Reading in a Foreign Language
ISSN 1539-0578

April 2024, Volume 36, No. 1
pp.1–22
https://hdl.handle.net/10125/67461

Incidental Grammar Acquisition Through Meaning-focused Reading: Structure Frequency and Reading Comprehension

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Abstract

Research shows that meaning-focused reading offers opportunities for incidental grammar acquisition. However, the number of such studies remains limited and none have examined the role of both in-text encounters with grammar structures and reading comprehension in this learning. The present study filled these gaps. Employing a between-group, pretest-posttest-delayed-posttest experiment, this study examined to what extent four groups of English-as-a-Foreign-Language adult learners (n = 132) in Vietnam learnt two specific grammar structures through meaning-focused reading in which they encountered these structures four, six, eight, or ten times. A control group (n = 30) was also added to this experiment to gauge test-taking effects. Grammar gain was measured by a self-report grammar-knowledge scale, while content comprehension by a topic-matching task. All treatment groups were found to make sizeable grammar gains, especially after six encounters with the structures. Reading comprehension could also predict the learning gains. These findings offer various useful pedagogical implications.

Keywords: meaning-focused reading, incidental grammar acquisition, in-text encounters with grammatical structures, content comprehension, reading comprehension, Input Processing, Form Meaning Use Model

According to VanPatten (2014), foreign/second language (L2) acquisition (including that of grammatical knowledge) may occur when L2 learners are able to make "appropriate form-meaning connections during the act of comprehension" (p.113). Previous research has substantiated this view both in the context of (semi)artificial (e.g., Saffran, 2001; Leung & Williams, 2012; Rebuschat et al., 2015; Tagarelli et al., 2016) and natural language reading (e.g., Elley & Mangubhai 1983; Lee, 2002; Song & Sardegna, 2014; Tammenga-Helmantel et al., 2014; Aka, 2020). However, the size of grammar gains from this source is often reported to be modest. This can be due to, among others, the incremental and cumulative nature of incidental grammar acquisition (N.Ellis, 2002; Boers, 2021). This in turn may stem from various constraints that L2 learners encounter while mapping a specific grammatical meaning to a novel grammatical form during the process of meaning-focused reading (Leung & Williams, 2011; VanPatten, 2014). It is therefore recommended that incidental grammar acquisition should not be

taken for granted or, in other words, L2 instructors might need to resort to some pedagogical interventions that can enlarge the size of grammar gains from this source (Boers, 2018, 2021).

A plausible intervention as such is to increase the frequency L2 learners (re)encounter the target structure in the reading material because, as suggested by N.C. Ellis (2002), Gass and Mackey (2002) and Loewen et al. (2009), fluent command of grammar tends to result from the cumulation of repeated exposure. Findings from some initial research endeavors (e.g., Lee, 2002; Aka, 2020; Ward & Lo, 2023) also support this view. However, since the number of such studies remains limited in the existing literature, especially compared to that in the case of incidental vocabulary acquisition, more research is still welcome in this area. In addition, during the above process of grammatical form-meaning mapping, reading comprehension can work as a mediating factor. On the one hand, it can put L2 learners at a better position to make use of both co-textual and contextual clues for their interpretation of the meaning of the target grammar point before mapping this meaning to the respective grammatical form (Boers, 2018, 2021). Since both reading comprehension and grammatical form-meaning mapping have to share the generally limited capacity of human working memory (VanPatten, 2014), once L2 learners have been able to cultivate a sufficient understanding of the reading content, they can free part of their attentional capacity and then relocate it for the purpose of grammatical form-meaning mapping (Boers, 2021). To date, however, there has been no research that examines the role of both in-text encounters with grammar structures and reading comprehension, especially that of the latter, in this learning.

