttest, $t(14) = 1.685, p > .05$, and the one-month delayed posttest, $t(14) = -1.209, p > .05$.

Table 16

Mean accuracy rate (%) and standard deviation (SD) value on simple items in GJT

<table>
<thead>
<tr>
<th></th>
<th>Pretest</th>
<th>Immediate</th>
<th>1 Week</th>
<th>1 Month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>DM ($n = 15$)</td>
<td>54.47</td>
<td>22.04</td>
<td>74.47**</td>
<td>20.82</td>
</tr>
<tr>
<td>MD ($n = 13$)</td>
<td>51.23</td>
<td>16.61</td>
<td>75.31**</td>
<td>16.61</td>
</tr>
<tr>
<td>IM ($n = 14$)</td>
<td>59.50*</td>
<td>14.77</td>
<td>73.21*</td>
<td>21.01</td>
</tr>
<tr>
<td>MI ($n = 14$)</td>
<td>55.29</td>
<td>15.52</td>
<td>74.50*</td>
<td>21.09</td>
</tr>
<tr>
<td>M ($n = 15$)</td>
<td>60.60*</td>
<td>14.35</td>
<td>63.13*</td>
<td>13.60</td>
</tr>
<tr>
<td>Control ($n = 15$)</td>
<td>46.00</td>
<td>18.82</td>
<td>49.47</td>
<td>13.81</td>
</tr>
</tbody>
</table>

Significance from chance: * $p < .05$. ** $p < .001$.  

*Figure 13. Accuracy rate (%) on simple items in GJT*
Next, a mixed ANOVA was run for the simple rule with Time as a within-subject variable and Group as a between-subjects variable. Thus, a four (Time: pretest, immediate, one-week delayed, and one-month delayed posttest) x six (Group: DM, MD, IM, MI, M, control) ANOVA was carried out for the GJT accuracy rates on the simple target. In the analyses for the simple rule, the assumption of sphericity ($p < .05$) was violated, so the Greenhouse-Geisser correction was made to the degrees of freedom. The mixed ANOVA revealed a significant main effect for Time, $F(2.542, 203.390) = 18.465, p < .001, \eta_p^2 = .188$, and for Group, $F(5, 80) = 5.771, p < .001, \eta_p^2 = .265$, but no significant Time x Group interaction effect, $F(12.712, 161.946) = 1.259, p > .05, \eta_p^2 = .073$.

A repeated-measures ANOVA was then performed for the groups’ gain scores on the simple rule in the GJT. A significant Time difference was found in the performance of four mixed-method groups: DM, $F(1.512, 21.172) = 5.897, p < .05, \eta_p^2 = .296$; MD, $F(1.765, 21.175) = 6.370, p < .05, \eta_p^2 = .347$; IM, $F(3, 39) = 4.112, p < .05, \eta_p^2 = .240$; and MI, $F(3, 39) = 4.049, p < .05, \eta_p^2 = .237$. On the other hand, a significant main effect for Time was not found for the M
group, $F(1.925, 26.950) = 1.218, p > .05, \eta^2_p = .080$, and the control group, $F(2.234, 31.273) = 1.266, p > .05, \eta^2_p = .083$. Further pairwise contrasts computed that all four mixed-method groups (i.e., DM, MD, IM, and MI) showed significant improvement on the immediate posttest ($p < .05$). Among them, the DM, IM, and MI groups maintained the significant improvement over one week ($p < .05$). However, for the one-month delayed posttest, all four mixed-method groups (i.e., DM, MD, IM, and MI) once again showed significant development compared to the pretest ($p < .05$). The results indicate that inclusion of an FFI method would positively impact initial and long-term development of linguistic knowledge for judging grammaticality of a simple L2 target.

The locus of the main effect for Group on the simple target was investigated by Bonferroni pairwise comparisons. On the immediate posttest, only the mixed-method groups (i.e., DM, MD, IM, and MI) outperformed the control group ($p < .05$). This pattern was maintained over a week and a month ($p < .05$). On the other hand, the M group never outperformed the control group ($p > .05$). These results suggest that an incorporated use of FFI and MFI would result in more substantial learning effects than an exclusive use of MFI in the short-term and in the long-term.

**Complex Target.** The descriptive statistics (Table 17 and Figure 14) for learners’ performance on the complex target in the GJT found higher accuracy rates on the posttests than the pretest. The one-sample $t$-test revealed that all experimental groups (i.e., DM, MD, IM, MI, and M) performed significantly above chance immediately after the instructional treatment (DM, $t(14) = 3.302, p < .05$; MD, $t(12) = 3.940, p < .05$; IM, $t(13) = 3.742, p < .05$; MI, $t(13) = 3.087, p < .05$; M, $t(14) = 2.453, p < .05$), but only three of them (i.e., MD, IM, and MI) sustained the knowledge over a week (MD, $t(12) = 4.071, p < .05$; IM, $t(13) = 3.382, p < .05$; MI, $t(13) =$
2.723, \( p < .05 \) and only two of them (i.e., DM and MD) over a month (DM, \( t(14) = 3.038, p < .05 \); MD, \( t(12) = 3.072, p < .05 \)). The DM and M groups’ performances on the complex targets were not sustained over a week (DM, \( t(14) = 1.834, p > .05 \); M, \( t(14) = .213, p > .05 \)). The same pattern in the loss of knowledge was observed in the IM, MI, and M groups (IM, \( t(13) = 1.049, p > .313 \); MI, \( t(13) = 1.017, p > .05 \); M, \( t(14) = .843, p > .05 \)). The control group’s performances were not statistically significantly different from chance on the immediate posttest, \( t(14)= .552, p > .05 \), one-week delayed posttest, \( t(14)= .380, p > .05 \), and the one-month delayed posttest, \( t(14)= -1.423, p > .05 \).

Table 17

<table>
<thead>
<tr>
<th>Group</th>
<th>Pretest</th>
<th>Immediate</th>
<th>1 Week</th>
<th>1 Month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>DM (n = 15)</td>
<td>46.53</td>
<td>14.70</td>
<td>65.07*</td>
<td>17.66</td>
</tr>
<tr>
<td>MD (n = 13)</td>
<td>41.69*</td>
<td>10.20</td>
<td>65.31*</td>
<td>14.00</td>
</tr>
<tr>
<td>IM (n = 14)</td>
<td>44.00*</td>
<td>8.92</td>
<td>62.64*</td>
<td>12.64</td>
</tr>
<tr>
<td>MI (n = 14)</td>
<td>49.57</td>
<td>12.84</td>
<td>65.50*</td>
<td>18.78</td>
</tr>
<tr>
<td>M (n = 15)</td>
<td>51.07</td>
<td>12.25</td>
<td>58.33*</td>
<td>13.15</td>
</tr>
<tr>
<td>Control (n = 15)</td>
<td>41.13</td>
<td>16.79</td>
<td>52.33</td>
<td>16.36</td>
</tr>
</tbody>
</table>

Significance from chance: * \( p < .05 \). ** \( p < .001 \).

*Figure 14. Accuracy rate (%) on complex items in GJT*
Next, a mixed ANOVA was run for the complex rule with Time as a within-subject variable and Group as a between-subject variable. Thus, a four (Time: pretest, immediate, one-week delayed, and one-month delayed posttest) x six (Group: DM, MD, IM, MI, M, control) ANOVA was carried out for the complex target. In the analyses of the complex rule, the assumption of sphericity ($p < .05$) was violated, so the Greenhouse-Geisser correction was made to the degrees of freedom. The mixed ANOVA found a significant main effect for Time, $F(2.761, 220.906) = 19.477, p < .001, \eta^2_p = .196$, and for Group, $F(5, 80) = 3.532, p < .05, \eta^2_p = .265$, but no significant interaction effect for Time x Group, $F(13.807, 220.906) = 1.579, p > .05, \eta^2_p = .073$.

A repeated-measures ANOVA was then performed for the learners’ scores on the complex target. The analyses found a main effect for Time for the DM group, $F(3, 42) = 5.103, p < .05, \eta^2_p = .267$; the MD group, $F(3, 36) = 10.485, p < .001, \eta^2_p = .466$; and the IM group, $F(3, 39) = 5.641, p < .05, \eta^2_p = .303$. On the other hand, a main effect for Time was not statistically significant for the MI group, $F(3, 39) = 2.548, p > .05, \eta^2_p = .164$; for the M group, $F(2.157,
The test of within-subjects contrasts indicated that the DM group and the MD group showed statistically significant improvement not only immediately after the treatment \( (p < .05) \) but also over a week \( (p < .05) \) and a month \( (p < .05) \). In the case of the MI group, the contrasts showed that they significantly improved immediately after the treatment \( (p < .05) \) and this was sustained over a week \( (p < .05) \). However, the improvement was not maintained over a month \( (p > .05) \). The analyses thus suggest that, while the benefits of FFI can be found generally, deductive FFI could enhance acquisition of grammatical knowledge on a complex L2 target more effectively both immediately and over time.

The locus of the main effect of Group for the complex rule was also investigated by Bonferroni pairwise comparisons. The Bonferroni pairwise comparisons did not detect a noticeable result after one week. However, after one month, it was found that the mixed-method groups that received a deductive type of FFI in addition to MFI (i.e., DM and MD) significantly outperformed the control group \( (p < .05) \). The results of all other experimental groups (i.e., IM, MI, and M) remained indistinguishable from those of the control group \( (p > .05) \). Therefore, the GJT performances of the DM and the MD groups support the suggestion that a deductive type of FFI would show greater benefits when the target form is more complex.

**Summary of Results.** The separate analyses of the learner performances on the simple versus complex targets illustrated that relative effectiveness of FFI and MFI would be influenced by the target complexity. In the analyses of learners’ performance on the simple target, it was found that (1) like the mixed-method learners, the M learners were able to perform significantly above chance, but (2) only the mixed-method learners’ performances were only statistically distinguishable from the control group. Also, the analysis revealed that (3) significant
improvement between pre and posttests only appeared in the mixed-method groups and (4) the significant development was sustained over a week and a month successfully. Thus, the results suggest that FFI, regardless of its types and timing, can offer more substantial effects for learners’ GJT performance.

In the analyses for learners’ performances on the complex target, the study found that (1) only the mixed-method groups who were instructed in the deductive type of FFI (i.e., DM, MD) sustained the immediate significant improvement over a week and a month. Also, (2) the performances of these groups were statistically higher than the control group’s and (3) the performance of all other groups (i.e., IM, MI and M) on the complex rule was not statistically different from the controls or was not sustained longer. Therefore, the results of the study suggest that learners’ GJT performance on complex rules would be benefited more effectively from the deductive type of FFI than from the inductive type. Timing of deductive FFI did not appear to be influential in this context.

**Oral Elicited Imitation**

A one-way ANOVA and a one-sample t-test were run for the pretest accuracy rates to examine if there was any significant between-subjects difference or a significant difference from a 50% chance level prior to the treatment. First, the one-way ANOVA found no significant group-difference on the simple rule, \( F(5, 80) = 1.308, p > .05, \eta^2_p = .076 \), or on the complex rule, \( F(5, 80) = .538, p > .05, \eta^2_p = .032 \), in the OEIT pretest. The one-sample t-test revealed that all groups performed significantly below chance on the simple target (DM, \( t(14) = -4.679, p < .05; \) MD, \( t(12) = -3.967, p < .05; \) IM, \( t(13) = -4.428, p < .05; \) MI, \( t(13) = -7.471, p < .05; \) M, \( t(14) = -6.997, p < .05; \) Control, \( t(14) = -5.662, p < .05 \)) and the complex target (DM, \( t(14) = -6.562, p < .05; \) MD, \( t(12) = -7.862, p < .05; \) IM, \( t(13) = -11.635, p < .05; \) MI, \( t(13) = -10.218, p < .05; \) M,
\( t(14) = -10.703, p < .05; \) Control, \( t(14) = -12.573, p < .05 \). As a result, any development found in the posttests can be attributed to the effect of instructional treatment.

**Simple Target.** The descriptive statistics (Table 18 and Figure 15) illustrate that all groups gained higher scores on the posttests than on the pretest. The one-sample \( t \)-test found that no groups performed significantly above chance on the immediate posttest (DM, \( t(14) = -.095, p > .05 \); MD, \( t(12) = -1.502, p < .05 \); IM, \( t(13) = -.904, p < .05 \); MI, \( t(13) = -1.595, p < .05 \); M, \( t(14) = -3.038, p > .05 \); Control, \( t(14) = -3.956, p > .05 \)). In the one-week delayed posttest, the analysis showed that the DM group, \( t(14) = 2.127, p < .05 \), and the IM group, \( t(13) = 2.696, p < .05 \), performed significantly above chance while the other experimental groups (MD, \( t(12) = .080, p > .05 \); MI, \( t(13) = 2.696, p > .05 \); M, \( t(14) = -1.069, p > .05 \)) and the control group, \( t(14) = -4.424, p > .05 \), did not. As for the one-month delayed posttest, the one-sample \( t \)-test revealed that the DM group performed significantly above chance, \( t(14) = 2.543, p < .05 \), whereas the other groups’ performances (MD, \( t(12) = 1.802, p < .05 \); IM, \( t(13) = 1.145, p < .05 \); MI, \( t(13) = .966, p < .05 \); M, \( t(14) = .960, p > .05 \); Control, \( t(14) = -2.460, p > .05 \)) were indistinguishable from the chance level.

<table>
<thead>
<tr>
<th></th>
<th>Pretest</th>
<th>Immediate</th>
<th>1 Week</th>
<th>1 Month</th>
</tr>
</thead>
<tbody>
<tr>
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<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>DM</td>
<td>27.77**</td>
<td>18.82</td>
<td>49.36</td>
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<tr>
<td>MD</td>
<td>25.62**</td>
<td>22.16</td>
<td>41.00</td>
<td>21.60</td>
</tr>
<tr>
<td>IM</td>
<td>28.57*</td>
<td>18.11</td>
<td>46.50</td>
<td>14.49</td>
</tr>
<tr>
<td>MI</td>
<td>15.50**</td>
<td>17.28</td>
<td>41.00</td>
<td>21.12</td>
</tr>
<tr>
<td>M</td>
<td>17.13**</td>
<td>18.19</td>
<td>35.00*</td>
<td>19.12</td>
</tr>
</tbody>
</table>

Table 18

*Mean accuracy rate (%) and standard deviation (SD) value on simple items in OEIT*
Control ($n = 15$) 26.13** 16.33 28.93* 20.62 28.40* 18.91 34.33* 24.67
Significance from chance: * $p < .05$. ** $p < .001$.

**Figure 15.** Accuracy rate (%) on simple items in OEIT

Next, a mixed ANOVA was run for the simple target with Time as a within-subject variable and Group as a between-subject variable. Thus, a four (Time: pretest, immediate, one-week delayed, and one-month delayed posttest) x six (Group: DM, MD, IM, MI, M, control) ANOVA was carried out for the OEIT accuracy rates on the simple rule. The assumption of sphericity ($p < .05$) was violated in the analysis for the simple rule, so the Greenhouse-Geisser correction was made to the degrees of freedom. The mixed ANOVA revealed a significant main effect for Time, $F(2.577, 203.544) = 69.962, p < .001, \eta^2_p = .470$, and for Group, $F(5, 79) = 2.854, p < .05, \eta^2_p = .153$, and a significant interaction effect for Time x Group, $(12.883, 203.544) = 2.688, p < .05, \eta^2_p = .145$. 

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In order to observe the locus of the significant main effect for Time, the repeated-measures ANOVA was then carried out for the gain scores on the simple target. A significant Time difference was found in the performance of all experimental groups: the DM group, $F(3, 42) = 23.144, p < .001, \eta_p^2 = .623$; the MD group, $F(3, 33) = 12.115, p < .001, \eta_p^2 = .524$; the IM group, $F(3, 39) = 12.704, p < .001, \eta_p^2 = .494$; the MI group, $F(3, 39) = 14.105, p < .001, \eta_p^2 = .520$; and the M group, $F(1.839, 25.745) = 15.657, p < .001$. The analysis of pairwise contrasts revealed that all experimental groups (i.e., DM, MD, IM, MI, and M) gained significantly higher accuracy rates on the immediate posttest, one-week delayed posttest, and one-month delayed posttest than on the pretest scores ($p < .05$). These results indicate that all of the experimental groups improved significantly after the treatment and the significant improvement was sustained over a week and a month. On the other hand, a significant main effect for Time was not found for the control group, $F(3, 42) = 1.265, p > .05, \eta_p^2 = .083$. The posttest scores of the control group were not distinguishable from their pretest scores.

The main effect for Group was then further investigated by Bonferroni post-hoc pairwise comparisons. Whereas no significant group difference was found in the immediate posttest scores, the analysis detected between-group differences in their one-week and one-month delayed posttest scores. For example, the DM group and the IM group outperformed the control group ($p < .05$) significantly on the one-week delayed posttest. Between these two groups, only the DM group’s scores remained significantly better than the control group’s ($p < .05$) on the one-month delayed posttest. No other experimental group gained significantly higher scores than the control group ($p > .05$) on the posttests. Thus, the analyses indicate that both deductive and inductive FFI may have positively affected learners’ performance on the simple target in the OEIT when they were provided prior to MFI. However, the DM group’s longer retention of
significant improvement suggests that FFI of the deductive type would support long-term
learning effects more effectively than the inductive type.

**Complex Target.** The descriptive statistics (Table 19 and Figure 15) show that all groups
scored higher on the posttests than on the pretests. However, none of the groups were found to
perform significantly above chance across all posttests (DM, $t(14) = -6.562, p < .05$; MD, $t(12) =
-7.862, p < .05$; IM, $t(13) = -11.635, p < .05$; MI, $t(13) = -10.218, p < .05$; M, $t(14) = -10.703, p
< .05$; Control, $t(14) = -12.573, p < .05$). As with the previous analyses, with the complex target,
the performance of the control group again appeared to be always significantly below chance
across all posttests.

Table 19

*Mean accuracy rate (%) and standard deviation (SD) value on complex items in OEIT*

<table>
<thead>
<tr>
<th>Group</th>
<th>Pretest</th>
<th>Immediate</th>
<th>1 Week</th>
<th>1 Month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>DM ($n = 15$)</td>
<td>17.07**</td>
<td>20.03</td>
<td>43.91</td>
<td>33.49</td>
</tr>
<tr>
<td>MD ($n = 13$)</td>
<td>17.23**</td>
<td>15.03</td>
<td>37.08</td>
<td>25.53</td>
</tr>
<tr>
<td>IM ($n = 14$)</td>
<td>11.29**</td>
<td>12.45</td>
<td>43.36</td>
<td>25.79</td>
</tr>
<tr>
<td>MI ($n = 14$)</td>
<td>11.36**</td>
<td>14.15</td>
<td>34.57*</td>
<td>26.40</td>
</tr>
<tr>
<td>M ($n = 15$)</td>
<td>9.93**</td>
<td>14.50</td>
<td>28.40**</td>
<td>13.24</td>
</tr>
<tr>
<td>Control ($n = 15$)</td>
<td>13.40**</td>
<td>11.27</td>
<td>22.13**</td>
<td>18.54</td>
</tr>
</tbody>
</table>

Significance from chance: * $p < .05$. ** $p < .001$.

*Figure 15. Accuracy rate (%) on complex items in OEIT*
Next, a mixed ANOVA was run for the complex rule with Time as a within-subject variable and Group as a between-subject variable. Thus, a four (Time: pretest, immediate, one-week delayed, and one-month delayed posttest) x six (Group: DM, MD, IM, MI, M, control) ANOVA was carried out for the complex rule. In this analysis, the assumption of sphericity ($p < .05$) was violated, so the Greenhouse-Geisser correction was made to the degrees of freedom. The mixed ANOVA found a significant main effect for Time, $F(2.712, 214.264) = 49.269, p > .05$, $\eta^2_p = .384$, but no main effect for Group $F(5, 79) = 2.177, p > .05$, $\eta^2_p = .121$, and again, no significant interaction effect for Time x Group, $F(13.619, 214.264) = 1.624, p > .05$, $\eta^2_p = .093$.