Another new feature of the present study is that it employs Larsen-Freeman's (2015) Form Meaning Use Model as a comprehensive construct of grammatical knowledge to examine the incidental grammar acquisition from meaning-focused reading (henceforth referred to as FMU Model for short). In this model, the form/morphosyntax dimension refers to a set of rules that govern how words are changed (as in the case of functors (e.g., *a* and *an* or *this* and *these*) or inflections (e.g., *go*, *goes* or *going*)) and combined (as in the case of syntax (e.g., *to be* + *good at* + *gerund*)) to form standard phrases, clauses or sentences. The meaning/semantics and the use/pragmatics dimension respectively concern (a) what a specific grammar point aims to convey and (b) for what purpose and in what context this grammar point is often used. If we map the focus of previous research in this area to the FMU model, it is clear that most of them fasten their focus on the learning of grammatical form/morphosyntax (e.g., Saffran, 2001; Leung & Williams, 2012; Song & Sardegna, 2014; Tammenga-Helmantel et al., 2014; Rebuschat et al., 2015; Tagarelli et al., 2016; Aka, 2020), some on that of grammatical meaning/semantics (e.g., Lee, 2002; Bordag et al., 2016), but none on that of grammatical use/pragmatics. Even as for the learning of grammatical form/morphosyntax, most of these studies have investigated the incidental uptake of functors (e.g., *articles* (Aka, 2020) or *prepositions* (Song & Sardegna, 2014)) and inflections (e.g., *plural -s nouns* (Shintani & R. Ellis, 2010) or *regular past simple -ed verbs* (Ward & Lo, 2023)), but very few on that of syntax (i.e., how words are combined to form standard phrases, clauses or sentences). Neither have they examined whether the initial learning of the grammatical knowledge can be retained over time (with the sole exception of the study by Lee (2002)).

The Present Study: Merging of Pedagogical and Theoretical Agendas

The present study aims to extend this research line by addressing all issues above. From the pedagogical perspective, this study is meaningful in at least three interrelated ways. First of all, it provides more empirical evidence about whether and to what extent L2 learners are able to pick up new grammatical knowledge through natural classroom-based meaning-focused reading. This in turn helps inform L2 instructors' decision-making process regarding whether it is worth incorporating incidental grammar acquisition into their reading instruction. Second, if in-text encounters with grammar structures and reading comprehension are both found to influence the size of the learning gains, they might also need to consider these factors in their development and execution of reading materials as well as classroom activities. To this end, as this study also examines the long-term effects of incidental grammar acquisition, L2 instructors can better estimate the time that they ought to have their learners recycle the incidentally acquired grammar knowledge before this knowledge starts to decay under the effects of natural attrition.

Literature Review

Incidental Grammar Acquisition Through Meaning-focused Reading

Incidental grammar acquisition through meaning-focused reading refers to a process in which L2 learners are able to pick up new grammatical knowledge while their focal attention is placed on interpreting the reading content (Krashen, 1985; Ellis, 1999; Boers, 2018, 2021; VanPatten, 2014). This learning differs from implicit grammar learning in the regard that it does involve some awareness of grammar learning on the part of L2 learners while the latter does not (Dekeyser, 2003; Williams, 2009). It is also distinctive from explicit grammar learning since L2 learners do not have intention to integrate new grammatical knowledge into their interlanguage system as in the case of explicit learning (at least when they start their meaning-focused reading) (Hulstijn, 2003; Williams, 2009). In research, the construct of incidental grammar acquisition through meaning-focused reading is often operationalized by having L2 learners first read a passage which contains the target grammar point for the purpose of content comprehension and then take a surprise post-intervention test that gauges their knowledge of the above grammar point (Hulstijn, 2003; Boers, 2018).

Research into incidental grammar acquisition, in fact, dates far back to the eighties of the previous century. In their report about the benefits of the Book Flood Project in New Zealand for L2 learning, for example, Elley and Mangubhai (1983) found that L2 extensive reading either implemented in the form of shared or silent reading both facilitated the development of overall grammatical ability for their researched students. This finding therefore suggests that L2 learners are indeed able to learn new grammatical knowledge through processing the reading input for the purpose of content comprehension. Since then, some research has been conducted to measure the size of incidental grammar uptake from meaning-focused reading, but for a specific grammar point.