A repeated-measures ANOVA was then carried out for the learners’ gain scores on the complex target. The main effect for Time was found to be significant for all experimental groups: DM, $F(3, 42) = 11.860, p < .001$, $\eta^2_p = .459$; MD, $F(3, 33) = 6.959, p < .05$, $\eta^2_p = .388$; IM, $F(3, 39) = 12.658, p < .001$, $\eta^2_p = .493$; MI, $F(3, 39) = 10.039, p < .001$, $\eta^2_p = .436$; and M, $F(3, 42) = 8.623, p < .001$, $\eta^2_p = .381$. In contrast, no significant main effect for Time was found in the control group, $F(3, 42) = 2.298, p > .05$, $\eta^2_p = .141$. The test of within-subjects contrasts
indicated that all experimental groups (i.e., DM, MD, IM, MI, and M) improved significantly from the pretest to all three posttests (i.e., immediate, one-week, and one-month delayed posttests) \((p < .05)\).

The locus of the main effect for Group on the complex rule was also investigated by Bonferroni pairwise comparisons. The Bonferroni pairwise comparisons found that the IM group significantly outperformed the control group \((p < .05)\) on the one-week posttest. No other comparison between any two groups at any moment of testing reached a significant level \((p > .05)\). Therefore, the analyses show that inductive FFI offered prior to MFI aided learners’ performance on the complex target in the OEIT the most effectively over time.

**Summary of Results.** The analyses for the simple target and the complex target found that (1) although all experimental groups showed significant development from the pretest to the immediate posttest and two delayed posttests, (2) only those groups who received either a deductive or an inductive type of FFI prior to MFI (i.e., DM or IM) outperformed the control group significantly. For example, for the simple target, the DM group and the IM group performed significantly better than the control group on the one-week delayed posttest, and the DM group sustained this over a month. As for the complex rule, only the IM group outperformed the control group significantly on the one-week delayed posttest. Therefore, the data suggest that early provision of FFI was more beneficial for learner performance on the OEIT.

**Metalinguistic Knowledge**

Learners’ performances on only the simple ungrammatical sentences and the complex ungrammatical sentences are analyzed in this section. There were two simple/complex ungrammatical items in each test, so the available maximum gain scores were two points and the
minimum was zero. Therefore, when learners gained two points on the test, it was considered an indication of reliable metalinguistic knowledge on the simple/complex target rules.

**Simple Target.** The frequency analysis for the simple ungrammatical items (Table 20) showed that most experimental groups participated in the pretest with no prior knowledge of the target rules; the majority of learners scored zero on the pretest. Immediately after the instruction, the DM, MD, IM and MI participants tended to gain perfect scores on the simple ungrammatical items (DM = 11; MD = 7; IM = 8; MI = 12) while only one participant in the M group gained the maximum scores. The reliable metalinguistic knowledge of the mixed-method learners was successfully sustained over a week (DM = 12; MD = 12; IM = 11; MI = 11) and over a month (DM = 11; MD = 11; IM = 12; MI = 9). However, the frequency analysis found that the number of M learners who acquired full points on the simple ungrammatical items increased to eight after a week. This trend was maintained over a month (M = 7). Although the number of M group participants who showed reliable metalinguistic knowledge was still lower than in the mixed-method groups, improvement of the M learners over a month indicates that acquisition of explicit metalinguistic knowledge can also take place without the aid of explicit FFI when the rules are simple. The control participants did not show clear evidence of reliable metalinguistic knowledge over time.

Table 20

*Number of learners who gained all possible points on simple ungrammatical items*

<table>
<thead>
<tr>
<th></th>
<th>Pretest</th>
<th>Immediate</th>
<th>1 Week</th>
<th>1 Month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>DM</td>
<td>12</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IM</td>
<td>11</td>
<td>1</td>
<td>1</td>
<td>2</td>
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</table>
Complex Target. The frequency analysis for the complex ungrammatical sentences (Table 21) revealed that all of the learners participated in the experiment without any prior knowledge on the complex targets; no learners gained the full two points on the MKT pretest. The number of mixed-method participants who acquired full points on the immediate posttest (DM = 11; MD = 8; IM = 8; MI = 8), the one-week delayed posttest (DM = 10; MD = 6; IM = 6; MI = 7), and the one-month delayed posttest (DM = 9; MD = 7; IM = 6; MI = 6) suggested that the FFI method may have positively affected acquisition of metalinguistic knowledge on the complex rule. The M participants showed no gain in reliable metalinguistic knowledge on the complex rule across the immediate posttest (M = 0), the one-week delayed posttest (M = 1), and one-month delayed posttest (M = 0), confirming that FFI is likely to affect acquisition of metalinguistic knowledge on L2 rules positively, and its impact would be greater when the target rules are more complex. No indication of learning was observed among the control participants.

Table 21

<table>
<thead>
<tr>
<th></th>
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<th>1 Week</th>
<th>1 Month</th>
</tr>
</thead>
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</tr>
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<td>IM</td>
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<td>2</td>
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<tr>
<td>Control</td>
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<td>14</td>
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</table>
Performance on Familiar vs. Unfamiliar Items

Grammaticality Judgment

In this section, learners’ performances are analyzed with familiarity of items (i.e., familiar items versus unfamiliar items) as an independent variable. In order to detect any significant between-subjects difference or significant difference from a chance level (i.e., 50%) before instructional treatment, a one-way ANOVA and a one-sample t-test were carried out for the learners’ performances on the familiar items and the unfamiliar items in the GJT pretest. The one-way ANOVA for the familiar items found a significant between group difference, $F(5, 80) = 2.539, p < .05, \eta^2_p = .091$. However, Bonferroni post-hoc pairwise comparisons revealed that the performances of any two groups were not significantly different from each other ($p > .05$). The one-sample t-test found none of the groups performed significantly above chance on the familiar items (DM, $t(14) = -1.275, p > .05$; MD, $t(12) = -2.237, p < .05$; IM, $t(13) = .916, p > .05$; MI, $t(13) = .771, p > .05$; M, $t(14) = .115, p > .05$; Control, $t(14) = -2.576, p < .05$). In terms of the unfamiliar items, the one-way ANOVA found no significant between-group difference, $F(5, 80) = 1.614, p > .05, \eta^2_p = .026$. The performances of all groups except for the M group ($t(14) = 2.309, p > .05$) appeared to be statistically indistinguishable from the chance level (DM, $t(14) = 1.469, p > .05$; MD, $t(12) = .000, p > .05$; IM, $t(13) = .669, p > .05$; MI, $t(13) = 1.056, p > .05$; Control, $t(14) = 2.802, p > .05$).

Familiar Items. The descriptive statistics (Table 22 and Figure 16) show that all groups gained higher scores on the posttests than on the pretest. Also, the one-sample t-tests showed that all experimental groups performed significantly above chance on the immediate posttest (DM, $t(14) = 4.845, p < .05$; MD, $t(12) = 5.395, p < .05$; IM, $t(13) = 4.443, p < .05$; MI, $t(13) = 3.590$, 

$p < .05$; $M, t(14) = 1.619, p < .05$, the one-week delayed posttest ($DM, t(14) = 3.129, p < .05$; $MD, t(12) = 4.119, p < .05$; $IM, t(13) = 4.320, p < .05$; $MI, t(13) = 2.887, p < .05$; $M, t(12) = 3.705, p < .05$), and the one-month delayed posttest ($DM, t(14) = 3.645, p < .05$; $MD, t(12) = 4.983, p < .05$; $IM, t(13) = 3.988, p < .05$; $MI, t(13) = 2.548, p < .05$; $M, t(14) = 2.352, p < .05$).

The control group did not show significantly above chance performance across the immediate posttest, $t(14) = .210, p > .05$, the one-week delayed posttest, $t(14) = .484, p > .05$, and the one-month delayed posttest, $t(14) = -1.382, p > .05$.

Table 22

*Mean accuracy rate (%) and standard deviation (SD) value on familiar items in GJT*

<table>
<thead>
<tr>
<th></th>
<th>Pretest</th>
<th>Immediate</th>
<th>1 Week</th>
<th>1 Month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>DM ($n = 15$)</td>
<td>45.60</td>
<td>13.36</td>
<td>69.53**</td>
<td>15.61</td>
</tr>
<tr>
<td>MD ($n = 13$)</td>
<td>43.00*</td>
<td>11.28</td>
<td>70.38**</td>
<td>13.62</td>
</tr>
<tr>
<td>IM ($n = 14$)</td>
<td>52.43</td>
<td>9.92</td>
<td>65.50*</td>
<td>13.05</td>
</tr>
<tr>
<td>MI ($n = 14$)</td>
<td>52.36</td>
<td>11.44</td>
<td>68.29*</td>
<td>19.06</td>
</tr>
<tr>
<td>M ($n = 15$)</td>
<td>50.40</td>
<td>13.48</td>
<td>57.13*</td>
<td>17.06</td>
</tr>
<tr>
<td>Control ($n = 15$)</td>
<td>39.47*</td>
<td>15.83</td>
<td>50.60</td>
<td>11.05</td>
</tr>
</tbody>
</table>

Significance from chance: *$p < .05$. **$p < .001$.  

*Figure 16. Accuracy rate (%) on familiar items in GJT*
A mixed ANOVA was conducted for the performance on the familiar items with Time as a within-subjects variable and Group as a between-subjects variable. A four (Time: pretest, immediate, one-week delayed, and one-month delayed posttest) x six (Group: DM, MD, IM, MI, M, control) ANOVA was thus performed for the accuracy rates on the familiar items in the GJT. In this analysis, the assumption of sphericity ($p < .05$) was violated, so the Greenhouse-Geisser correction was made to the degrees of freedom. The mixed ANOVA revealed a significant main effect for Time, $F(2.754, 220.332) = 29.864, p < .001, \eta_p^2 = .272$, and for Group $F(5, 80) = 5.845, p < .001, \eta_p^2 = .268$, but no Time x Group interaction effect, $F(13.771, 220.332) = 1.701, p > .05, \eta_p^2 = .096$.

As a further analysis, a repeated-measures ANOVA was performed for the familiar items in order to observe the locus of the significant main effect for Time (pretest to each posttest). A significant difference was shown in the performances of all mixed-method experimental groups: DM, $F(3, 42) = 11.216, p < .001, \eta_p^2 = .445$; MD, $F(3, 36) = 14.400, p < .001, \eta_p^2 = .545$; IM, $F(3, 39) = 5.091, p < .05, \eta_p^2 = .281$; and MI, $F(3, 39) = 3.190, p < .05, \eta_p^2 = .197$. On the other
hand, a significant main effect for Time was not found in the performances of the M group, $F(3, 42) = 2.406, p > .05, \eta^2_p = .147$, and the control group, $F(3, 42) = 2.228, p > .05, \eta^2_p = .137$. The pairwise contrasts found a significant immediate improvement in all mixed-method groups (i.e., DM, MD, IM, and MI) ($p < .05$). Among these groups, the DM, MD and IM groups sustained the significant gains for one week ($p < .05$) and for one month ($p < .05$). The MI group, on the other hand, did not sustain the significant improvement after the immediate posttest ($p > .05$). The results indicate a general beneficial effect of FFI methods on learners’ ability to judge grammaticality of familiar items correctly.

The main effect of Group was then further investigated by Bonferroni post-hoc pairwise comparisons. On the immediate posttest, the DM, MD, and IM groups significantly outperformed the control group ($p < .05$), and this trend was generally maintained over a month ($p < .05$). On the other hand, the M group never outperformed the control group significantly across the posttests ($p > .05$). The analyses support the position that the inclusion of FFI methods into MFI should positively affect learners’ skill in deciding on the grammaticality of familiar sentences, as shown from the mixed-method groups’ more substantial learning outcomes compared to the M group’s.

**Unfamiliar Items.** The descriptive statistics (Table 23 and Figure 17) show higher scores on the unfamiliar items in the posttests than in the pretests. The one-sample $t$-tests showed that the DM, the MD, the IM, the MI, and the M groups performed significantly above chance on the immediate posttest (DM, $t(14) = 4.191, p < .05$; MD, $t(12) = 4.043, p < .05$; IM, $t(13) = 3.929, p < .05$; MI, $t(13) = 4.599, p < .05$), the one-week delayed posttest (DM, $t(14) = 4.432, p < .05$; MD, $t(12) = 3.538, p < .05$; IM, $t(13) = 6.082, p < .05$; MI, $t(13) = 5.410, p < .05$), and the one-month delayed posttests (DM, $t(14) = 4.010, p < .05$; MD, $t(12) = 4.421, p < .05$; IM, $t(13) =$
The M group performed significantly above chance on the immediate posttest, $t(13) = 2.344, p < .05$. The control group’s performances on the immediate posttest, $t(14) = 2.545, p > .05$, and the one-week delayed posttest, $t(14) = 4.109, p = .001$, were not significantly above chance.

Table 23

<table>
<thead>
<tr>
<th></th>
<th>Pretest</th>
<th>Immediate</th>
<th>1 Week</th>
<th>1 Month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>DM ($n = 15$)</td>
<td>55.40</td>
<td>14.23</td>
<td>69.87*</td>
<td>18.36</td>
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<tr>
<td>MD ($n = 13$)</td>
<td>50.00</td>
<td>11.32</td>
<td>70.08*</td>
<td>17.90</td>
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<tr>
<td>IM ($n = 14$)</td>
<td>51.14</td>
<td>14.93</td>
<td>70.29*</td>
<td>19.31</td>
</tr>
<tr>
<td>MI ($n = 14$)</td>
<td>52.50</td>
<td>13.98</td>
<td>71.57**</td>
<td>17.54</td>
</tr>
<tr>
<td>M ($n = 15$)</td>
<td>61.07*</td>
<td>15.29</td>
<td>64.40*</td>
<td>13.57</td>
</tr>
<tr>
<td>Control ($n = 15$)</td>
<td>47.07</td>
<td>17.61</td>
<td>51.07</td>
<td>8.75</td>
</tr>
</tbody>
</table>

Significance from chance: * $p < .05$. ** $p < .001$.

Figure 17. Accuracy rate (%) on unfamiliar items in GJT
A mixed ANOVA was conducted for the unfamiliar items in the GJT with Time as a within-subjects variable and Group as a between-subjects variable. A four (Time: pretest, immediate, one-week delayed, and one-month delayed posttest) x six (Group: DM, MD, IM, MI, M, control) ANOVA was thus performed for unfamiliar items in the GJT. The assumption of sphericity ($p < .05$) was violated in this analysis, so the Greenhouse-Geisser correction was made to the degrees of freedom. The mixed ANOVA showed a significant main effect of Time, $F(2.603, 208.209) = 17.035$, $p < .001$, $\eta^2_p = .176$, and of Group $F(5, 80) = 4.008$, $p < .001$, $\eta^2_p = .971$, but, again, no significant effect of Time x Group interaction, $F(13.013, 208.209) = 1.702$, $p > .05$, $\eta^2_p = .096$.

As a further analysis, a repeated-measures ANOVA was performed for the scores of unfamiliar items to observe the locus of the significant main effect for Time. A significant difference was found in the performances of all mixed-method experimental groups: the DM group, $F(3, 42) = 3.852$, $p < .05$, $\eta^2_p = .216$; the MD group, $F(3, 36) = 6.651$, $p < .05$, $\eta^2_p = .357$; the IM group, $F(3, 39) = 9.378$, $p < .001$, $\eta^2_p = .419$; and the MI group, $F(1.987, 25.829) =$
4.148, \( p < .05, \eta^2_p = .242 \). A significant main effect for Time was not found for the performances of the M group, \( F(3, 42) = .710, p > .05, \eta^2_p = .048 \), and the control group, \( F(3, 42) = 1.154, p > .05, \eta^2_p = .076 \). When the posttests performances of the DM, MD, IM and MI groups were compared to their pretest scores, the pairwise contrasts found a significant immediate improvement in all mixed-method groups (i.e., DM, MD, IM, and MI) \( (p < .05) \). All these groups maintained the significant improvement over a week \( (p < .05) \) but only DM, MD and IM groups sustained it over a month. In contrast, the MI group’s performance on the unfamiliar items in the one-month delayed posttest was not distinguishable from their pretest score \( (p > .05) \). Therefore, the analyses generally indicate that the learners who were instructed in both FFI and MFI acquired skill in generalizing the rule knowledge to a new syntactic context that they had not been exposed to before.

Bonferroni pairwise comparisons were run to observe the locus of the main effect for Group. First of all, the pairwise comparisons found that all experimental groups (i.e., DM, MD, IM, MI, and M) performed significantly better than the control group \( (p < .05) \) on the immediate posttest. However, only three (i.e., DM, MD, and IM) of the mixed-method experimental groups performed significantly better than the control group on the one-week delayed posttest, and only two (i.e., DM and MD) did so on the one-month delayed posttest \( (p < .05) \). The analyses suggest that FFI may not only aid development of the ability to generalize rules to a new context but also may support retainment of such transferrable rule knowledge over time.

**Summary of Results.** The separate analyses for the learners’ performance on the familiar and unfamiliar items found that (1) both a combined use of FFI and MFI and an exclusive use of MFI can lead learning effects when the learners are tested with items similar to those used in the treatment, and (2) the skill in judging familiar items can be sustained by all learners over time.
However, the analysis also found that (3) when the learners were tested with the unfamiliar items that employed the same underlying transformational rules, only the mixed-method learners (i.e., DM, MD, IM, MI) tended to significantly outperform chance level and to show significant development over time. This suggests that FFI would effectively facilitate the ability to generalize rule knowledge in a new context. In addition, the analysis demonstrated that (4) the group of learners who were instructed in the deductive type of FFI (i.e., DM and MD) were more likely to sustain the knowledge effectively than those who were instructed in an inductive type (i.e., IM and MI) of FFI. This suggests that the deductive type of FFI would contribute to a rule transfer ability more successfully than the inductive type. Timing of FFI did not appear to be an influential variable in this analysis.

**Oral Elicited Imitation**

A one-way ANOVA and a one-sample t-test were run for the pretest accuracy rates to examine if there was any significant between-subjects difference or significant difference from a 50% chance level prior to the treatment. For the pretest scores, the one-way ANOVA did not find significant group-difference on familiar items, $F(5, 80) = 1.608, p > .05, \eta_p^2 = .091$, and on unfamiliar items, $F(5, 80) = .423, p > .05, \eta_p^2 = .026$. Also, the one-sample t-test revealed that all groups performed significantly below chance on the familiar items (DM, $t(14) = -3.265, p < .05$; MD, $t(12) = -3.080, p < .05$; IM, $t(13) = -3.406, p < .05$; MI, $t(13) = -6.497, p < .05$; M, $t(14) = -7.093, p < .05$; Control, $t(14) = -4.209, p < .05$) and the unfamiliar items (DM, $t(14) = -9.473, p < .05$; MD, $t(12) = -6.662, p < .05$; IM, $t(13) = -14.159, p < .05$; MI, $t(13) = -11.195, p < .05$; M, $t(14) = -12.600, p < .05$; Control, $t(14) = -18.422, p < .05$) in the OEIT pretest. As a result, any development found from the posttests can be attributed to the effect of the instructional treatment.
Familiar Items. The descriptive statistics (Table 24 and Figure 18) illustrate that all groups scored higher on the posttests than on the pretest. Furthermore, the one-sample $t$-test found that the IM group, $t(13) = 2.428, p < .05$, performed significantly above chance on the immediate posttest, the DM group, $t(14) = 2.129, p < .05$, and the IM group, $t(13) = 2.894, p < .05$, performed significantly above chance on the one-week delayed posttest, and the DM group, $t(14) = 2.526, p < .05$, and the MD group, $t(12) = 2.627, p < .05$, performed significantly above chance on the one-month delayed posttest. The other experimental groups’ and the control group’s accuracy rates were not distinguishable from the chance level on the immediate posttest (DM, $t(14) = 1.119, p > .05$; MD, $t(12) = 1.209, p > .05$; MI, $t(13) = 2.428, p > .05$; M, $t(14) = -.385, p > .05$; Control, $t(14) = -2.810, p < .05$), the one-week delayed posttest (MD, $t(12) = .731, p > .05$; MI, $t(13) = -.227, p > .05$; M, $t(14) = -.391, p > .05$; Control, $t(14) = -3.675, p < .05$), and the one-month delayed posttest (IM, $t(13) = 1.447, p > .05$; MI, $t(13) = 1.385, p > .05$; M, $t(14) = 1.037, p > .05$; Control, $t(14) = -1.555, p > .05$).