Robinson (1996), for instance, compared the size of grammar gains across four learning conditions – implicit learning, incidental learning (through meaning-focused reading), learning

through rule-searching and learning through explicit instruction. Target structures consisted of four sentence types – (a) easy-rule grammatical types (e.g., time + S + V = *On her birthday Gabi sang*.), (b) easy-rule ungrammatical types (e.g., V + S + time – no inversion without location first = *Golfed Debbie in the morning*.), (c) hard-rule grammatical types (e.g., S + V + location and S + V + location = *The pen is in the box and the pencil is in the drawer*.) and (d) hard-rule ungrammatical types (e.g., required tense agreement = *Where the bird is was in the sky*.). Speed and accuracy gauged via a judgment test for the above sentence types were used as the two dependent variables. It was found that incidental learning did occur in this experiment. Specifically, the size of grammar gains under this condition far surpassed that in both implicit learning and explicit learning via rule-searching on the accuracy measure. On the reaction-time measure (i.e., the speed measure), the incidental learning condition even fared the best among all experimental groups above.

Song and Sardegna (2014) also investigated incidental grammar acquisition through meaning-focused reading, but with English prepositions as the target grammar point. In this study, 24 Korean high-school students of English as a foreign language received either a normal grammar instruction of these prepositions over one semester long (i.e., the comparison group) or the same instruction as above, but followed by an after-class extensive reading program over the same period of time (i.e., the experiment group). The results from the pretest and posttest which aimed to measure their receptive and productive knowledge for the target prepositions clearly demonstrated that the experiment group outperformed the comparison group on this measure, especially for their productive knowledge of the target grammar point.

Bordag et al. (2016) is an interesting study since it is among a few studies to date that have examined the incidental acquisition of grammatical meanings through meaning-focused reading. Specifically, it investigated whether L1 and L2 learners of German language were able to deduce the transitivity and regularity of a novel verb while reading given passages for the purpose of content comprehension. Their reaction time in a self-paced reading task was recorded as an indicator for their online processing of plausible and implausible verb-form realizations in the above reading task. The results showed that the learners in both populations were able to recognize the transitivity and regularity of novel verbs, albeit to a different extent. The grammar gain among the L1 German learners was more pronounced than that made by their L2 counterparts. This learning was also found to be moderated by the complexity of the input text.

The above review demonstrates that meaning-focused reading is actually a source of incidental grammar acquisition. However, as Boers (2018) also found in his own review, the size of grammar gains from this source is relatively limited. One plausible explanation for this is the incremental and cumulative nature of incidental grammar acquisition (N. Ellis, 2002; Boers, 2021), which is in turn probably due to many constraints that L2 learners often undergo when they implement a dual process of both meaning-focused reading and grammatical form-meaning mapping at the same time (VanPatten, 2014). While discussing the typical mechanism behind input processing, VanPatten (2014) specifies nine conditions under which L2 learners are supposed to make initial grammatical form-meaning connections during comprehension – a precursor of incidental grammar acquisition. These conditions are summed up in Table 1 below.

Table 1. *Grammatical form-meaning mapping conditions*

During a process of meaning-focused reading, ….	
01. *Primacy of content words*	L2 learners process content words in the input before anything else.
02. *Lexical preference*	they will process lexical items for meaning before grammatical forms when both encode the same semantic information.
03. *Preference for non-redundancy*	they tend to process non-redundant meaningful grammatical markers before they process redundant meaningful markers.
04. *Meaning before non-meaning*	they tend to process meaningful grammatical markers before non-meaning ones.
05. *First-noun*	they tend to process the first noun or pronoun in a sentence as the subject.
06. *Event probability*	they may rely on event probabilities, where possible, instead of the above First-noun principle, to interpret a sentence.
07. *Lexical semantics*	they may also rely on lexical semantics, where possible, instead of the above First-noun principle, to interpret a sentence.
08. *Contextual constraints*	they may rely less on the above First-noun principle if preceding context constrains the possible interpretation of a sentence.
09. *Sentence location*	they tend to process items in sentence-initial positions before those in the medial and final positions.

Note. Source: VanPatten, 2014

As can be seen from Table 1, the chance for L2 learners to pay attention to a new grammar point in the reading input, initiate an attempt to deduce its meaning using available co-textual and/or contextual clues and then match this meaning to the respective form while simultaneously processing the same input material for the purpose of content comprehension slim.

Put differently, L2 learners are less likely to pick up new grammatical knowledge through meaning-focused reading since this learning is constrained by at least three different conditions: First, the meaning of the target grammar point should be essential for interpreting the reading content; otherwise, it will be ignored. Second, this meaning cannot be found elsewhere in the reading input and thus it will be perceived as non-redundant. Finally, L2 learners' endeavors to decipher this meaning and then map this meaning to its relevant form does not deplete their mental resources to such an extent that they cannot process the reading input for the purpose of content comprehension. Therefore, Boers (2018, 2021) suggests that incidental grammar acquisition through meaning-focused reading should not be taken for granted and L2 instructors might need to use some intervention to enhance the learning gain from this source.

Frequency and Incidental Grammar Acquisition Through Reading

There is now a common consensus in the field of second language acquisition that the more frequently a new language code (including a new grammar point) (re)occurs in the input material, the more likely it is to be learnt. This appears to be true in both L1 (N. Ellis, 2002) and

L2 contexts (Gass & Mackey, 2002). Research into incidental grammar acquisition through meaning-focused reading also supports this view.

Foreign language context. Lee (2002), for example, gauged to what extent 181 university students of Spanish as a foreign language learnt a particular grammar point – the future tense morphology – through reading an input text for the purpose of content comprehension. This study also looked at the relationship between this learning on the one hand and the structure encounter (i.e., the frequency that the target structure occurred in the input text), the task orientation (i.e., whether the reading activity also drew students' attention towards the form or the meaning of the target structure) and the contextual clue (i.e., whether the adverbials that denote the meaning of the target structure were present in the input text) on the other hand. Grammar gain was measured by a form recognition and a form production test. The above students were found to gain a noticeable amount of knowledge for the target structure. This learning gain was also found to be positively correlated with the frequency of in-text encounters with the target grammar point, the task orientation and the contextual clue. As for the effects of in-text encounters with the target grammar point, these students could pick up the form of the above morpheme right after as few as 6 encounters with it in the reading material. This learning gain was significantly enlarged after 10 and especially 16 encounters. However, the facilitative role of in-text encounters with the target grammar point was also mediated by many other factors such as the task orientation or the contextual clue.

Using a similar between-group research design, Aka (2020) also compared the extent to which 157 Japanese high-school students of English as a foreign language incidentally picked up the knowledge related to the use of *to-infinitive* verbs as nouns through reading five short passages in which the target structure occurred either 40 or 10 times. Their grammatical knowledge gain was gauged by a multiple-choice and a sentence-reordering task. Both groups were found to learn the form dimension for the above structure; however, such a gain was more robust among those who encountered this structure 40 times.

Second language context. The most recent study in this area was carried out by Ward and Lo (2023). In this between-group pretest-posttest quasi-experiment, 30 lower-intermediate English-as-a-Second-Language (ESL) learners were assigned either as the experimental group (n = 14) or the comparison group (n = 16). In the experimental group, the learners were asked to read a different 950-word passage over six consecutive 1.5-hour sessions in which the target grammar point – the regular past simple *-ed* verb form – occurred in an interval of every 15 running words. Meanwhile, the comparison group received their regular ESL training with no focus on the target grammar point. Their grammar gain was measured by an untimed grammaticality judgement test and a word monitoring test which respectively tapped into their uptake of explicit and implicit knowledge of the above morpheme. The results showed that the experimental group could noticeably increase the size of their implicit grammar knowledge after the above reading intervention, but not that of their explicit grammar knowledge. No learning gain was found in the comparison group.