Table 24

Mean accuracy rate (%) and standard deviation (SD) value on familiar items in OEIT

<table>
<thead>
<tr>
<th></th>
<th>Pretest</th>
<th>Immediate</th>
<th>1 Week</th>
<th>1 Month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>DM ($n=15$)</td>
<td>32.27**</td>
<td>21.04</td>
<td>57.18</td>
<td>24.85</td>
</tr>
<tr>
<td>MD ($n=13$)</td>
<td>30.85*</td>
<td>22.42</td>
<td>57.69</td>
<td>22.94</td>
</tr>
<tr>
<td>IM ($n=14$)</td>
<td>32.64*</td>
<td>19.07</td>
<td>64.86*</td>
<td>22.89</td>
</tr>
<tr>
<td>MI ($n=14$)</td>
<td>17.29**</td>
<td>18.84</td>
<td>51.14</td>
<td>22.09</td>
</tr>
<tr>
<td>M ($n=15$)</td>
<td>21.73*</td>
<td>15.43</td>
<td>48.40</td>
<td>16.12</td>
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<tr>
<td>Control ($n=15$)</td>
<td>30.53**</td>
<td>17.91</td>
<td>35.47*</td>
<td>20.03</td>
</tr>
</tbody>
</table>

Significance from chance: * $p < .05$. ** $p < .001$. 

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Next, a mixed ANOVA was conducted for the familiar items with Time as a within-subject variable and Group as a between-subject variable. Thus, a four (Time: pretest, immediate, one-week delayed, and one-month delayed posttest) x six (Group: DM, MD, IM, MI, M, control) ANOVA was carried out for the familiar items in the OEIT. The assumption of sphericity ($p < .05$) was violated in this analysis, so the Greenhouse-Geisser correction was made to the degrees of freedom. For the familiar items, the mixed ANOVA revealed a significant main effect for Time, $F(2.730, 215.645) = 58.727, p < .001, \eta_p^2 = .426$, and Group $F(5, 79) = 3.464, p < .05, \eta_p^2 = .180$, and a significant interaction effect for Time x Group, $F(13.648, 215.645) = 2.028, p < .05, \eta_p^2 = .114$.

The locus of the significant main effect for Time on the familiar items was investigated by a repeated-measures ANOVA. A significant Time difference was found in the performance of all experimental groups: DM, $F(3, 42) = 11.804, p < .001, \eta_p^2 = .457$; MD, $F(1.938, 21.316) =$...
8.130, \( p < .05, \eta^2_p = .425 \); IM, \( F(3, 39) = 13.651, p < .001, \eta^2_p = .512 \); MI, \( F(3, 39) = 15.126, p < .001, \eta^2_p = .538 \); and M, \( F(4, 42) = 14.416, p < .001 \). For all experimental groups (i.e., DM, MD, IM, MI, and M), the accuracy rates on the immediate posttest, one-week delayed posttest, and one-month delayed posttest were significantly higher than the pretest scores \( p < .05 \). On the other hand, the significant main effect for time was not found in the control group, \( F(3, 42) = 2.290, p > .05, \eta^2_p = .141 \).

The main effect of Group was then further investigated by Bonferroni post-hoc pairwise comparisons. The post-hoc analysis revealed that the IM group performed significantly better than the control group on the immediate posttest \( p < .05 \), and the DM group and the IM group performed significantly better than the control group on the one-week delayed posttest \( p < .05 \). For the one-month delayed posttests, no significant between-group difference was detected \( p > .05 \). These analyses illustrate that both deductive and inductive types of FFI method may positively affect learners’ oral imitation of L2 items that the learners are familiar with.

**Unfamiliar Items.** The descriptive statistics (Table 25 and Figure 19) indicate that all groups performed better on the posttests than the pretest. However, none of the learners’ performances, on the immediate posttest (DM, \( t(14) = -1.648, p > .05 \); MD, \( t(12) = -4.689, p < .05 \); IM, \( t(13) = -4.502, p < .05 \); MI, \( t(13) = -4.381, p < .05 \); M, \( t(14) = -6.913, p < .05 \); Control, \( t(14) = -6.826, p < .05 \)), the one-week delayed posttest (DM, \( t(14) = -2.600, p < .05 \); MD, \( t(12) = -1.040, p < .05 \); IM, \( t(13) = -1.679, p > .05 \); MI, \( t(14) = -4.460, p < .05 \); Control, \( t(14) = -4.871, p < .05 \)), and the one-month delayed posttest was significantly above chance (DM, \( t(14) = .628, p > .05 \); MD, \( t(12) = -1.040, p < .05 \); IM, \( t(13) = -.573, p > .05 \); MI, \( t(13) = -.406, p > .05 \); M, \( t(14) = -1.905, p > .05 \); Control, \( t(14) = -5.458, p < .05 \)).
Table 25

Mean accuracy rate (%) and standard deviation (SD) value on unfamiliar items in OEIT

<table>
<thead>
<tr>
<th></th>
<th>Pretest</th>
<th>Immediate</th>
<th>1 Week</th>
<th>1 Month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>DM (n = 15)</td>
<td>11.07**</td>
<td>15.92</td>
<td>36.02</td>
<td>32.85</td>
</tr>
<tr>
<td>MD (n = 13)</td>
<td>12.23**</td>
<td>20.44</td>
<td>20.46*</td>
<td>22.71</td>
</tr>
<tr>
<td>IM (n = 14)</td>
<td>7.07**</td>
<td>11.34</td>
<td>25.00</td>
<td>20.78</td>
</tr>
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<td>MI (n = 14)</td>
<td>9.57**</td>
<td>13.51</td>
<td>24.43*</td>
<td>21.84</td>
</tr>
<tr>
<td>M (n = 15)</td>
<td>5.60**</td>
<td>13.65</td>
<td>14.93**</td>
<td>19.54</td>
</tr>
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<td>Control (n = 15)</td>
<td>8.80**</td>
<td>8.66</td>
<td>15.53**</td>
<td>19.56</td>
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</table>

Significance from chance: * \( p < .05 \). ** \( p < .001 \).

Figure 19. Accuracy rate (%) on unfamiliar items in OEIT.
Next, a mixed ANOVA was conducted for the unfamiliar items with Time as a within-subject variable and Group as a between-subject variable. Thus, a four (Time: pretest, immediate, one-week delayed, and one-month delayed posttest) x six (Group: DM, MD, IM, MI, M, control) ANOVA was carried out for the unfamiliar items in the OEIT. In this analysis, the assumption of sphericity ($p < .05$) was violated, so the Greenhouse-Geisser correction was made to the degrees of freedom. The mixed ANOVA found a significant main effect for Time, $F(2.384, 188.313) = 66.777$, $p < .001$, $\eta^2_p = .458$, but no main effect for Group $F(5, 79) = 2.186$, $p > .05$, $\eta^2_p = .687$. However, there was a significant interaction effect for Time x Group, $F(11.919, 188.313) = 2.840$, $p < .05$, $\eta^2_p = .152$.

The locus of the significant main effect for Time was investigated by a repeated-measures ANOVA. The main effect for Time was found to be significant for all experimental groups: DM, $F(3, 42) = 18.707$, $p < .001$, $\eta^2_p = .572$; MD, $F(3, 33) = 10.042$, $p < .001$, $\eta^2_p = .477$; IM, $F(3, 39) = 15.686$, $p < .001$, $\eta^2_p = .547$; MI, $F(1.834, 23.843) = 11.909$, $p < .001$, $\eta^2_p = .478$; and M, $F(3, 42) = 12.101$, $p < .001$, $\eta^2_p = .464$. The test of within-subjects contrasts indicated that all experimental groups (i.e., DM, MD, IM, MI, and M) improved significantly from the pretest to all three posttests ($p < .05$). A main effect of Time for the controls, $F(2.033, 28.460) = 4.228$, $p < .05$, $\eta^2_p = .232$, was also significant. Further analysis found that the significant effect of Time can be attributed to the control group’s significant development from the pretest to the one-week delayed posttest ($p < .05$). However, as the control group’s mean accuracy rates on the one-week delayed posttests were still significantly below chance, this significant increase may not be considered learning.

The locus of the main effect for Group on the unfamiliar items was also investigated by Bonferroni pairwise comparisons. The Bonferroni pairwise comparisons found that the IM group...
significantly outperformed the control group on the one-week delayed posttest \((p < .05)\), and the DM group significantly outperformed the control group on the one-month delayed posttest \((p < .05)\).

**Summary of Results.** The analysis for the familiar items and the unfamiliar items in the OEIT found that (1) it was possible for all experimental participants (e.g., DM, MD, IM, MI, M) to gain posttest scores significantly higher than the pretest scores. However, the between-subjects analysis indicated that (2) only those groups who received a deductive or inductive type of FFI prior to MFI (i.e., the DM and the IM groups) significantly outperformed the control group on the immediate and delayed posttests while the other experimental groups did not. Therefore, the results indicate that early provision of FFI would be more effective for learners in developing an oral imitation ability for both familiar items and unfamiliar items.

**Metalinguistic Knowledge**

Learners’ performances on only the familiar ungrammatical sentences and the unfamiliar ungrammatical sentences are analyzed in this section. There were two familiar/unfamiliar ungrammatical items in each test, so the possible maximum gain scores were two points and the minimum was zero. Therefore, when learners gained two points on the test, it was considered an indication of reliable metalinguistic knowledge on the familiar/unfamiliar target rules.

**Familiar Items.** The frequency analysis for the familiar ungrammatical items (Table 26) indicated that all experimental groups participated in the pretest with no prior knowledge on the target rules, as shown by their scores of zero on the pretest. Immediately after the instruction, the DM, MD, IM and MI participants were likely to have acquired reliable metalinguistic knowledge on the familiar ungrammatical items \((DM = 11; MD = 7; IM = 9; MI = 11)\), whereas just two M participant obtained the maximum possible scores. The reliable metalinguistic knowledge of the
mixed-method learners was maintained over a week (DM = 10; MD = 8; IM = 9; MI = 8) and over a month (DM = 12; MD = 19; IM = 10; MI = 7). On the other hand, no successful gain of metalinguistic knowledge was shown by the M group immediately after the treatments (M = 2) or over a week (M = 1). However, the frequency analysis revealed that the number of M learners who acquired full points on the familiar ungrammatical items increased after a month (M = 6) although no further instruction was provided in addition to MFI. This indicates that learners’ analytic skills on L2 items can be successfully demonstrated when the rules are presented in the sentences with familiar syntactic patterns and words. No learning effect was shown by the control group over time.

Table 26

*Number of learners who gained all possible points on familiar ungrammatical items*

<table>
<thead>
<tr>
<th></th>
<th>Pretest</th>
<th>Immediate</th>
<th>1 Week</th>
<th>1 Month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0  1  2</td>
<td>0  1  2</td>
<td>0  1  2</td>
<td>0  1  2</td>
</tr>
<tr>
<td>DM</td>
<td>12  3  0</td>
<td>2  2  11</td>
<td>0  5  10</td>
<td>2  1  12</td>
</tr>
<tr>
<td>MD</td>
<td>12  1  0</td>
<td>3  3  7</td>
<td>1  4  8</td>
<td>0  4  9</td>
</tr>
<tr>
<td>IM</td>
<td>14  0  0</td>
<td>3  2  9</td>
<td>2  3  9</td>
<td>2  2  10</td>
</tr>
<tr>
<td>MI</td>
<td>13  1  0</td>
<td>2  1  11</td>
<td>2  4  8</td>
<td>5  2  7</td>
</tr>
<tr>
<td>M</td>
<td>11  4  0</td>
<td>10  3  2</td>
<td>6  8  1</td>
<td>5  4  6</td>
</tr>
<tr>
<td>Control</td>
<td>15  0  0</td>
<td>14  0  1</td>
<td>13  2  0</td>
<td>12  2  1</td>
</tr>
</tbody>
</table>

Maximum available points = 2

**Unfamiliar Items.** The frequency analysis for the unfamiliar ungrammatical sentences (Table 27) did not find an indication of solid prior knowledge on the target forms, as evidenced by the failure of a majority of participants to gain full points on the unfamiliar ungrammatical items. Development on the unfamiliar items was found for the mixed-method groups in the immediate posttest (DM = 10; MD = 8; IM = 10; MI = 9), and the trend as sustained over a week.
(DM = 10; MD = 6; IM = 10; MI = 10) and over a month (DM = 8; MD = 8; IM = 8; MI = 7). This suggests that FFI methods may positively affect acquisition of metalinguistic knowledge and that FFI methods may lead learners to analyze the sentences with high accuracy even when the underlying rules are presented within an unfamiliar syntactic construction. The M participants showed no such development in the immediate posttest (M = 0), the one-week delayed posttest (M = 4), and the one-month delayed posttest (M = 1). This indicates that learners who were exposed to MFI exclusively would find it difficult to analyze target rules when the rules are embedded in new syntactic structures that are unfamiliar to the learners. No indication of learning was observed in the control participants.

Table 27

<table>
<thead>
<tr>
<th></th>
<th>Pretest</th>
<th>Immediate</th>
<th>1 Week</th>
<th>1 Month</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0 1 2</td>
<td>0 1 2</td>
<td>0 1 2</td>
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<td>DM</td>
<td>13 1 1</td>
<td>0 5 10</td>
<td>2 3 10</td>
<td>2 5 8</td>
</tr>
<tr>
<td>MD</td>
<td>11 2 0</td>
<td>2 3 8</td>
<td>0 7 6</td>
<td>2 3 8</td>
</tr>
<tr>
<td>IM</td>
<td>9 5 0</td>
<td>2 2 10</td>
<td>2 2 10</td>
<td>2 4 8</td>
</tr>
<tr>
<td>MI</td>
<td>10 4 0</td>
<td>0 5 9</td>
<td>2 2 10</td>
<td>3 4 7</td>
</tr>
<tr>
<td>M</td>
<td>12 2 1</td>
<td>9 6 0</td>
<td>5 6 4</td>
<td>8 6 1</td>
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<tr>
<td>Control</td>
<td>12 2 1</td>
<td>9 6 0</td>
<td>10 4 1</td>
<td>11 4 0</td>
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</tbody>
</table>

Maximum available points = 2
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<tr>
<th>Group</th>
<th>All Items</th>
<th>Overall</th>
<th>Immediate &gt; Control</th>
<th>Week &gt; Control</th>
<th>Month &gt; Control</th>
<th>Immediate &gt; Pretest</th>
<th>Week &gt; Pretest</th>
<th>Month &gt; Pretest</th>
</tr>
</thead>
<tbody>
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</table>

**Table 28**: Summary of Results: Overall GJT Performance
## Table 29: Summary of Results: Overall OEIT Performance

<table>
<thead>
<tr>
<th>Group</th>
<th>Immediate &gt; Control</th>
<th>1 Week &gt; Control</th>
<th>1 Month &gt; Control</th>
<th>Immediate &gt; Prettest</th>
<th>1 Week &gt; Prettest</th>
<th>1 Month &gt; Prettest</th>
<th>Overall All Items</th>
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</thead>
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</tr>
<tr>
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Summary of Results: Overall OEIT Performance
### Table 30

<table>
<thead>
<tr>
<th>Target Complexity</th>
<th>Immediate &gt; Pretest</th>
<th>Time</th>
<th>Immediate &gt; Pretest</th>
<th>Time</th>
<th>Immediate &gt; Pretest</th>
<th>Time</th>
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<table>
<thead>
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<th>Time</th>
<th>Immediate &gt; Control</th>
<th>Time</th>
<th>Immediate &gt; Control</th>
<th>Time</th>
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Summary of Results: GJT Performance by Target Complexity
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<th>MI</th>
<th>IM</th>
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<th>DM</th>
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<tr>
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</tr>
<tr>
<td>1 Month &gt; Pretest</td>
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<td>✓</td>
</tr>
<tr>
<td>Immediate &gt; Control</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>1 Week &gt; Control</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>1 Month &gt; Control</td>
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Summary of Results: OET Performance by Target Complexity

Table 31
### Summary of Results: GJT Performance by Item Familiarity

<table>
<thead>
<tr>
<th>Item Familiarity</th>
<th>Immediate &gt; Pretest</th>
<th>1 Week &gt; Pretest</th>
<th>1 Month &gt; Pretest</th>
<th>Immediate &gt; Control</th>
<th>1 Week &gt; Control</th>
<th>1 Month &gt; Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Familiar</td>
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<td>✓</td>
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<tr>
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<td>✓</td>
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<td>✓</td>
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</table>

Table 32
### Table 33: OEIT Performance by Item Familiarity

<table>
<thead>
<tr>
<th>Group</th>
<th>Immediate &gt; Pretest</th>
<th>1 Week &gt; Pretest</th>
<th>1 Month &gt; Pretest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate &gt; Control</td>
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<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Immediate &gt; Control</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Immediate &gt; Control</td>
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<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Immediate &gt; Control</td>
<td>✓</td>
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</tr>
<tr>
<td>Immediate &gt; Control</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group</th>
<th>Immediate &gt; Control</th>
<th>1 Week &gt; Pretest</th>
<th>1 Month &gt; Pretest</th>
</tr>
</thead>
<tbody>
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<td>Immediate &gt; Control</td>
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<td>✓</td>
</tr>
<tr>
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<tr>
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<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group</th>
<th>Immediate &gt; Control</th>
<th>1 Week &gt; Pretest</th>
<th>1 Month &gt; Pretest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate &gt; Control</td>
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<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Immediate &gt; Control</td>
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<tr>
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<td>✓</td>
<td>✓</td>
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<tr>
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</tr>
<tr>
<td>Immediate &gt; Control</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

For familiar items:
- Immediate > Pretest
- 1 Week > Pretest
- 1 Month > Pretest

For unfamiliar items:
- Immediate > Pretest
- 1 Week > Pretest
- 1 Month > Pretest

*Table 33: Summary of Results: OEIT Performance by Item Familiarity*
Confidence Ratings

The analysis for confidence ratings only focused on the results of the experimental groups. Because the confidence ratings aimed to measure learners’ awareness of L2 knowledge, only the data from the experimental participants, who showed a clear learning effect, were relevant. As no learning effect was found from the control group, their data were excluded from this analysis. The analysis primarily examined the proportion and accuracy rate across the levels of confidence (0 for guessing, 1 for somewhat confident, 2 for quite confident, and 3 for extremely confident).

Judgment Knowledge on the Pretest

As shown by the descriptive statistics (Table 34 and Figure 20), all experimental groups tended to select the option quite confident most frequently, followed by the option somewhat confident. The DM, the MD, the IM and the MI groups tended to choose the guessing option least frequently, and the M group tended to choose the extremely confident option least frequently. Therefore, the mean confidence levels (minimum 0; maximum 3) of the experimental groups indicated that they had mid-level confidence in their judgment decisions before treatment:

DM = 1.83 (SD = 0.92); MD = 1.70 (SD = 0.92); IM = 1.70 (SD = 0.95); MI = 1.60 (SD = 1.04); M = 1.44 (SD = 0.93).

Table 34

Pretest: Accuracy (Acc) and proportions (Prop) (%) across confidence ratings

<table>
<thead>
<tr>
<th></th>
<th>Guessing</th>
<th></th>
<th>Somewhat</th>
<th></th>
<th>Quite</th>
<th></th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acc</td>
<td>Prop</td>
<td>Acc</td>
<td>Prop</td>
<td>Acc</td>
<td>Prop</td>
<td>Acc</td>
</tr>
<tr>
<td>DM (n = 15)</td>
<td>54.55</td>
<td>5.70</td>
<td>52.08</td>
<td>25.00</td>
<td>48.08</td>
<td>40.90</td>
<td>51.25</td>
</tr>
<tr>
<td>MD (n = 13)</td>
<td>40.63</td>
<td>10.30</td>
<td>32.75</td>
<td>30.80</td>
<td>48.28</td>
<td>37.20</td>
<td>50.00</td>
</tr>
<tr>
<td>IM (n = 14)</td>
<td>51.35</td>
<td>11.00</td>
<td>46.73</td>
<td>31.80</td>
<td>56.25</td>
<td>33.30</td>
<td>52.50</td>
</tr>
</tbody>
</table>
In terms of accuracy rates (Table 34), the analysis showed that the DM and the M groups were the most accurate when reporting themselves to be guessing and slightly less accurate when reporting themselves to be extremely confident. On the other hand, the MD, the IM and the MI groups were the most accurate when reporting that they were extremely confident and slightly less accurate when reporting that they were guessing. However, statistical analysis revealed that all of the accuracy rates across the confidence levels were indistinguishable from chance ($p > .05$). Before treatment, therefore, no indication of conscious or unconscious judgment knowledge was found in the confidence ratings across groups.
Judgment Knowledge on the Immediate Posttest

In terms of proportion, the descriptive statistics (Table 35 and Figure 21) illustrates that all mixed-method groups (i.e., DM, MD, IM and MI) tended to select the option *extremely confident* the most frequently and the option *quite confident* the second most frequently. The M group chose the *quite confident* option the most frequently, followed by the option *somewhat confident*. All groups chose the option *guessing* the least frequently. Therefore, the analysis on proportion indicates that, overall, the confidence level of the experimental participants increased immediately after the instructional treatment: DM = 2.30 ($SD = 0.79$); MD = 2.11 ($SD = 0.92$); IM = 2.17 ($SD = 0.86$); MI = 1.93 ($SD = 0.96$); M = 1.72 ($SD = 0.93$). According to the mean confidence levels, the DM group had the highest confidence level whereas the M group had the lowest. Compared to their confidence levels before treatment, the largest increase was shown in the DM group (mean difference = 0.48), followed by the IM group (mean difference = 0.47), the MD group (mean difference = 0.41), and the MI group (mean difference = 0.32). The M group showed the least increase in their confidence level (mean difference = 0.28).

Table 35

Immediate posttest: Accuracy (Acc) and proportions (Prop) (%) across confidence ratings

<table>
<thead>
<tr>
<th>Group</th>
<th>Guessing</th>
<th>Somewhat</th>
<th>Quite</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acc</td>
<td>Prop</td>
<td>Acc</td>
<td>Prop</td>
</tr>
<tr>
<td>DM ($n = 15$)</td>
<td>25.00</td>
<td>2.10</td>
<td>62.75</td>
<td>13.30</td>
</tr>
<tr>
<td>MD ($n = 13$)</td>
<td>56.25</td>
<td>5.10</td>
<td>68.18*</td>
<td>21.20</td>
</tr>
<tr>
<td>IM ($n = 14$)</td>
<td>50.00</td>
<td>3.60</td>
<td>55.56</td>
<td>18.80</td>
</tr>
<tr>
<td>MI ($n = 14$)</td>
<td>45.83</td>
<td>7.10</td>
<td>64.52*</td>
<td>27.70</td>
</tr>
<tr>
<td>M ($n = 15$)</td>
<td>72.73*</td>
<td>9.80</td>
<td>48.11</td>
<td>31.50</td>
</tr>
</tbody>
</table>

Significance from chance: * $p < .05$, ** $p < .001$
In terms of accuracy (Table 35), the mixed-method groups (i.e., DM, MD, IM, and MI) tended to perform significantly above chance when reporting that they had some level of confidence in their judgment decisions. For example, the DM group and the IM group performed significantly above chance when reporting themselves quite or extremely confident (3) \((p < .05)\); the MD group when selecting somewhat or extremely confident \((p < .05)\); and the MI group when reporting somewhat or quite confident \((p < .05)\) in their judgment decisions. None of these groups performed significantly above chance when they believed they were guessing \((p > .05)\). On the other hand, the M group performed significantly above chance when selecting not only quite or extremely confident but also guessing. As a result, the analyses indicate that the mixed-method groups (i.e., DM, MD, IM, and MI) acquired conscious judgment knowledge whereas the M group acquired both conscious and unconscious judgment knowledge immediately after the instructional treatment.
Judgment Knowledge on the One-week Delayed Posttest

As illustrated by the descriptive statistics (Table 36 and Figure 22), on the one-week delayed posttest all mixed-method groups, except for MI (i.e., DM, MD, and IM), still tended to choose the option extremely confident the most frequently and quite confident the next. On the other hand, the MI and the M groups selected quite confident the most frequently and somewhat confident the second most frequently. All groups chose the option guessing the least frequently.

The mean confidence levels on the one-week delayed posttest were in a similar range as on the immediate posttest; DM = 2.45 (SD = 0.74); MD = 2.09 (SD = 0.91); IM = 2.04 (SD = 0.92); MI = 1.82 (SD = 0.94); M = 1.71 (SD = 0.87). The DM group showed the highest confidence level while the M group showed the lowest. In terms of the mean difference from the immediate posttest, only DM (mean difference = 0.15) showed a slight increase in their confidence level while the rest of the groups showed a slight decrease (MD = -0.02; IM = -0.13; MI = -0.11; and M = -0.01).

Table 36

One-week delayed posttest: Accuracy (Acc) and proportions (Prop) (%) across confidence ratings

<table>
<thead>
<tr>
<th></th>
<th>Guessing</th>
<th>Somewhat</th>
<th>Quite</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acc</td>
<td>Prop</td>
<td>Acc</td>
<td>Prop</td>
</tr>
<tr>
<td>DM (n = 15)</td>
<td>75.00</td>
<td>1.00</td>
<td>51.11</td>
<td>11.70</td>
</tr>
<tr>
<td>MD (n = 13)</td>
<td>46.15</td>
<td>4.20</td>
<td>57.89</td>
<td>24.40</td>
</tr>
<tr>
<td>IM (n = 14)</td>
<td>52.94</td>
<td>5.10</td>
<td>59.04</td>
<td>24.70</td>
</tr>
<tr>
<td>MI (n = 14)</td>
<td>62.07</td>
<td>8.60</td>
<td>55.21</td>
<td>28.60</td>
</tr>
<tr>
<td>M (n = 15)</td>
<td>51.41</td>
<td>8.00</td>
<td>57.41</td>
<td>32.10</td>
</tr>
</tbody>
</table>

Significance from chance: * p < .05, ** p < .001
Figure 22. One-week delayed posttest: Proportions of guessing, somewhat, quite, and extremely confident responses across groups

As for accuracy (Table 36), the results indicated that all groups gained conscious judgment knowledge. All mixed-method groups performed significantly above chance when they reported that they were quite or extremely confident. A similar pattern was identified for the M group, which showed significantly above chance performance when selecting the option extremely confident. However, no groups performed significantly above chance when guessing. The analysis shows that all experimental groups maintained conscious judgment knowledge over one week, and none, including M, showed evidence of maintaining unconscious judgment knowledge over one week.

Judgment Knowledge on the One-month Delayed Posttest

As the descriptive statistics (Table 37 and Figure 23) show, the mixed-method participants (i.e., DM, MD, IM and MI) still selected the option extremely confident the most frequently after a month. Among them, the DM, the MD, and the IM groups chose the option
Quite confident the second most frequently, while the MI group’s next most frequent choice was the option somewhat confident. Those who received MFI only (i.e., M) chose the quite confident option the most frequently, followed by the option extremely confident. All of them chose the option guessing the least frequently. The participants’ mean confidence levels stayed quite close to what they were on the one-week delayed posttest; DM = 2.43 (SD = 0.69), MD = 2.07 (SD = 0.92); IM = 2.11 (SD = 0.89); MI = 1.80 (SD = 1.04); M = 1.87 (SD = 0.92). In this analysis, the DM group showed the highest confidence level and the MI group showed the lowest level. No group showed a dramatic increase or decrease in their confidence levels (mean difference: DM = -0.02; MD = -0.02; IM = +0.07, MI = -0.02, and M = +0.16).

Table 37

One-month delayed posttest: Accuracy (Acc) and proportions (Prop) (%) across confidence ratings

<table>
<thead>
<tr>
<th></th>
<th>Guessing</th>
<th>Somewhat</th>
<th>Quite</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acc</td>
<td>Prop</td>
<td>Acc</td>
<td>Prop</td>
</tr>
<tr>
<td>DM (n = 15)</td>
<td>40.00</td>
<td>1.30</td>
<td>48.15</td>
<td>7.00</td>
</tr>
<tr>
<td>MD (n = 13)</td>
<td>38.89</td>
<td>6.10</td>
<td>59.38</td>
<td>20.50</td>
</tr>
<tr>
<td>IM (n = 14)</td>
<td>41.18</td>
<td>5.10</td>
<td>53.97</td>
<td>18.80</td>
</tr>
<tr>
<td>MI (n = 14)</td>
<td>52.50</td>
<td>11.90</td>
<td>56.00</td>
<td>29.90</td>
</tr>
<tr>
<td>M (n = 15)</td>
<td>42.31</td>
<td>7.70</td>
<td>55.17</td>
<td>25.90</td>
</tr>
</tbody>
</table>

Significance from chance: * p < .05, ** p < .001

Figure 23. One-month delayed posttest: Proportions of guessing, somewhat, quite, and extremely confident responses across groups.
Regarding the accuracy, the evidence of conscious judgment knowledge was once again shown at this stage (Table 37). All groups performed significantly above chance when they reported that they were extremely confident in their decision (p < .05). Additionally, the DM, the MD, the MI, and the M groups also performed significantly above chance when reporting themselves quite confident. No groups showed a distinguishable performance when selecting the guessing option. The analyses illustrate that all groups had gained conscious judgment knowledge after one month. No indication of unconscious judgment knowledge was identified at this stage.

In summary, the analyses of confidence ratings found that all experimental groups gained increased levels of confidence after receiving the instructional treatment (see graphic representation in Figure 24). This indicates that any type of FFI and MFI instructional treatment provided with any timing contributes to the increase of confidence levels overall.

*Figure 24.* Overall mean confidence levels across time (0 the minimum; 3 the maximum)
Additionally, the analysis revealed that all experimental participants had gained conscious judgment knowledge at the end of the treatment session. This was indicated by all experimental participants’ significantly better than chance performance when reporting that they were extremely confident in their judgment decisions. Although the M group appeared to perform significantly above chance when choosing guessing immediately after the treatment, this indication of unconscious judgment knowledge disappeared in a week. No other groups showed such an indication of unconscious judgment knowledge across the posttests. Taking these results together, it can be summarized that all instructional treatments, regardless of whether, when, and what type of FFI is added to MFI, would contribute to increasing learners’ of confidence, which, in turn, result in the acquisition of conscious judgment knowledge.

**Source Attributions**

As with the analysis of the confidence ratings, the analysis of source attributions focused only the results of the experimental groups, because they showed a clear learning effect. The analysis primarily examined the proportion and accuracy rates across the levels of confidence.
Structural Knowledge on the Pretest

In terms of proportion, most of the experimental groups tended to believe that their classification decisions were based on intuition or guess, which are the sources of unconscious structural knowledge (Table 38 and Figure 25). For example, the DM, the MD, the MI, and the M groups selected the option intuition the most frequently, followed by the option guess. Only the IM group chose the rule knowledge option the most frequently and the intuition option second most frequently. Because no instructional treatment had been provided for any of the learners at this stage, choosing unconscious sources such as intuition and guess would be a natural tendency for most of the learners.

Table 38
Pretest: Accuracy (Acc) and proportions (Prop) (%) across source attributions

<table>
<thead>
<tr>
<th>Source Attribute</th>
<th>Guess</th>
<th>Intuition</th>
<th>Memory</th>
<th>Rule knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acc</td>
<td>Prop</td>
<td>Acc</td>
<td>Prop</td>
</tr>
<tr>
<td>DM (n = 15)</td>
<td>54.84</td>
<td>26.10</td>
<td>46.04</td>
<td>38.60</td>
</tr>
<tr>
<td>MD (n = 13)</td>
<td>50.00</td>
<td>23.10</td>
<td>43.22</td>
<td>37.80</td>
</tr>
<tr>
<td>IM (n = 14)</td>
<td>48.68</td>
<td>22.60</td>
<td>51.04</td>
<td>28.60</td>
</tr>
<tr>
<td>MI (n = 14)</td>
<td>46.32</td>
<td>28.30</td>
<td>50.88</td>
<td>33.90</td>
</tr>
<tr>
<td>M (n = 15)</td>
<td>52.58</td>
<td>26.90</td>
<td>50.45</td>
<td>30.80</td>
</tr>
</tbody>
</table>

Significance from chance: * p < .05, ** p < .001

Figure 25. Pretest: Proportions of guess, intuition, memory, and rule knowledge responses across groups
As for accuracy (Table 38), the descriptive statistics shows that most experimental participants scored around 50% when basing their choice on each of the sources. None of their accuracy rates were significantly above chance ($p > .05$), indicating no evidence of reliable conscious or unconscious structural knowledge across groups.

**Structural Knowledge on the Immediate Posttest**

Regarding the proportion, the descriptive statistics (Table 39 and Figure 26) shows that on the immediate posttest the mixed-method participants (i.e., DM, MD, IM and MI) tended to make judgment decisions based on *rule knowledge* the most frequently, followed by *memory* (i.e., DM and IM) or *intuition* (i.e., MD and MI). All of them chose the option *guess* the least frequently. After explicitly receiving L2 rule instruction, they tended to rely on *rule knowledge* primarily, rather than other sources. In contrast, the M group tended to rely on *memory* the most frequently, followed by *intuition*. Because they were not instructed with the rules, the M participants relied on *rule knowledge* the least frequently.
In terms of accuracy (Table 39), the groups who were instructed in FFI (i.e., DM, MD, IM and MI) performed significantly above chance when reporting that they were relying on rule knowledge \((p < .05)\), a source of conscious structural knowledge. The DM group and the MI group also scored significantly above chance when basing their choice on memory and intuition \((p < .05)\), indicating that the DM and the MI groups were able to develop not only a reliable conscious source but also reliable unconscious sources of the knowledge. Thus, the DM and the MI groups showed an indication of development of both conscious and unconscious structural knowledge while the MD and the IM groups showed evidence of acquisition of conscious structural knowledge only. On the other hand, the M group performed significantly above chance when basing their decisions guess \((p < .05)\), a source of unconscious structural knowledge, and memory, a source of conscious structural knowledge. That is, the analysis found that the M group gained conscious and unconscious structural knowledge.

Table 39

<table>
<thead>
<tr>
<th>Source Attributions</th>
<th>Guess</th>
<th>Intuition</th>
<th>Memory</th>
<th>Rule knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acc</td>
<td>Prop</td>
<td>Acc</td>
<td>Prop</td>
</tr>
<tr>
<td>DM ((n = 15))</td>
<td>35.83</td>
<td>6.70</td>
<td>68.57**</td>
<td>29.20</td>
</tr>
<tr>
<td>MD ((n = 13))</td>
<td>61.29</td>
<td>9.90</td>
<td>57.83</td>
<td>26.60</td>
</tr>
<tr>
<td>IM ((n = 14))</td>
<td>51.85</td>
<td>8.00</td>
<td>57.63</td>
<td>17.60</td>
</tr>
<tr>
<td>MI ((n = 14))</td>
<td>45.45</td>
<td>13.10</td>
<td>71.68**</td>
<td>33.60</td>
</tr>
<tr>
<td>M ((n = 15))</td>
<td>71.43*</td>
<td>17.50</td>
<td>50.00</td>
<td>36.40</td>
</tr>
</tbody>
</table>

Significance from chance: * \(p < .05\), ** \(p < .001\)

*Figure 26. Immediate posttest: Proportions of guess, intuition, memory, and rule*
knowledge responses across groups

Structural Knowledge on the One-week Delayed Posttest

The descriptive statistics (Table 40 and Figure 27) show, after a week, the DM and the MI groups relied on intuition the most frequently, followed by rule knowledge. They still relied on guess the least frequently. On the other hand, the MD and the IM groups showed the highest reliance on rule knowledge at this stage, followed by intuition. The MD group reported that they made a judgment based on guess the least frequently, and the IM group reported relying on memory the least frequently. The M group relied on intuition the most frequently, followed by the memory category. The M participants also relied on guess the least frequently. Generally, it was found that all groups at this stage chose either rule knowledge or intuition as a primary source of judgment decisions.

Table 40

One-week delayed posttest: Accuracy (Acc) and proportions (Prop) (%) across source
attributions

<table>
<thead>
<tr>
<th></th>
<th>Guess</th>
<th>Intuition</th>
<th>Memory</th>
<th>Rule knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acc</td>
<td>Prop</td>
<td>Acc</td>
<td>Prop</td>
</tr>
<tr>
<td>DM (n = 15)</td>
<td>62.50</td>
<td>8.90</td>
<td>67.50**</td>
<td>33.30</td>
</tr>
<tr>
<td>MD (n = 13)</td>
<td>64.29</td>
<td>13.50</td>
<td>52.38</td>
<td>26.90</td>
</tr>
<tr>
<td>IM (n = 14)</td>
<td>53.66</td>
<td>12.20</td>
<td>64.47*</td>
<td>22.60</td>
</tr>
<tr>
<td>MI (n = 14)</td>
<td>63.38*</td>
<td>21.10</td>
<td>65.04*</td>
<td>36.90</td>
</tr>
<tr>
<td>M (n = 15)</td>
<td>52.17</td>
<td>12.80</td>
<td>61.11*</td>
<td>40.30</td>
</tr>
</tbody>
</table>

Significance from chance: * p < .05, ** p < .001

Figure 27. One-week delayed posttest: Proportions of guess, intuition, memory and rule knowledge responses across groups

In terms of accuracy, the descriptive statistics (Table 40) illustrate that the DM and the IM groups tended to perform significantly above chance when basing their choice on unconscious (p < .05) (i.e., intuition) and conscious (p < .05) (i.e., memory and rule knowledge)
sources. The learners from the IM group showed a similar pattern performing significantly above chance when basing their decisions on unconscious sources \( (p < .05) \) (i.e., guess and intuition) and a conscious source (i.e., rule knowledge). However, the MD group only performed above chance when they reported that they relied on the conscious sources \( (p < .05) \) (i.e., memory and rule knowledge). The analysis, therefore, indicates that the DM, the IM, and the MI groups seem to have acquired both conscious and unconscious structural knowledge whereas the MD group was limited to gaining conscious structural knowledge after a week. The M participants appeared to be significantly above chance when basing their judgment on intuition \( (p < .05) \), an implicit source. Therefore, an indication of unconscious structural knowledge was found for the M participants.

**Structural Knowledge on the One-month Delayed Posttest**

In terms of proportion (Table 41 and Figure 28), the analysis found that all groups generally tended to rely on intuition (i.e., DM and M) or rule knowledge (i.e., DM, IM, and MI) the most frequently after a month. This was followed by either rule knowledge (DM) or intuition (MD, IM, and MI). For the M participants, who did not receive FFI, reliance on memory was their second most frequent strategy. All groups appeared to rely on guess (DM, MD, and M) or memory (IM and MI) the least frequently. In sum, all experimental participants were likely to rely more on intuition and rule knowledge and less on guess and memory.

Table 41

One-month delayed posttest: Accuracy (Acc) and proportions (Prop) (%) across source attributions

<table>
<thead>
<tr>
<th></th>
<th>Guess</th>
<th>Intuition</th>
<th>Memory</th>
<th>Rule knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acc</td>
<td>Prop</td>
<td>Acc</td>
<td>Prop</td>
</tr>
<tr>
<td>DM ((n = 15))</td>
<td>48.00</td>
<td>6.90</td>
<td>66.15**</td>
<td>36.10</td>
</tr>
</tbody>
</table>
Fig. 28. One-month delayed posttest: Proportions of guess, intuition, memory, and rule knowledge responses across groups

Regarding the accuracy (Table 41), the DM and the MD groups appeared to perform significantly above chance when basing their choices on not only the conscious sources ($p < .05$) (i.e., rule knowledge and memory) but also an unconscious source ($p < .05$) (i.e., intuition). The IM and the MI groups were likely to score significantly above chance when relying on a conscious source only ($p < .05$) (i.e., rule knowledge). The performance of the M group was statistically significantly above chance when they reported that they relied on memory ($p < .05$), one of the conscious sources. Thus, the analysis found that only the DM and the MD groups...
showed an indication of the acquisition of both conscious (i.e., memory, rule knowledge) and unconscious (i.e., intuition) structural knowledge. As for the IM group (rule knowledge), the MI group (rule knowledge) and the M group (memory), only evidence of conscious structural knowledge was found.

In summary, the analyses on the source attributions found that learners who received a deductive type of FFI (i.e., DM, MD) developed both conscious and unconscious structural knowledge and sustained them successfully over a month. The same pattern was not found for those learners who received an inductive type of FFI (i.e., IM, MI) or those who were instructed in MFI exclusively (i.e., M). The IM and the MI learners showed the evidence of reliable conscious and unconscious structural knowledge over a week, but the unconscious knowledge did not last over a month. The M group learners showed an immediate loss of unconscious structural knowledge and no development of conscious structural knowledge. This suggests that the addition of FFI to MFI does not hinder the development of unconscious structural knowledge. Rather, the use of FFI would possibly impact the development of unconscious structural knowledge positively in the short term as well as in the long term. Regardless of the timing of its provision, the data indicated that the deductive type of FFI would be more facilitative for the development of both conscious and unconscious structural knowledge. Additionally, the M learners’ immediate loss of unconscious structural knowledge suggests that mere exposure to L2 would not offer a sufficient condition to develop unconscious structural knowledge in the context of adult L2 learning.
Chapter V: Discussion

Research Questions and Overall Results

The current study investigated whether a combination of FFI and MFI facilitates L2 learning outcomes more effectively than an exclusive use of MFI and how the internal (e.g., timing of FFI, types of FFI) and external (e.g., target complexity, item familiarity) variables of FFI influence the relative benefits of FFI within the context of adult SLA. The benefits of FFI were measured by the participants’ performance on the assessment task and their development of implicit and explicit knowledge.

The first research question was: Does the combination of FFI and MFI promote acquisition of L2 targets more effectively than the exclusive use of MFI? The study found supportive evidence for the claim that combined FFI and MFI may be more facilitative for adult L2 learning than MFI alone. For example, learners’ overall performance on the GJT showed that the participants who were instructed in the combination of FFI and MFI had significant improvement after a period of instructional treatment, and the significant improvement was successfully maintained over a month. More evidence for a facilitative effect for the combined use of FFI and MFI was found from the comparison of the performances of the mixed-method groups and the control group. Unlike the M group, whose performance was not distinguished from the performance of the control group, the mixed-method group(s) significantly outperformed the control group on the GJT not only immediately but also over time. As a result, it was clearly observed in this study that the FFI-MFI combination is more advantageous than over the exclusive use of MFI for adult learners’ L2 syntax learning.

The second research question was: Does FFI differentially promote acquisition of L2 knowledge of a simple target and a complex target? The findings of the current study indicate
that FFI is generally beneficial for acquisition of both simple and complex rules, but its effectiveness is considerably greater when targets are complex. For example, the analysis found that all experimental groups (i.e., DM, MD, IM, MI, M) performed significantly above chance on judging grammaticality of the simple target whereas only the mixed-method groups (i.e., DM, MD, IM, MI) performed significantly above chance on judging grammaticality of the complex target. This indicates that, in the current study, exclusive use of MFI does not offer a sufficient condition for adult learners to acquire complex rules but the limitations of the MFI condition can be addressed by the inclusion of FFI, which provides the necessary complement to a primarily MFI setting. The within- and between-group analyses provided further evidenced that a combined use of FFI and MFI may result in a more substantial learning effect. For instance, the analyses revealed that the mixed-method learners’ scores on the GJT posttests were significantly higher than their own pretest scores as well as the control group’s posttest scores. The mixed-method learners’ significant development was maintained over time. However, the M group’s scores on the posttests were statistically different neither from their own pretest scores nor from the control group’s posttest scores. The beneficial effect of FFI appeared to be equivalent for all groups when the target was simple. However, when the target form was more complex, the data revealed that the DM group and the MD group were more likely than the IM group and the MI group to sustain their development for a longer period of time. Therefore, the data indicated that the benefits of FFI can be shown to be greater when the target forms are more complex, and the use of deductive types of FFI may contribute to more substantial learning effects on the target form. No distinctive effects between early versus delayed FFI were observed in relation to the target complexity.
The third research question was: *Does FFI promote acquisition of L2 knowledge of familiar items as well as unfamiliar items?* The study suggests that FFI can aid learners to apply their existing rule knowledge to both familiar syntactic structures and unfamiliar syntactic structures. Note that this research question particularly looked into whether FFI can aid development of an ability to generalize rule knowledge to a new context. In this sense, learners’ performance on the unfamiliar items was considered a rule transfer ability. According to the data, all experimental participants (i.e., DM, MD, IM, MI, M) performed significantly above chance on judging familiar items across the posttests. As for the unfamiliar items, on the other hand, only the mixed-method learners (i.e., DM, MD, IM, MI) tended to perform significantly above chance, while the M group did not. As a result, the study indicated that MFI would not be a sufficient condition for development of rule transfer ability that enables learners to generalize the target rules when they encounter a new, unfamiliar context. Evidence of substantial learning outcomes was also shown by the within- and between-group analyses. The results illustrated that only those learners who were instructed by both FFI and MFI were able to develop significantly from the pretest and maintained the development over the period of a month. Also, their scores were significantly higher than those of the control group. The pattern of substantial learning was found in their performance on familiar as well as unfamiliar items. When the timing and types of FFI are considered, the study indicated that DM, MD, and IM participants were able to maintain the significant improvement on the familiar target over a month but only DM and MD groups were able to sustain the significant development on the unfamiliar target over a month. As a result, the study demonstrated that inclusion of FFI can enhance development of rule transfer ability and that the positive effect of FFI can be even greater when the FFI is delivered in a
deductive manner. No differential effects of early versus delayed FFI were observed in this context.

The fourth research question was: *Does FFI promote acquisition of explicit knowledge as well as implicit knowledge of the L2?* The study found that the addition of FFI can support development of explicit knowledge as well as implicit knowledge of the L2. According to the subjective measures of awareness, all experimental groups appeared to gain conscious judgment knowledge, evidenced by high confidence ratings and above chance accuracy rates. The DM and the MD groups showed evidence of conscious judgment knowledge based on reliable conscious structural knowledge (*rule knowledge, memory*) and reliable unconscious structural knowledge (*intuition*). Here, conscious structural knowledge and conscious judgment knowledge were considered an evidence of explicit knowledge; unconscious structural knowledge and conscious judgment knowledge were considered an indication of implicit knowledge. These two types of knowledge were observed over a month in the DM and the MD groups. The DM and MD learners’ performances on the OEIT and the MKT support the pattern of implicit and explicit knowledge development. The DM and the MD groups showed significant gains over time on the OEIT, an assessment tool that taps implicit knowledge. Also, they showed superior performance on the MKT, a measure taps of explicit knowledge. The subjective reports and performances of the IM, the MI, and the M groups did not show the same patterns in the development of L2 knowledge. As a result, the DM and MD groups’ successful development of implicit as well as explicit knowledge illustrates that having existence of explicit knowledge may not hinder development of implicit knowledge. The M learners’ considerable loss of implicit knowledge over time further suggests that learners’ possession of explicit knowledge may foster more robust implicit knowledge. In sum, it can be concluded that acquisition of explicit knowledge may
facilitate the process of developing implicit knowledge. In terms of the timing and types of FFI, the current research observed that the deductive type of instruction offered before or after the MFI positively impact development of both implicit and explicit knowledge more effectively than FFI of the inductive type.

**Discussion of Findings and Related Issues**

**Effects of MFI in Adult L2 Acquisition**

In terms of the effects of meaning-focused exposure to L2 learning, the results of the present study agree with the previous findings of the SLA literature on L2 incidental learning (e.g., Cleary & Langley, 2007; Laufer, 1997; Laufer & Hulstijn, 2001; Leung, 2007; Leung & Williams, in press; Pulido, 2007; Rebuschat & Williams, 2006; Robinson, 1996, 2005; Williams, 2005, 2010; Williams & Kuribara, 2008) that support the argument that L2 learning can take place incidentally from simple exposure without the support of explicit instruction. Overall, the M group, who engaged in MFI exclusively, achieved significantly above chance performance on tests for measures of learning. Therefore, the results of the study suggest that instruction focusing on L2 meaning plays a positive role in adult learners’ L2 syntactic rule learning.

However, the test performance of the M group illustrates that an exclusive use of MFI does not offer a sufficient condition for L2 learning, and this is also consistent with the previous studies in SLA (e.g., R. Ellis, 1984, 1994, 2001, 2002; Lightbown, 1983; Long, 1983, 1988; Spada, 1986, 1997). For example, separate GJT analyses by target complexity and item familiarity found that the M learners achieved significant development when the target was more complex or embedded in unfamiliar syntactic patterns. These results contrast with their superior performance on the simple target and familiar items in the GJT. Therefore, the M group’s
performance suggests that not all L2 targets can be learned effectively in a primarily incidental condition.

In terms of the effects of MFI in relation to target complexity, the present study found counterevidence to Krashen’s (1982, 1994) proposals. Krashen claimed that hard rules are too complex to be taught successfully so these rules can be best learned implicitly or incidentally. Nonetheless, the findings of the present study illustrated that the incidental condition of L2 learning is less effective when the target forms are more complex (de Graaff, 1997; Robinson, 1996). For example, Robinson (1996) found that incidental learners not only gained higher scores but also reacted faster on the simple rule while the same effect was not observed on the complex rule. Also, in de Graaff (1997), incidental participants gained higher accuracy rates on the simple rule in all tests (e.g., timed/untimed GJT, gap-filling task, correction task), but not on the complex rule. As Krashen (1982, 1994) has not defined complexity and its constructs, different interpretations are possible and would affect how the results of these studies are to be understood. However, when the complexity was operationalized as the number of criteria to reach the correct form of the target, the current study found confirming evidence that the incidental condition, by means of MFI, can be beneficial when the target structures are less complex. The M learners’ limited acquisition of the complex target is discussed in the next section of the discussion.

Another limitation of incidental learning appeared from learners’ poor performance on L2 targets embedded in new patterns, which is an indication of their lack of rule transfer ability. Incidental learners’ limited rule transfer ability is in line with the previous findings in SLA (Robinson, 2005; Williams, 2010; Williams & Kuribara, 2008). For example, Robinson’s (2005) Samoan study found that incidental learners performed significantly better at judging old items
that they had seen during training than new items that had not been part of the training. Furthermore, incidental learners performed equally well at judging old items for all rule types (i.e., ergative, incorporated, locative), but their performance at judging new items varied according to rule types. Studies by Williams (2011) and Williams and Kuribara (2008) found a similar result. In their study on incidental learning of Japanese scrambling, Williams and Kuribara (2008) observed a clear learning effect exclusively on the canonically structured sentences that were frequently presented during training, but not on the legitimately scrambled sentences that were less frequently presented during training. Williams (2010) further found that an extended period of L2 exposure still did not fully support learners’ ability to generalize the rules to the legitimately scrambled sentences.

The limited development of rule generalization abilities can be attributed to the nature of knowledge acquired incidentally in MFI. The M learners’ superior performance on the familiar items but poor performance on the unfamiliar items illustrate that MFI learners’ judgment decisions may not have derived from abstract rule knowledge, but be based on memory of familiar structural patterns that was firmly established with greater exposure (Williams, 2011; Williams & Kuribara, 2008). Therefore, L2 knowledge developed under MFI can be characterized as memory of chunks on the old patterns rather than general knowledge of underlying abstract rule systems.

Indeed, according to the results of the source attributions, the M learners performed significantly above chance only on the delayed GJT posttests when performance is based on memory. In contrast, their judgments were not reliably accurate when based on rule knowledge, intuition, and guessing. These results illustrate that the nature of knowledge the M learners acquired in MFI is explicit, memory-based knowledge represented by chunks and patterns. The
M group’s memory-based knowledge seems to later contribute to acquisition of conscious judgment knowledge, knowing that testing items do or do not have the same system that training items had. The M learners’ poor performance on the OEIT, which was employed as a subsequent measure of implicit knowledge, also partially confirms that they were not able to develop reliable implicit, rule-based knowledge in MFI. As a result, the analyses of the M group’s performance and subjective reports indicate that L2 learning under the incidental condition does not successfully contribute to acquisition of abstract representations of a language system and may not facilitate flexible use of target rules in a new context.

In sum, the study found that MFI is particularly helpful for learners when the target forms are less complex. However, the M participants’ inability to transfer L2 knowledge into a new context suggests that MFI is not an optimal condition for adult L2 learners to develop abstract rule-based knowledge that can be more flexibly used in both familiar and unfamiliar contexts. The fact that the M learners showed learning effects on the familiar items indicates that MFI facilitates memory-based, data-driven associative learning, not an understanding of underlying linguistic rule systems. As the learners in MFI acquired memory-based knowledge, the nature of L2 knowledge in this context is less likely to compose a primary portion of implicit knowledge, which is a main goal of L2 learning. This contradicts Reber’s (1967, 1989, 1993) argument that learning outcomes of implicit/incidental learning are tacit and implicit in nature. From this perspective, it can be concluded that a purely meaning-focused environment would not be an effective condition for adult L2 learners to reach the ultimate goal of L2 competence and performance.
Facilitative Effects of FFI in Adult L2 Acquisition

The current experimental study found supportive evidence that FFI plays a facilitative role when it is added to a primarily MFI setting. In particular, the study observed that the mixed-method groups significantly outperformed the control group and maintained the significant improvement over time. Although the M group also performed significantly above chance on the posttests, their accuracy rates on the posttests were not significantly higher than the accuracy rates on the pretest. Also, no statistically significant difference was identified between the gain scores of the M group and the control group. Therefore, it can be concluded that a combination of FFI and MFI produces a synergistic effect in L2 learning, and the synergistic effect results in more robust and substantial learning outcomes in both the short term and the long term. The facilitative effect of FFI found by this experimental study is consistent with the findings of previous studies (e.g., Alanen, 1995; Ammar & Lightbown, 2005; Carroll & Swain, 1993; de Graaff, 1997; DeKeyser, 1995; N. Ellis, 1993; Fernández, 2008; Fotos, 1993; Fotos & R. Ellis, 1991; Muranoi, 2000; Robinson, 1995, 1996, 1997; Stafford, Bowden, & Sanz, in press; Scott, 1989, 1990; Spada & Lightbown, 1993; White, Spada, Lightbown, & Ranta, 1991; Williams & Evans, 1998), which observed positive impacts of FFI in adult SLA.

FFI and Complex Rule Learning. Further analyses indicated that the locus of robust L2 learning is in learners’ outstanding performance on the complex target. Unlike the M participants, all mixed-method groups showed superior performance on both simple and complex targets in the posttests. The benefits of FFI for acquiring complex L2 targets have been demonstrated by previous studies (e.g., de Graaff, 1997; Fernández, 2008). For example, de Graaff (1997) found in his eXperanto study that learners in the explicit learning condition scored significantly higher than learners in the implicit learning condition on the complex syntactic structure. However, a
greater effect of explicit learning was not found on the simple syntactic structure. In a study by Fernández (2008), which investigated the role of explicit grammar instruction in acquisition of simple (word order) versus complex (subjunctive Spanish) targets, she found that explicit instruction appeared to be beneficial for acquisition of the subjunctive (complex) whereas its effect was neutral for acquisition of the word order (simple). The benefits of explicit instruction were shown by explicit learners’ higher accuracy rates and faster response times.

These researchers suggest that FFI plays an effective role when the L2 targets are less clear and hence less easily noticed in the input, so that it is hard for learners to process the target rules spontaneously (de Graaff, 1997). On the other hand, the effect of FFI can be neutralized when the targets are clear enough because L2 learners can notice and process the targets spontaneously without additional aid. It seems that FFI may help learners save considerable time and effort in discovering and processing the intricacies in target forms (Hulsijn & de Graaff, 1994). The same effect of FFI appears when L2 targets are not salient enough for learners to make connections between form and meaning spontaneously (Fernández, 2008). In this study, the complex target involves obligatory deletion of *that* in the complementizer position. However, unlike other syntactic rules such as *do*-support and *wh*-movement, presence or absence of the complementizer *that* does not affect comprehension. As learners are predisposed to process L2 meaning primarily, rather than forms (Van Patten, 2005), the rules related to communicatively redundant elements, such as the complementizer *that*, are likely to be less salient and thus less available for learners to discover by themselves.

This explains why the successful acquisition of the complex target was only observed from the mixed-method groups, who received extra aid for focusing on form. Without the additional guidance on where to focus, the M learners were not able to attend to
communicatively redundant elements even when they involved crucial underlying rules. The mixed-method learners, on the other hand, were able to gain the complex rules successfully because they were guided on where to focus during MFI and paid additional attention to those elements. Consequently, that the superior learning effect appeared in the mixed-method learners confirms that the effect of FFI can be much greater when the forms are complex because the FFI helps learners notice forms that might not have been noticed due to low saliency and high intricacy of the target forms.

**FFI and Rule Transfer Ability.** The analyses also observed that substantial L2 learning appeared in mixed-method learners’ superior performance on unfamiliar as well as familiar items. This indicates that only the learners who additionally engaged in FFI were able to develop underlying rule knowledge that could be utilized in and transferred to a new, unfamiliar linguistic context. The benefits of FFI in developing transferable rule knowledge have been shown in N. Ellis’s (1993) study. N. Ellis (1993) compared adult learners’ acquisition of soft mutation of Welsh in two different learning conditions: a condition with random exposure to L2 instances (implicit condition) versus a condition with explicit rule instruction and random exposure (explicit condition). When the learners encountered the well-formedness task, consisting of items that were new constructions with the same underlying rules, N. Ellis observed that the explicit learners performed significantly better than the implicit group. Also, the researcher found that only the explicit learners were able to use retained old knowledge, and abstracted from or transfer the learned structure to the new constructions.

Learners’ ability to generalize rule knowledge is closely related to two types of learning process that Carr and Curran’s (1994) discuss: rule-based learning and exemplar-based learning. According to Carr and Curran, both learning processes can contribute to the acquisition of L2
knowledge. However, the difference between the two lies in the representation of the acquired grammar knowledge. While the products of rule-based learning are represented as abstract rules, those of exemplar-based learning are represented as individual exemplars of input. As the products of rule-based learning consist of a set of abstract rules, it leads learners to be able to perform any tasks guided by underlying rules, such as defining categories of linguistic elements, identifying their co-occurrence in grammatical constructions, determining equivalent and not equivalent constructions, and altering component elements for a new construction (Carr & Curran, 1994). Most of these tasks cannot be done successfully with the products of exemplar-based learning because the representation of exemplars of input is often frozen formulaic speech. In this case, learners’ performance may be limited to employment of specific example constructions they have received as input and committed to memory (Larsen-Freeman & Long, 1991). Although the rule-based and exemplar-based representations of grammar may coexist and contribute to development of L2 knowledge simultaneously, the products of rule-based learning certainly facilitate flexible L2 performance more considerably on the basis of proficient rule transfer skills.

In this sense, mixed-method learners’ successful performance on new unfamiliar items suggests that FFI may facilitate rule-based learning that enables learners to generalize an abstract rule system to a new context. It is possible that FFI raises learners’ attention to form and allows learners to observe L2 rules in operation during the extended period of MFI. The M learners who were exposed to the same amount of L2 input without the guidance of FFI did not show the same learning effect on the new unfamiliar items. This suggests that pedagogical rules presented with L2 instances facilitate abstraction of functional schemata for underlying grammatical structures (N. Ellis, 1993). The M learners’ superior performance on familiar items and unsuccessful
performance on unfamiliar items once again emphasize that exclusive use of MFI may lead learners to remain at the stage of memorizing fixed chunks and fabricated units of the language. Taking the results together, it seems to be appropriate to conclude that inclusion of FFI enhances a rule transfer ability that promotes flexible use of L2.

**FFI and Types of L2 Knowledge.** The subjective measures of awareness indicate that the MFI–FFI combination may facilitate development of both explicit knowledge and implicit knowledge. Rule instruction was provided for all mixed-method groups, and they showed evidence of conscious judgment knowledge across the posttests (i.e., high confidence rating when their accuracy rates on the GJT were significantly above chance). Evidence of unconscious judgment knowledge (i.e., low confidence ratings when their accuracy rates on the GJT were significantly above chance) was not observed in these groups. The source attributions, which measure consciousness of structural knowledge, showed that the mixed-method learners gained not only conscious structural knowledge (e.g., rule knowledge) but also unconscious structural knowledge (e.g., intuition) over time. The pattern of unconscious structural knowledge was clearly demonstrated by the DM and the MD groups, who were instructed with a deductive type of FFI. Here, conscious judgment knowledge driven by conscious structural knowledge is considered explicit knowledge whereas conscious judgment knowledge driven by unconscious structural knowledge is regarded as implicit knowledge. The DM and the MD learners’ superior performance on the MKT and significant development on the OEIT subsequently confirmed that these learners were able to develop explicit knowledge and implicit knowledge as well. The greater benefits of deductive FFI over inductive FFI are discussed in the following section.

In terms of FFI and types of L2 knowledge, the current study found counterevidence to Krashen’s learning-acquisition hypothesis (1982, 1983) but supportive evidence for the interface
hypothesis of implicit and explicit knowledge (Anderson, 1982, 1983; DeKeyser, 1995; R. Ellis, 1992; Sharwood Smith, 1981). While it is less clear whether explicit rule knowledge can be converted into implicit knowledge (i.e., the strong interface position) or instead only facilitates development of implicit knowledge (i.e., the weak interface position), the findings of the current research are evidence that inclusion of explicit methods of L2 instruction does not hinder development of implicit knowledge. When compared to the M learners’ failure in acquiring implicit knowledge, the data further illustrate that FFI may support the more effective development of implicit knowledge.

The possibility of parallel development of implicit knowledge and explicit knowledge has been suggested by research in the field of cognitive psychology that deals with a domain of motor-skill learning (e.g., Willingham, 1998; Willingham & Goedert-Eschmann, 1999). Using a serial response time (SRT) task, William and Goedert-Eschmann found that participants in the explicit learning group showed the same reliable effect of the SRT task as the participants in the implicit group at the transfer phase. Based on this result, the researchers suggested that implicit and explicit learning of a sequence in a motor task are not mutually exclusive, but can occur in parallel. In other words, when learners acquired explicit knowledge, they could still gain implicit knowledge during the training, as “explicit knowledge can be used to guide motor behavior while implicit learning occurs in parallel, based on the motor behavior being executed” (Willingham & Goedert-Eschmann, 1999, p. 534).

Another interesting finding in this dissertation study was that the mixed-method groups and the M group showed different qualities of unconscious structural knowledge in terms of the duration of knowledge retention. For example, the analyses of the source attributions on the immediate posttest indicate that both mixed-method groups and the M group performed
significantly above chance when basing their choice on *intuition*, indicating that reliable unconscious structural knowledge was sustained over a week. However, the data show that the M learners could not sustain the reliable *intuition* more than a week, while the mixed-method learners, particularly, the DM and MD groups, maintained it for a month. As the only difference between the mixed-method groups and the M group was provision of explicit FFI, this finding might argue that FFI can play a positive role in retaining unconscious structural knowledge (here, *intuition*) for a longer period of time. It is possible that explicit knowledge would offer a foundation for robust implicit knowledge in addition to guiding development of implicit knowledge. Also, it is possible that explicit knowledge would support simultaneous acquisition of the ability to process implicit knowledge during treatment. Consequently, according to the data of the present study, explicit FFI and explicit L2 knowledge are not likely to interfere with the development of implicit knowledge. Rather, they may facilitate development of implicit L2 knowledge.

**Specifying Differential Effects of FFI**

The study found that deductive FFI provided prior to MFI is the most effective, as shown by the DM group’s consistently superior performance over time and successful acquisition of implicit and explicit L2 knowledge. These advantageous effects of deductive FFI over inductive FFI are consistent with what has been found in other studies in the context of adult L2 learning (e.g., DeKeyser, 1995; Erlam, 2003; Robinson, 1996; Rose & Ng, 2001; Seliger, 1975). These previous studies observed that a deductive type of FFI by means of explicit grammar explanation is more facilitative for the development of L2 comprehension (Robinson, 1996; Seliger, 1975) as well as L2 production (Erlam, 2003; Rose & Ng, 2001). For example, Seliger (1975) showed that both deductive and inductive types of FFI positively affect initial
learning of L2 after the treatment. However, Seliger also found that only the deductive group retained knowledge over three weeks, while the inductive learners showed losses of knowledge after three weeks. Seliger’s study illustrates that deductive FFI is more beneficial than inductive, as it effectively supports successful development of L2 comprehension and production abilities and retention of knowledge for a longer period of time.

Close observation of learners’ performance on targets with different levels of complexity offers another perspective on the relative benefits of deductive versus inductive FFI. In this study, the effectiveness of FFI appeared to be greater when the target rules were complex. This finding is in line the findings of other studies (e.g., DeKeyser, 1995; Robinson, 1996) that have identified superior impacts of deductive instruction for learning complex L2 rules. Widodo (2006) ascribes the relative benefits of deductive instruction over inductive instruction to its systematic and analytic manner of rule presentation. According to him, a deductive approach to grammar instruction simplifies the rules systematically and gives analytic, metalinguistic explanations in detail. Therefore, adult learners can understand the rules more effectively in a reduced period of time and with high clarity. On the other hand, as the learners in inductive FFI are asked to find out the rules by themselves, they tend to spend more time grasping the rules and they experience some trial and error. For these reasons, a deductive method of L2 learning is more appropriate for adult learners, who are cognitively mature enough to understand various grammatical terminologies and rules in a reduced time.

Previous researchers have claimed that the choice of either deductive or inductive instruction cannot be separated from consideration of target complexity. For example, Fisher (1979) proposed that inductive instruction may be more appropriate when target rules are similar to or simpler than those in learners’ first language (L1). When the target rules are more complex,
however, inductive instruction is not the best option because learners may induce incorrect rules from L2 examples (Nunan, 2003; Robinson, 1994). In this context, deductive FFI is more effective, as it delivers rules with high clarity and systematicity. Therefore, deductive FFI offers a condition in which learners can acquire complex rules accurately and with less trial and error. Accordingly, deductive learners’ superior performance on the complex rule in the current study might be resulted from clearer representation of underlying rules, which in turn contributed to accurate transfer of rule knowledge.

However, this study, with its findings of the superior effects of deductive FFI, runs counter to other studies that have shown an advantage of inductive FFI over deductive FFI (e.g., Herron & Tomasello, 1992; Shaffer, 1989) or no significant difference between the two methods (e.g., Abraham, 1985; Rosa & O’Neill, 1999). This inconsistency between the current findings and the previous studies seems to be the result of variations in research design. Therefore, thorough observation of the designs and results of the studies offers another perspective from which to consider the relative benefits of deductive versus inductive FFI. A principal difference between the current study and the studies whose results it contradicts is in the utilization of targets and assessment instruments. Unlike the current study, the previous studies (e.g., Herron & Tomasello, 1992; Shaffer, 1989) observed the impacts of two different types of FFI on multiple targets without controlling for complexity. For example, Shaffer (1989) recruited participants from three intact L2 French and Spanish classes and tested the effectiveness of deductive and inductive types of FFI on any grammatical point that occurred in the school’s curriculum. Herron and Tomasello (1992) utilized 10 random grammar structures in French. As for the assessment instruments, most studies have been limited to employing immediate posttests so they did not measure retention of rule knowledge. Consequently, it seems likely that these
studies’ results suggesting that inductive FFI has superior impacts would not be replicated if these variables were strictly controlled for.

In terms of the timing of FFI, the current study found that the deductive type of FFI is even more beneficial when it is offered earlier within the context of MFI rather than later. These benefits were shown by the DM group’s outstanding rule transfer ability. The better performance of the DM group than the MD group is consistent with what was observed by Reber et al. (1980) and Kim and Rebuschat (in preparation), whose studies tested synergistic effects of explicit learning and implicit learning when subjects learn AGL or semi-artificial language, respectively. Both studies found that a synergistic effect of explicit and implicit/incidental modes of learning takes place optimally when explicit learning precedes implicit/incidental learning. When the learning conditions were offered in the reverse order, the synergistic effect of the two modes was reduced. Stafford et al. (in press) also investigated the effects of timing, with study in which some participants received pre-practice grammar explanation and metalinguistic feedback on initial learning of Latin morphosyntax. The study observed that only those learners who were instructed with pre-practice grammar explanation achieved significant initial development on GJT and written production. The same effect was not observed for those learners who received only metalinguistic feedback during practice. The study’s results support the claim that deductive FFI offered prior to practice activities potentially has stronger effects on L2 development.

The advantage of early provision of FFI for learners’ development of rule generalization has been partially explained by some studies in cognitive psychology, which attempted to identify a condition that promotes or inhibits rule transfer. Anderson, Fincham, and Douglass (1997) demonstrated that thorough understanding of the underlying principles before exposure to target examples help learners establish usable rule knowledge that can be transferred to new
target examples. After participants practiced applying rules to examples over a period of five days, Anderson et al. (1997) observed that the participants became competent at solving not only old study examples but also new test examples. Their development was shown by high accuracy rates and fast reaction times on the test items. Moreover, the participants’ reports on the problem-solving process suggested that learners’ initial tendency to use example-based strategies gradually changed into a preference for rule-based strategies, which is an indication of development of procedural embodiment of the rule.

On the other hand, drawbacks of rule learning that is delayed until after extensive exposure have also been noted by other SLA researchers. It has been emphasized by many researchers that the focus of L2 instruction and assessment is on application—transfer of knowledge, in other words—rather than on the possession of basic skills and knowledge (Brown, 2009; Merrifield, 2000). The ability to transfer knowledge can be acquired only through practice (DeKeyser, 2007; Hartman, 2001; Pressley & Woloshyn, 1995) as learners become aware of gaps or inconsistencies in their existing knowledge while they access it during practice. Thus, practice based on their existing linguistic knowledge and contextualized L2 leads them to restructure or expand that knowledge.

Although a contextualized approach is highly promoted as a mean to develop application of underlying principles, patterns, and their relationships (Bransford, Brown, & Cocking, 1999; Glaser, 1992; Greeno, Resnick, & Collins, 1997), Bransford et al. (1999) claimed that rule transfer would be rather reduced when the knowledge is overly contextualized. Their study found that L2 learners may not be able to develop transferrable L2 knowledge unless proper instruction on rules is provided in a timely way because learners can be overwhelmed by excessively contextualized use of L2. In other words, exposure to contextualized L2 without prior rule
knowledge may not function well as practice to observe and learn how the rules work. Therefore, it can be concluded that rule transfer ability is more likely to be achieved effectively when learners are informed of rules before they are exposed to contextualized L2 because understanding underlying principles and patterns help learners observe how they work during practice.
Chapter VI: Conclusion

The current dissertation experiment aimed to identify benefits of FFI when it was offered within a primarily meaning-focused condition in the context of adult SLA. In order to observe the effectiveness of FFI, the study examined whether FFI plus MFI promotes adult L2 learning more effectively than exclusive use of MFI. Differential impacts of learning conditions were assessed by learner performances on the posttests and in terms of the type of knowledge (e.g., implicit knowledge and explicit knowledge) they demonstrated having acquired after the instructional treatment. In addition, by manipulating external and internal variables of FFI, such as the timing of FFI (i.e., prior to versus after MFI), the type of FFI (i.e., deductive versus inductive types), the complexity of target forms (i.e., simple versus complex targets), and the familiarity of target patterns (i.e., familiar versus unfamiliar patterns), this study attempted to specify an optimal condition in which FFI best promotes L2 learning.

The mixed-method groups significantly outperformed the control group in the short term as well as the long term, indicating that the additional use of FFI within MFI produces a robust learning effect. On the other hand, the learners who were only instructed in MFI neither significantly outperformed the control group nor sustained the knowledge over time. The facilitative effect of FFI appeared more clearly when the learners’ performances were separately analyzed by the variables of target forms (i.e., target complexity and pattern familiarity). The study observed that the mixed-method learners tended to show significant development consistently across simple and complex targets and familiar and unfamiliar items. In contrast, the MFI-only learners showed significant development only on the simple rule and the familiar items, and no development on the complex rule and the unfamiliar items. The results of all the analyses, taken together, suggest that inclusion of FFI within the context of MFI is beneficial for
adult L2 learning. Moreover, FFI may have a greater impact when the target forms are relatively more complex or the rules are presented in new patterns.

The relative benefits of the combination of FFI and MFI over the exclusive use of MFI in learning complex rules and acquiring of generalizable rule knowledge may be attributed to the different natures of MFI and FFI. First of all, MFI leads learners’ attention primarily to meaning, and it does not necessarily raise learner awareness on analytic information of L2 codes. Therefore, when L2 target forms are not perceptually salient or do not carry a heavy communicative load, it is less likely learners are less likely to notice the underlying rules and learn them accurately. As the MFI learners in this study actively engaged in the meaning-focused task, it is possible that they were not able to pay extra attention to forms. Note that the complex target of the study involved deletion of the complementizer *that*, which is communicatively redundant. Due to the lack of the communicative load, the MFI learners might have not focused on the criteria, which resulted in no learning on the complex form. In addition, the MFI learners’ poor rule transfer ability indicates that the repetitive exposure to meaningful L2 input does not sufficiently support rule abstraction for adult L2 learners, and its effect is limited to pattern learning based on memory of L2 exemplars.

Unlike MFI, which does not guarantee additional focus on L2 forms, FFI directs learners’ attention to L2 forms and underlying systems of the L2. It appears to be due to the form-focused nature of FFI that the FFI learners in this study fairly easily noticed and understood the transformational syntactic rules of the L2. Although the complex rule involved less salient transformational rules and criteria with no communicative value, the learners who were guided with explicit grammar information were able to focus on the critical part, and they showed development on it immediately and over time. In addition, the FFI learners’ superior
performance on the unfamiliar items suggests that the grammar information on the target forms may lead adult learners to rely less on memory-based L2 examples and more on underlying rule systems, which may facilitate rule abstraction and rule generalization.

As for the timing and types of FFI, the results of this study show that FFI offered prior to MFI and in a deductive fashion (i.e., DM and MD) are more facilitative than FFI offered after MFI or in an inductive manner. The relative benefits of early deductive FFI were demonstrated by the DM and MD participants’ consistently superior performance on the posttests and their development of both implicit knowledge and explicit knowledge over time. Compared to the other mixed-method groups, the DM and the MD groups consistently showed significant pre-to-post development on both simple and complex rules and familiar and unfamiliar items along with superior performance to that of the control group over time. In terms of implicit and explicit knowledge, the subjective measures of analysis, OEIT, and MKT gain scores provide evidence that the DM group and the MD group immediately acquired explicit knowledge and gained implicit knowledge in parallel over a month. Other groups did not show evidence of implicit knowledge but did gain explicit knowledge based on rules (i.e., IM and MI groups) or memory (i.e., M group).

An interesting aspect of the current study is that it provides positive evidence for the claim of the interface hypothesis of implicit and explicit knowledge, which is that explicit instruction on forms supports development of implicit knowledge of the L2. It further indicates that implicit knowledge can develop in a parallel with explicit knowledge, so the presence of explicit knowledge of L2 does not hinder development of implicit L2 knowledge. Because the parallel development of implicit and explicit knowledge was only shown by the DM group and the MD group, and not by the M group (i.e., the incidental learning group), it can be concluded
that explicit instruction and products of explicit learning can be useful in the development of implicit knowledge in the context of adult SLA.

At this point, it is less clear whether explicit knowledge was converted into implicit knowledge (i.e., the strong interface hypothesis) or just remains as a facilitator for implicit knowledge (i.e., the weak interface hypothesis). As the proponents of the strong interface position suggest (DeKeyser, 1995; Anderson, 1982; 1983), it is possible that a portion of explicit knowledge converted into implicit knowledge through intensive practice on the L2 targets. On the other hand, as R. Ellis’ (1993) weak interface position proposes, it is also possible that explicit knowledge of L2 forms triggered active restructuring of learners’ interlanguage system and facilitated development of implicit knowledge. Although no clear conclusion can be drawn for the developmental process of implicit knowledge, the data of the current study indicate that implicit knowledge can develop more effectively when the grammar rule information is taught in deductive manner as it delivers the rules in a succinct and analytic way. Also, the data suggest that this process can be facilitated when learners receive more authentic L2 input after learning the rules because then learners have more chance to observe the operation of the rules and internalize them through repetitive practice. As a result, the current research offers clear evidence that explicit knowledge does play a considerable role in the development of implicit knowledge, so explicit grammar instruction does not need to be avoided or excluded from meaning-focused L2 learning classrooms for adults.

The current study has important pedagogical implications for the structure of adult second language classes, which mainly consist of MFI methods and FFI methods. The current findings suggest that a combination of FFI and MFI is facilitative of L2 learning, and more effective learning is driven when adult learners learn the rules deductively before engaging in the
meaning-focused activities. In this study, a considerably greater synergistic effect of FFI and MFI was shown for complex rule learning and development of rule transfer ability. Adult L2 curricula could be improved by being structured around explicit rule presentation provided before exposure to naturalistic L2 instances, which is the most facilitative of adults’ L2 syntax learning.
Chapter VII: Limitations and Future Research

This study has several methodological limitations. First of all, the duration of exposure to the L2 targets was not rigidly controlled. In addition to the MFI condition, which lasted approximately 30–40 minutes, the mixed-method groups received FFI for another 10–15 minutes. During these 10–15 minutes, the mixed-method learners were instructed in the rules either deductively or inductively and shown three to six example sentences, and they completed three comprehension questions. Although the rule instruction took a short period of time and the number of example sentences was small, the extra 10 minutes of exposure to positive input could result in unexpected changes in learners’ cognition, which might facilitate or impede their learning of the targets. In addition, recall that the meaning-focused task for MFI asked learners to hear and repeat the same target sentence until they reached the correct answer. This means that learners would have received more positive input when they made more errors in the meaning-focused task. Therefore, in order to validate the results of the current research, a future study should observe whether the results can be replicated when the amount and duration of exposure to positive input are rigidly controlled.

The second methodological limitation stems from learners’ individual differences and their potential influence on the effectiveness of deductive or inductive types of FFI. In this study, the deductive type of FFI demonstrated a greater effect than the inductive type of FFI in L2 syntactic rule learning. The facilitative effect of deductive FFI was attributed to its systematic, clear, and succinct rule presentation. However, it is possible that the effectiveness of an instructional method can be significantly correlated with individual learning preferences, which are largely determined by learners’ learning styles (e.g., sensing vs. intuitive; visual vs. verbal; active vs. reflective; sequential vs. global) (Oxford, 1990; Oxford & Ehrman, 1993; Oxford,
Ehrman, & Lavine, 1991; Wallace & Oxford, 1992), cultural backgrounds (e.g., individualist vs. collectivist; hierarchical vs. egalitarian) (Hayes & Allinson, 1988; Hughes-Wiener, 1986; Kolb, 1976, 1984; Kolb & Fry, 1975), and motivation to be involved in instructional activities (Felder & Brent, 2005; Kolb, 1984; Piaget, 1972, among others). All these factors would affect the relative effectiveness of the two types of FFI instructional methods. Therefore, a further study examining any moderating effect of learners’ individual differences on the effectiveness of deductive and inductive types of FFI would be useful for further validating the results of the current study.

Third, L2 learning, in this study, would have taken place not only from the treatment but also from the testing. Recall that the experimental groups and the control group generally showed an increasing trend in their scores on the tests measuring learning. Also, unlike much other SLA research that uses a repeated-measures design, the current study detected little significant loss of L2 knowledge during the month after the treatment. As with the learners in the study by Morgan-Short, Finger, Grey, and Ullman (2012), this study’s learners’ successful retainment of L2 knowledge might have derived from their relatively high proficiency in the L2 target that was achieved during the treatment sessions. However, the fact that the control group also showed an increase in their mean scores indicates that the learners might have acquired L2 knowledge during testing.

In order to reduce the testing effect, the current study employed only twenty-four sentences in total for the GJT and the OEIT and only eight sentences for the MKT. Nevertheless, regular exposure to the targets through the four test times (i.e., pretest, immediate posttest, one-week delayed posttest, and one-month delayed posttest) might have brought the learners L2 knowledge or strategies for testing. As data triangulation provides more valid and reliable results
(Mackey & Gass, 2005), utilization of multiple measures of knowledge is an accepted method in SLA research. However, employment of multiple measures also increases incidental exposure to L2 targets. In order to enhance the research’s validity, a future study needs to consider an innovative way to triangulate data and to reduce testing effects at the same time.

Fourth, due to the limited number of testing items, the current study cannot provide an elaborate interpretation of the complex relationships among the target complexity, item familiarity, types of knowledge, and effectiveness of various types of FFI. As mentioned, this study utilized a minimum number of items in order to reduce testing effects. For this reason, there were three items that were purely simple and familiar, three items purely simple and complex, three items purely complex and familiar, and three items purely complex and unfamiliar. This small number of testing items for quantitative statistical analysis makes it very hard to observe separate and combined effects of the dependent variables (i.e., target complexity and target familiarity) on the relative effectiveness of FFI and the development of implicit and explicit knowledge. As an increased number of testing items and testing effects should be considered together, future research should observe the effects of FFI methods and target complexity separately from the effects of FFI methods and item familiarity by testing different but comparable groups of participants.

The fifth methodological limitation stems from the measures of awareness. In order to enhance assessment reliability, development of implicit knowledge and explicit knowledge was examined by one primary measure (i.e., subjective measures of awareness) and one subsequent measure (i.e., the OEIT for implicit knowledge and the MKT for explicit knowledge). In this study, no great discrepancy between the subjective measures of awareness and the OEIT and the MKT was demonstrated. However, there were some cases where the mixed-method learners’
accuracy rates on the GJT were significantly above chance when they relied on implicit knowledge while their performance on the OEIT was not significantly above chance. In these cases, the study referred to results of the analyses of between-group and within-group difference. When the mixed-method groups either significantly outperformed the control group or developed significantly over time, the study concluded that the mixed-method group showed a trend of development.

However, as the subjective measures of awareness and the OEIT did not report the same results all the time, no firm conclusion can be drawn as to whether the implicit knowledge was acquired during training. As the GJT requires an L2 interpretation skill and the OEIT requires an L2 production skill, it is possible that the implicit knowledge was only available for the interpretation skill and not yet available for the production skill (De Jong, 2005). In other words, different skills of language would be likely to require different amounts of implicit knowledge to perform successfully. It is also possible that, although the learners were thoroughly instructed what guess, intuition, memory, and rule knowledge refer to, they may have not reported accurately on what sources they relied on for the grammaticality judgment. In order to clarify these matters, a future study should include online measures such as reaction time or verbal protocol such as think-aloud, and examine whether learners’ subjective reports and their behavior correspond to each other. Moreover, separate analyses on grammatical sentences and ungrammatical sentences would also provide additional evidence for the types of knowledge the learners rely on (R. Ellis, 2005).

Lastly, this study only looked at L2 syntax learning, so it was not ideal for making generalizations about other aspects of linguistic knowledge. In this study, two syntactic transformational rules were used as target forms. However, a study might have different results if
the target forms involved different aspects of language (e.g., morphological rules, semantic rules, vocabulary). Also, different results would be likely in a study that operationalized target complexity in different ways. To address these limitations, a future replication study should investigate whether the sequence and manner of learning conditions that this study identifies as optimal are applicable to other L2 targets.
Appendix A

Deductive FFI (Delivered in Korean, English translation provided in *italics*)

1. Deductive FFI for the Object Extraction Construction

**목적어를 찾는 의문문 만들기**

*How to make an interrogative sentence that the object is in question*

복문 (ex. You think that John likes English) 을
목적어를 찾는 의문문으로 만드는 방법 3 단계

*Three steps to change a complex declarative sentence*

(ex. You think that John likes English)

*into an interrogative sentence that the object is in question*

1. **Do/Does 동사를 이용하여 주절을 의문형으로 바꾸기.**

Insert do/does and change the main clause into a form of interrogative sentence.

You think that John likes English. → **DO you think** that John likes English.

2. **종속절 목적어에 알맞는 의문사 찾기.**

Find out an appropriate wh-word for the object.

Do you think that John likes **English**. → Do you think that John likes **WHAT**.

3. **종속절 의문사를 문두로 이동.**

Move the _wh_-word to the sentence front.

Do you think that John likes **what**. → **WHAT** do you think that John likes?  
= **WHAT** do you think John likes?

[연습하기 Practice] 아래의 평서형 복문을 의문형 복문으로 바꾸되, 밑줄 친 문장이 의문형의 답이 될 수 있도록 바꾸어 봅시다. *Change the complex declarative sentences into interrogative forms that the underlined word to be the answer.*

Ex1) You think that Mary makes dinner.  
Ex2) He believes that John drives the bus.  
Ex3) She guesses that Sarah visited her grandmother.
2. Deductive FFI for the Subject Extraction Construction

주어를 찾는 의문문 만들기

How to make an interrogative sentence that the subject is in question

복문 (ex. You think that John likes English) 을 주어를 찾는 의문문으로 만드는 방법 3 단계

Three steps to change a complex declarative sentence (ex. You think that John likes English) into an interrogative sentence that the subject is in question

1. Do/Does 동사를 이용하여 주절을 의문형으로 바꾸기.

   **You think** that John likes English. \(\rightarrow\) **DO you think** that John likes English.

2. 종속절 목적어에 알맞는 의문사 찾기.

   Do you think that John **likes** English. \(\rightarrow\) Do you think that **WHO** likes English.

3. 종속절 의문사를 문두로 이동.

   Move the wh-word to the sentence front.

   Do you think that **who** likes English. \(\rightarrow\) **WHO** do you think that likes English?

4. 접속사 that 삭제.

   Delete the complementizer **that**

   Who do you think **that** likes English? \(\rightarrow\) Who do you think likes English?

[연습하기 Practice] 아래의 평시형 복문을 의문형 복문으로 바꾸어, 밑줄 친 문장이 의문형의 답이 될 수 있도록 바꾸어 보십시오. Change the complex declarative sentences into interrogative forms that the underlined word to be the answer.

Ex1) You think that Mary makes dinner.
Ex2) He believes that John drives the bus.
Ex3) She guesses that **Sarah** visited her grandmother.
Appendix B

Inductive FFI (Delivered in Korean, English translation provided in *italics*)

1. Inductive FFI for the Object Extraction Construction

How to make an interrogative sentence that the object is in question

Find out the three steps how to change a complex declarative sentence (ex. You think that John likes English) into an interrogative sentence that the object is in question.

Step 1:

A 그룹

- You think that John likes her.
- He believes that Mary reads books.
- She guesses that Tom rides a bike.

B 그룹

- DO you think that John likes her.
- DOES he believe that Mary reads books.
- DOES she guess that Tom rides a bike.

What makes the sentences in Group B be different from the sentences in Group A?

Create a rule for the sentences in Group A to be transformed into the sentence in Group B.

Step 2:

B 그룹

- Do you think that John likes her.
- Does he believe that Mary reads books.
- Does she guess that Tom rides a bike.

C 그룹

- Do you think that John likes WHO.
- Does he believe that Mary reads WHAT.
- Does she guess that Tom rides WHAT.

What makes the sentences in Group C be different from the sentences in Group B?

Create a rule for the sentences in Group B to be transformed into the sentence in Group C.
Step 3:

C 그룹

Do you think that John likes who.
Does he believe that Mary reads what.
Does she guess that Tom rides what.

D 그룹

WHO do you think that John likes?
WHAT does he believe that Mary reads?
HAT does she guess that Tom rides?

- C 그룹의 문장들과 D 그룹의 문장들의 차이는 무엇입니까?

What makes the sentences in Group D be different from the sentences in Group C?

- C 에서 D 로 가기 위한 법칙을 말해보세요.

Create a rule for the sentences in Group C to be transformed into the sentence in Group D.

Still Step 3:

D 그룹

Who do you think that John likes?
What does he believe that Mary reads?
What Does she guess that Tom rides?

E 그룹

Who do you think John likes?
What does he believe Mary reads?
What does she guess Tom rides?

- D 그룹의 문장들과 E 그룹의 문장들의 차이는 무엇입니까?

What makes the sentences in Group E be different from the sentences in Group D?

- D 그룹의 문장들과 E 그룹의 문장들을 보고 내일 수 있는 결론은 무엇입니까?

What can you conclude from the sentences in Group D and E?

[연습하기 Practice] 아래의 평서형 복문을 의문형 복문으로 바꾸되, 밑줄 친 문장이 의문형의 답이 될 수 있도록 바꾸어 쓰십시오. Change the complex declarative sentences into interrogative forms that the underlined word to be the answer.

Ex1) You think that Mary makes dinner.
Ex2) He believes that John drives the bus.
Ex3) She guesses that Sarah visited her grandmother.
2. Inductive FFI for the Subject Extraction Construction

주어를 찾는 의문문 만들기

*How to make an interrogative sentence that the subject is in question*

지금부터 우리들은 복문 (ex. You think that John likes English)을 주어를 찾는
의문문으로 만드는 방법 3 단계를 찾을 것입니다.

*Find out the three steps how to change a complex declarative sentence*

*ex. You think that John likes English)*

*into an interrogative sentence that the subject is in question*

**Step 1:**

**A 그룹**

- You think that John likes he believes that Mary reads books.
- She guesses that Tom rides a bike.

**B 그룹**

- DO you think that John likes h r believes that Mary reads books.
- DOES he believe that Mary reads books.
- DOES she guess that Tom rides a bike.

*A 그룹의 문장들과 B 그룹의 문장들의 차이는 무엇입니까?*

*What makes the sentences in Group B be different from the sentences in Group A?*

- A에서 B로 가기 위한 법칙을 말해보세요.

*Create a rule for the sentences in Group A to be transformed into the sentence in Group B.*

**Step 2:**

**B 그룹**

- Do you think that John likes her.
- Does he believe that Mary reads books.
- Does she guess that Tom rides a bike.

**C 그룹**

- Do you think that WHO likes her.
- Does he believe that WHO reads books.
- Does she guess that WHO rides bike.

*B 그룹의 문장들과 C 그룹의 문장들의 차이는 무엇입니까?*

*What makes the sentences in Group C be different from the sentences in Group B?*

- B에서 C로 가기 위한 법칙을 말해보세요.

*Create a rule for the sentences in Group B to be transformed into the sentence in Group C.*
Step 3:

C 그룹

Do you think that WHO likes her. 

Who do you think that likes her?

Does he believe that WHO reads books.

Who does he believe that reads books?

Does she guess that WHO rides bike.

Who does she guess that rides bike?

D 그룹

- C 그룹의 문장들과 D 그룹의 문장들의 차이는 무엇입니까?

What makes the sentences in Group D be different from the sentences in Group C?

- C 에서 D 로 가기 위한 법칙을 말해보세요.

Create a rule for the sentences in Group C to be transformed into the sentence in Group D.

Step 4:

D 그룹

Who do you think that likes her?

Who does he believe that reads books?

Who does she guess that rides bike?

E 그룹

Who do you think likes her?

Who does he believe reads books?

Who does she guess rides bike?

- D 그룹의 문장들과 E 그룹의 문장들의 차이는 무엇입니까?

What makes the sentences in Group E be different from the sentences in Group D?

- D 그룹의 문장들과 E 그룹의 문장들을 보고 내일 수 있는 결론은 무엇입니까?

What can you conclude from the sentences in Group D and E?

[연습하기 Practice] 아래의 평서형 복문을 의문형 복문으로 바꾸되, 밑줄 친 문장이 의문형의 답이 될 수 있도록 바꾸어 볼시다. Change the complex declarative sentences into interrogative forms that the underlined word to be the answer.

Ex1) You think that Mary makes dinner.
Ex2) He believes that John drives the bus.
Ex3) She guesses that Sarah visited her grandmother.
Appendix C

120 Sentences for Treatment

Objective Extraction with *that* (OE + that)

1. What do you believe that Jessica likes the most?
2. What do you guess that David studies now?
3. What do you think that John drinks every Friday?
4. What do you believe that John knows very well?
5. What does she guess that Jessica draws on the canvas?
6. What does she think that John has in his hand?
7. What does he think that Sarah cooks in the kitchen?
8. What does he believe that Jessica steams in the pot?
9. What do you guess that Jessica cooked this afternoon?
10. What do you think that David broke last night?
11. What do you believe that John grew in his garden?
12. What do you guess that Sarah fed her dog yesterday?
13. What does she believe that John tore yesterday?
14. What does she guess that David cleaned last Friday?
15. What does he think that John borrowed from Jessica?
16. Who do you guess that Jessica respects among her friends?
17. Who do you think that Jessica gets along with?
18. Who do you believe that David buys the flowers for?
19. Who does he guess that John hangs out with these days?
20. Who does she believe that Jessica made cookies with?
21. Who does she guess that Sarah teaches at school?
22. Who does he think that John watches TV with after dinner?
23. Who do you think that Sarah invited to the party?
24. Who do you believe that Snow White danced with?
25. Who do you guess that the cat walked with?
26. Who do you think that the bear looked at?
27. Who does he believe that Sarah met on Thursday?
28 Who does she think that the kids are flying with?
29 Who does she believe that David picked up last Tuesday?
30 Who does she believe that the witch looked at?

Objective Extraction without *that* (OE – *that*)

31 What do you believe Sarah teaches at school?
32 What do you guess Jessica rides in the park?
33 What do you think the tiger throws in the field?
34 What do you believe the animal grows in the field?
35 What does she guess Sarah sends to her brother?
36 What does he think John wears on Sundays?
37 What does he think the tiger jumps on in the field?
38 What does he believe John observes on May 22nd?
39 What do you guess the little pig sat on in the field?
40 What do you think Jessica decided two weeks ago?
41 What do you believe Sarah has learned before?
42 What do you guess Jessica decided a week ago?
43 What does she believe the bear had in the pot?
44 What does she guess David baked last Thursday?
45 What does he think David played in the playground?
46 Who do you guess Sarah sings a song for on August 26th?
47 Who do you think the crocodile helps fight?
48 Who do you believe John donates 30 dollars to monthly?
49 Who does he guess Sarah visits once in a while?
50 Who does she believe Wendy is proud of?
51 Who does she guess David talks to over the phone?
52 Who does he think John can deceive so easily?
53 Who do you think David hugged on the street?
54 Who do you believe the dog bit at the door?
55 Who do you guess Peter Pan fought with?
56  Who do you think sailed the ship on the sea?
57  Who does he believe Wendy looked at?
58  Who does she think David wrapped a gift for at school?
59  Who does she believe Jessica was kissed by?
60  Who does he guess David sued two years ago?

Subjective Extraction (SE – that)

61  What do you believe falls down from the sky?
62  What do you guess makes David happy on Sundays?
63  What do you think supports Jessica financially?
64  What do you believe files in the sky?
65  What does she guess makes the boy sleepy?
66  What does she think chases the mouse on the hill?
67  What does he think sits on the leaf?
68  What does he believe looks like a mushroom?
69  What do you guess spoiled Sarah's plan for skiing?
70  What do you think surprised Sarah the other day?
71  What do you believe delayed her presentation?
72  What do you guess absorbed the water on the floor?
73  What does she believe impressed his parents a lot?
74  What does she guess drew the students' attention in class?
75  What does he think runs faster than the cat?
76  Who do you guess wears a blue shirt in the picture?
77  Who do you think hates Sarah the most in class?
78  Who do you believe offers special lunch next week?
79  Who does he guess has a very fancy house in this area?
80  Who does she believe goes jogging every morning?
81  Who does she guess wears a swim cap in the picture?
82  Who does he think works at the department store?
83  Who do you think brought the hamburger to the beach?
Who do you believe is depressed these days?
Who do you guess enjoyed the day at the beach?
Who do you think married Sarah last year?
Who does he believe memorized all words completely?
Who does she think blew out the candles on the cake?
Who does she believe brought a gift to the party?
Who does he guess discovered America in the 1450s?
What do you guess makes Mary happy now?
What do you think disappointed Sarah last week?
What do you believe rotates around the sun once an year?
What do you guess takes place weekly on Mondays?
What does he believes determines price in the market?
What does she guess contributes to social justice a lot?
What does she think makes learning English difficult?
What does he believe help his diet a lot?
What do you believe made the boy excited?
What do you guess gave Jessica a lot of wisdom?
What do you think was good news to Sarah last week?
What do you believe watched Jerry secretly?
What does he think slept in front of the fireplace?
What does he believe was in Bulgogi yesterday?
What does she guess made this restaurant unique?
Who do you believe likes banana very much?
Who do you believe climbs the mountain every Saturday?
Who do you guess needs to see a doctor tomorrow?
Who does she guess leads this group very well?
Who does he think checks the report everyday?
Who does he believe is a birthday person today?
Who does she think stole the money at the store?
Who do you guess went on a trip last month?
Who do you think sat next to Goofy at that time?
Who do you believe missed the bus on May 11th?
Who do you guess made a sand castle at the beach?
Who does she think played with a beach ball?
Who does she believe liked Sarah's dinner plan next week?
Who does he think brought snacks a week ago?
Who does she believe met David last Thursday?
Appendix D

Sample presentation of the picture-selection task

(A participant hears *What does he think that Sarah cooks?*)

(The participant repeats *What does he think that Sarah cooks?*)

(The Participant chooses an answer. Moving on to the next question if the participant chooses a correct one. If not, the same question is repeated until the participant answers correctly)
Appendix E

24 Sentences for the Elicited Oral Imitation Task

Pretest

1. Who do you think that Jessica chases? OE+that Familiar
2. Who does he guess John introduced? OE-that Familiar
3. Who does she believe hugs David? SE-that Familiar
4. What does he think grew under the tree? SE-that Familiar
5. What does she guess that the lawyer has? OE+that Familiar
6. Which sport do you assume Jessica joined? OE-that Unfamiliar
7. What does she believe flies in the air? SE-that Familiar
8. Which fish do you suppose lived in the river? SE-that Unfamiliar
9. Which singer does he imagine that John remembers? OE+that Unfamiliar
10. Which person do you assume Jessica praised? OE-that Unfamiliar
11. Which climber does he suppose goes hiking? SE-that Unfamiliar
12. Which movie does she imagine was the best? SE-that Unfamiliar
13. * What do you think that Sarah celebrates it? OE+that Familiar
14. * What does he guess David cleaned it? OE-that Familiar
15. * What does she believe that watches John? SE+that Familiar
16. * Who does he think she went on a trip? SE-that Familiar
17. * Which vegetable does she assume that Jessica sells it? OE+that Unfamiliar
18. * Who do you guess John met her? OE-that Familiar
19. * Who does she believe that wears the uniform? SE+that Familiar
20. * Which factory do you suppose it polluted the sea? SE-that Unfamiliar
21. * Which score does he imagine that Jessica gains it? OE+that Unfamiliar
22. * Which lines do you assume John connected them? OE-that Unfamiliar
23. * Which bird does he suppose that catches insects? SE+that Unfamiliar
24. * Which criminal does she imagine he robbed the bank? SE-that Unfamiliar
<table>
<thead>
<tr>
<th>Question</th>
<th>Type</th>
<th>Familiarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who do you think that Jessica brings?</td>
<td>OE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Who does he guess David kidnapped?</td>
<td>OE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Who does she believe works at school?</td>
<td>SE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Who does he think looked at the blackboard?</td>
<td>SE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>What does she guess that Sarah waits for?</td>
<td>OE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Which key do you assume John lost?</td>
<td>OE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>What does she believe owns a company?</td>
<td>SE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Which fruit do you suppose dropped from the tree?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which door does he imagine that she pushes?</td>
<td>OE+that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which program do you assume David sponsored?</td>
<td>OE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which person does he suppose ignores Jessica?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which dinosaur does she imagine appeared now?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>What do you think David likes it?</td>
<td>OE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>What does he guess Sarah steamed it?</td>
<td>OE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>What does she believe that is good news?</td>
<td>SE+that</td>
<td>Familiar</td>
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<tr>
<td>Who does he think she folded the paper?</td>
<td>SE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Which student does she assume that John accepts?</td>
<td>OE+that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Who do you guess the truck carried them?</td>
<td>OE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Who does she believe that was a birthday person?</td>
<td>SE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Which way do you suppose it is narrow?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which lotion does he imagine that David uses it?</td>
<td>OE+that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which dress do you assume Jessica fixed it?</td>
<td>OE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which candy does he suppose that melts quickly?</td>
<td>SE+that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which driver does she imagine he forgot it?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Question</td>
<td>Pronoun</td>
<td>Familiarity</td>
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<td>--------------------------------------------------------------------------</td>
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<tr>
<td>Who do you think that Sarah kisses?</td>
<td>OE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Who does he guess John respected?</td>
<td>OE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Who does she believe sees the game?</td>
<td>SE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>What does he think raised her reputation?</td>
<td>SE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>What does she guess that David misses?</td>
<td>OE+that</td>
<td>Familiar</td>
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<tr>
<td>Which animal do you assume Jessica protected?</td>
<td>OE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>What does she believe is in the basket?</td>
<td>SE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Which plan do you suppose sounded good?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which room does he imagine that Sarah locks?</td>
<td>OE+that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which machine do you assume John washed?</td>
<td>OE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which question does he suppose is difficult?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
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<tr>
<td>Which class does she imagine began at 5pm?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
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<tr>
<td>What do you think that David throws it?</td>
<td>OE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>What does he guess Sarah tore it?</td>
<td>OE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>What does she believe that sleeps in the cave?</td>
<td>SE+that</td>
<td>Familiar</td>
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<tr>
<td>Who does he think she rode the tiger?</td>
<td>SE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Which system does she assume that David controls it?</td>
<td>OE+that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Who do you guess the dog bit him?</td>
<td>OE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Who does she believe that rotates the building?</td>
<td>SE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Which bomb do you suppose it exploded suddenly?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
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<tr>
<td>Which project does he imagine that Sarah starts it?</td>
<td>OE+that</td>
<td>Unfamiliar</td>
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<tr>
<td>Which test do you assume Jessica failed it?</td>
<td>OE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which skill does he suppose that develops well?</td>
<td>SE+that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which author does she imagine he edited the book?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
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</tbody>
</table>
### One-Month Delayed Posttest

<table>
<thead>
<tr>
<th>Question</th>
<th>Response Type</th>
<th>Familiarity</th>
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<tbody>
<tr>
<td>Who do you think that Sarah tells?</td>
<td>OE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Who does he guess Jessica visited?</td>
<td>OE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Who does she believe worries the child?</td>
<td>SE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>What does he think ran slow?</td>
<td>SE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>What does she guess that David helps?</td>
<td>OE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Which job do you assume John selected?</td>
<td>OE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>What does she believe is his hobby?</td>
<td>SE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Which color do you suppose matches well?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which lamp does he imagine that David turns on?</td>
<td>OE+that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which homework do you assume John gave?</td>
<td>OE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which group does he suppose causes trouble?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which sofa does she imagine smelled bad?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>What do you think that Jessica teaches it?</td>
<td>OE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>What does he guess Sarah stole it?</td>
<td>OE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>What does she believe that makes noise?</td>
<td>SE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Who does he think she drew the mountain?</td>
<td>SE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Which woman does she assume that John prays for her?</td>
<td>OE+that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Who do you guess the school sued him?</td>
<td>OE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Who does she believe that holds the door?</td>
<td>SE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>Which nurse do you suppose she found your name?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which lecture does he imagine that David understands it?</td>
<td>OE+that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which music do you assume David composed it?</td>
<td>OE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which fence does he suppose that is strong?</td>
<td>SE+that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>Which artist does she imagine he sketched it?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
</tr>
</tbody>
</table>
Appendix F

Sample presentation of the Oral Elicited Imitation Task

You think that Sarah stole the wallet.
   (A participant reads the sentence)

↓

(The participant hears What do you think that Sarah stole it?)

↓

The answer?
   (The participant orally produces the answer the wallet)

↓

Repeat the question.
   (The participant orally repeats the answer in a correct form What do you think that Sarah stole?)
Appendix G

24 Sentences for the Untimed Grammaticality Judgment Task

| Pretest |
|-----------------|-----------------|-----------------|
| 1 | Who do you think that Sarah meets? | OE+that | Familiar |
| 2 | Who does he guess David invites? | OE-that | Familiar |
| 3 | Who does she believe drinks juice? | SE-that | Familiar |
| 4 | What does he think moved the boxes? | SE-that | Familiar |
| 5 | What does she guess that David buys? | OE+that | Familiar |
| 6 | Which person do you assume John dated? | OE-that | Unfamiliar |
| 7 | What does she believe deceived them? | SE-that | Familiar |
| 8 | Which store do you suppose closed early? | SE-that | Unfamiliar |
| 9 | Which lady does he imagine that David loves? | OE+that | Unfamiliar |
| 10 | Which report do you assume Jessica copied? | OE-that | Unfamiliar |
| 11 | Which dog does he suppose barks at night? | SE-that | Unfamiliar |
| 12 | Which hotel does she imagine was full? | SE-that | Unfamiliar |
| 13 | * What do you think that Sarah climbs it? | OE+that | Familiar |
| 14 | * What does he guess David observed this? | OE-that | Familiar |
| 15 | * What does she believe that contributes to her ability? | SE+that | Familiar |
| 16 | * Who does he think she visited the hospital? | SE-that | Familiar |
| 17 | * Which book does she assume that Sarah keeps it? | OE+that | Unfamiliar |
| 18 | * Who do you guess the tanks attacked them? | OE-that | Familiar |
| 19 | * Who does she believe that runs on the road? | SE+that | Familiar |
| 20 | * Which police do you suppose he saved John? | SE-that | Unfamiliar |
| 21 | * Which story does he imagine that she writes it? | OE+that | Unfamiliar |
| 22 | * Which book do you assume Jessica returned it? | OE-that | Unfamiliar |
| 23 | * Which color does he suppose that looks good? | SE+that | Unfamiliar |
| 24 | * Which boy does she imagine he hit the car? | SE-that | Unfamiliar |
Immediate Posttest

25  Who do you think that Jessica takes care of?  OE+that  Familiar
26  Who does he guess Sarah confused?  OE-that  Familiar
27  Who does she believe brings the vegetable?  SE-that  Familiar
28  What does he think happened at school?  SE-that  Familiar
29  What does she guess that David cooks?  OE+that  Familiar
30  Which food do you assume John ordered?  OE-that  Unfamiliar
31  What does she believe delays the event?  SE-that  Familiar
32  Which school do you suppose Sarah graduated from?  SE-that  Unfamiliar
33  Which taxi does he imagine that John drives?  OE+that  Unfamiliar
34  Which animal do you assume John dislikes?  OE-that  Unfamiliar
35  Which class does he suppose is popular?  SE-that  Unfamiliar
36  Which woman does she imagine got a ring?  SE-that  Unfamiliar
37  * What do you think that David enjoys it?  OE+that  Familiar
38  * What does he guess Sarah followed it?  OE-that  Familiar
39  * What does she believe that falls down?  SE+that  Familiar
40  * Who does he think she studied English?  SE-that  Familiar
41  * Which task does she assume that Sarah forgets it?  OE+that  Unfamiliar
42  * Who do you guess the condition depressed him?  OE-that  Familiar
43  * Who does she believe that supports John?  SE+that  Familiar
44  * Which house do you suppose it was cheap?  SE-that  Unfamiliar
45  * Which bird does he imagine that John feeds it?  OE+that  Unfamiliar
46  * Which test do you assume David passed it?  OE-that  Unfamiliar
47  * Which person does he suppose that measures the price?  SE+that  Unfamiliar
48  * Which person does she imagine he found it?  SE-that  Unfamiliar
One-Week Delayed Posttest

49  Who do you think that Jessica hates?       OE+that    Familiar
50  Who does he guess Sarah checked?         OE-that    Familiar
51  Who does she believe likes it?           SE-that    Familiar
52  What does he think broke her leg?        SE-that    Familiar
53  What does she guess that David looks at? OE+that    Familiar
54  Which information do you assume he received? OE-that Unfamiliar
55  What does she believe grows in the garden? SE-that    Familiar
56  Which boy do you suppose recorded the lecture? SE-that Unfamiliar
57  Which journal does he imagine that Sarah evaluates? OE+that Unfamiliar
58  Which student do you assume John encouraged? OE-that Unfamiliar
59  Which actor does he suppose reads the magazine? SE-that Unfamiliar
60  Which girl does she imagine listened to music? SE-that Unfamiliar
61  * What do you think that Jessica is proud of it? OE+that Familiar
62  * What does he guess David waited for it?  OE-that    Familiar
63  * What does she believe that surprises the professor? SE+that Familiar
64  * Who does he think she memorized the song? SE-that    Familiar
65  * Which lady does she assume that John mails her? OE+that Unfamiliar
66  * Who do you guess the letter disappointed him? OE-that    Familiar
67  * Who does she believe that learns swimming? SE+that    Familiar
68  * Which president do you suppose he improved it? SE-that Unfamiliar
69  * Which friend does he imagine that Jessica discouraged? OE+that Unfamiliar
70  * Which shirt do you assume Sarah designed it? OE-that Unfamiliar
71  * Which library does he suppose that is open? SE+that Unfamiliar
72  * Which handbag does she imagine it was heavy? SE-that Unfamiliar
One-Month Delayed Posttest

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>OE/SE</th>
<th>Familiarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>73</td>
<td>Who do you think that John leads?</td>
<td>OE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>74</td>
<td>Who does he guess Jessica impressed?</td>
<td>OE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>75</td>
<td>Who does she believe knows him?</td>
<td>SE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>76</td>
<td>What does he think determined the value?</td>
<td>SE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>77</td>
<td>What does she guess that Jessica offers?</td>
<td>OE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>78</td>
<td>Which assistant do you assume she hired?</td>
<td>OE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>79</td>
<td>What does she believe picks up John?</td>
<td>SE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>80</td>
<td>Which teacher do you suppose graded the tests?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>81</td>
<td>Which song does he imagine that John sings?</td>
<td>OE+that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>82</td>
<td>Which box do you assume David threw away?</td>
<td>OE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>83</td>
<td>Which actress does he suppose calls the manager?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>84</td>
<td>Which article does she imagine criticized John?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>85</td>
<td>* What do you think that Sarah plays it?</td>
<td>OE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>86</td>
<td>* What does he guess David drew it?</td>
<td>OE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>87</td>
<td>* What does she believe that helps John?</td>
<td>SE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>88</td>
<td>* Who does he think it spoiled his work?</td>
<td>SE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>89</td>
<td>* Which card does she assume that David collects?</td>
<td>OE+that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>90</td>
<td>* Who do you guess the office agreed to her?</td>
<td>OE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>91</td>
<td>* Who does she believe that bakes the cookies?</td>
<td>SE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>92</td>
<td>* Which reporter do you suppose he examined the results?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>93</td>
<td>* Which plastic does he imagine that John recycles it?</td>
<td>OE+that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>94</td>
<td>* Which country do you assume Japan invaded it?</td>
<td>OE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>95</td>
<td>* Which company does he suppose that builds houses?</td>
<td>SE+that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>96</td>
<td>* Which car does she imagine it crashed suddenly?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
</tr>
</tbody>
</table>
Appendix H

Sample presentation of the Untimed Grammaticality Judgment Task

(The participant hears *Who does she believe knows him?*)

Grammatical?

YES  NO

(The participant click either YES or NO)

Report confidence in your decision?

0 = Guessing  1 = Somewhat confident  2 = Quite confident  3 = extremely confident

(The participant clicks 0, 1, 2 or 3)

Report the source of your decision.

G = Guess  i = Intuition  m = Memory  r = Rule knowledge

(The participant clicks g, i, m, or r.)
Appendix I

12 Sentences for the Metalinguistic Knowledge Test

Pretest

1. Who do you think that Sarah looks like? OE+that Familiar
2. Which family does he imagine she trusted? OE-that Unfamiliar
3. What does she believe burns the picture? SE-that Familiar
4. Which officer does he suppose reported it? SE-that Unfamiliar
5. * Who do you guess that the cat saw her? OE+that Familiar
6. * Which tea does he assume Sarah imported it? OE-that Unfamiliar
7. * What does she think that absorbs the ink? SE+that Familiar
8. * Which room do you imagine it was bright? SE-that Unfamiliar

Immediate Posttest

9. Which flower do you imagine that Jessica cuts? OE+that Familiar
10. Who does he think Jessica married? OE-that Unfamiliar
11. Which manager does she suppose is reliable? SE-that Familiar
12. What does he believe was unique? SE-that Unfamiliar
13. * Which clock do you assume that David adjusts? OE+that Familiar
14. * Who does she guess the dog sat next to him? OE-that Unfamiliar
15. * Which stove does she suppose that boils the water? SE+that Familiar
16. * What does he believe it has power? SE-that Unfamiliar
### One-Week Delayed Posttest

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<th>Question</th>
<th>Type</th>
<th>Familiarity</th>
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<tbody>
<tr>
<td>17</td>
<td>What do you think that she teaches?</td>
<td>OE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>18</td>
<td>Which poster does he imagine Jessica posted?</td>
<td>OE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>19</td>
<td>Who does she believe wears the green cap?</td>
<td>SE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>20</td>
<td>Which intern does he suppose invented it?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>21</td>
<td>* What do you guess that John pours it?</td>
<td>OE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>22</td>
<td>* Which spoon does he assume David used it?</td>
<td>OE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>23</td>
<td>* Who does she guess that discovers gold?</td>
<td>SE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>24</td>
<td>* Which supervisor do you imagine he chose his assistant?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
</tr>
</tbody>
</table>

### One-Month Delayed Posttest

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<th>Question</th>
<th>Type</th>
<th>Familiarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>Which goal do you imagine that Sarah pursues?</td>
<td>OE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>26</td>
<td>What does he think Jessica prepared?</td>
<td>OE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>27</td>
<td>Which business man does she suppose allows it?</td>
<td>SE-that</td>
<td>Familiar</td>
</tr>
<tr>
<td>28</td>
<td>Who does he believe played it?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>29</td>
<td>* Which medicine do you assume that David takes it?</td>
<td>OE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>30</td>
<td>* What does he guess Jessica drank it?</td>
<td>OE-that</td>
<td>Unfamiliar</td>
</tr>
<tr>
<td>31</td>
<td>* Which director does she imagine that produces many movies?</td>
<td>SE+that</td>
<td>Familiar</td>
</tr>
<tr>
<td>32</td>
<td>* Who do you think he went jogging?</td>
<td>SE-that</td>
<td>Unfamiliar</td>
</tr>
</tbody>
</table>
Appendix J

Sample presentation of the Metalinguistic Knowledge Test
(English translation is provided in italic)

Among the eight sentences, four of them are grammatical and four of them are ungrammatical. After reading each sentence, please answer the questions below. If you do not know the answer, you can skip the question.

1. What does he think Jessica prepared?
   a. 위 문장이 문법에 맞습니까?  
      Is the sentence grammatical?

   b. 문법에 어긋난다면, 어긋나는 부분에 밑줄 치세요.  
      Which part of the sentence is ungrammatical? Please underline.

   c. 밑줄 친 문장이 문법에 어긋나는 이유는 무엇입니까?  
      Why is the underlines part ungrammatical?

   d. 올바른 문장으로 고치세요.  
      Change the sentence into a grammatical sentence.

2. Which medicine do you assume that David takes it?
   a. 위 문장이 문법에 맞습니까?  
      Is the sentence grammatical?

   b. 문법에 어긋난다면, 어긋나는 부분에 밑줄 치세요.  
      Which part of the sentence is ungrammatical? Please underline.

   c. 밑줄 친 문장이 문법에 어긋나는 이유는 무엇입니까?  
      Why is the underlines part ungrammatical?

   d. 올바른 문장으로 고치세요.  
      Change the sentence into a grammatical sentence.

3. Which goal do you imagine that Sarah pursues?
4. Who do you think he went jogging?
   a. 위 문장이 문법에 맞습니까?
      *Is the sentence grammatical?*
   b. 문법에 어긋난다면, 어긋나는 부분에 밑줄 치세요.
      *Which part of the sentence is ungrammatical? Please underline.*
   c. 밑줄 친 문장이 문법에 어긋나는 이유는 무엇입니까?
      *Why is the underlines part ungrammatical?*
   d. 올바른 문장으로 고치세요.
      *Change the sentence into a grammatical sentence.*

5. What does he guess Jessica drank it?
   a. 위 문장이 문법에 맞습니까?
      *Is the sentence grammatical?*
   b. 문법에 어긋난다면, 어긋나는 부분에 밑줄 치세요.
      *Which part of the sentence is ungrammatical? Please underline.*
   c. 밑줄 친 문장이 문법에 어긋나는 이유는 무엇입니까?
      *Why is the underlines part ungrammatical?*
   d. 올바른 문장으로 고치세요.
      *Change the sentence into a grammatical sentence.*

6. Which businessman does she suppose allows it?
   a. 위 문장이 문법에 맞습니까?
      *Is the sentence grammatical?*
   b. 문법에 어긋난다면, 어긋나는 부분에 밑줄 치세요.
      *Which part of the sentence is ungrammatical? Please underline.*
7. Who does he believe played it?
   a. 위 문장이 문법에 맞습니까?
      *Is the sentence grammatical?*
   
   b. 문법에 어긋난다면, 어긋나는 부분에 밑줄 칭세요.
      *Which part of the sentence is ungrammatical? Please underline.*
   
   c. 밑줄 친 문장이 문법에 어긋나는 이유는 무엇입니까?
      *Why is the underlines part ungrammatical?*
   
   d. 올바른 문장으로 고치세요.
      *Change the sentence into a grammatical sentence.*

8. Which director does she imagine that produces many movies?
   a. 위 문장이 문법에 맞습니까?
      *Is the sentence grammatical?*
   
   b. 문법에 어긋난다면, 어긋나는 부분에 밑줄 칭세요.
      *Which part of the sentence is ungrammatical? Please underline.*
   
   c. 밑줄 친 문장이 문법에 어긋나는 이유는 무엇입니까?
      *Why is the underlines part ungrammatical?*
   
   d. 올바른 문장으로 고치세요.
      *Change the sentence into a grammatical sentence.*
References


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