This review suggests that frequency of in-text encounters with grammar structures can foster incidental grammar acquisition through meaning-focused reading. Therefore, a pedagogical intervention that L2 instructors might incorporate into this learning with a view to optimizing the

learning outcome is to increase the frequency L2 learners (re)encounter the target grammar point in the reading material. However, as Gass and Mackey (2002) convincingly put it, the effect of frequency (i.e., in-text encounters with grammar structures in this case) on second language acquisition (SLA) is "a complex picture" and therefore it is worth being investigated in the relationship "with other aspects of SLA" like human working memory or other input-related factors (p.257). When discussing different factors that influences incidental grammar learning, Boers (2018) underscores the role of co-textual/contextual clues in grammatical form-meaning mapping, which is in turn directly related to the degree to which L2 learners understand the reading content. However, no studies to date have examined the roles of both in-text encounters with grammar structures and reading comprehension in this learning.

A Slim Chance for Incidental Grammar Acquisition Through Reading?

According to VanPatten (1996, 2014), the relationship between grammar and content processing in a meaning-focused reading activity is often far from compatible mostly due to the limited capacity of human working memory. In other words, L2 learners might still be able to process a new grammatical item in such an activity, but this will be done at the expense of their content processing. However, in a typical procedure of incidental grammar acquisition through meaning-focused reading (R. Ellis, 1999; Boers, 2021), L2 learners do not often simultaneously activate both processes at the same time as VanPatten (1996, 2014) believed, but strategically switch back and forth between these two processes with a view to optimizing their content comprehension. Specifically, when they encounter a new grammar point in the reading material and find its meaning essential for their content comprehension, they will briefly divert their attention from content processing to grammar processing, making use of available co-textual/contextual clues for the meaning interpretation and then matching this meaning to the relevant form. As a result, their attentional capacity is less likely to be depleted on this premise. In addition, the above two processes can be even supplementary to each other. Once L2 learners have succeeded in processing the knowledge related to a novel grammatical item in the reading passage (especially its (semantics) meaning and use (pragmatics) dimensions), this information can contribute to their understanding of the reading content or at least justify their previous interpretation of the reading content (which has been generated based on their processing of lexical items). In case they have cultivated a sufficient understanding of the reading content, this understanding will, in turn, provide them with more co-textual clues for their interpretation of the meaning of the target structure and their form-meaning mapping for this structure.

Comprehensible Input Hypothesis

The above view is in line with Krashen's Comprehensible Input Hypothesis (1985). Research in the realm of incidental vocabulary acquisition consistently shows that reading comprehension is actually a useful mediator for this learning. Pulido (2007), for example, examined the relationship between incidental vocabulary learning and reading comprehension. In this study, 99 adult learners of Spanish as a foreign language were recruited as research participants. They were then required to read four narrative texts in which 32 target words were replaced with nonsense words in order to ensure that they did not know these words prior to their involvement in this experiment. Their reading comprehension was measured by an L1 content-recall task, while their vocabulary gain was gauged by a combo of word-form recognition, word-meaning

recall and word-meaning recognition tasks. The findings showed that the more these students understood the input content, the more successfully they were able to recognize and recall the form and the meaning of the target words in the immediate and delayed posttests. This correlation was found to be moderate in strength and also influenced by the degree of topic familiarity of the reading passages.

Vidal (2011) also investigated the above relationship, but in the context of reading or listening to three L2 academic texts. In this study, 192 ESL learners were assigned either to the reading or the listening condition. Their content comprehension was gauged by a True/False test and a cloze test. Their incidental vocabulary gain was determined by a self-report test. The results showed that the learners in both reading and listening conditions could make noticeable lexical gains. In addition, the size of their vocabulary gains was positively correlated with their content comprehension. Nguyen (2019) measured the size of incidental L2 vocabulary uptake through viewing a TED talk video one time, two times and two times with an oral summary task inserted in between. Their content comprehension was rated using a True/False judgment task, while their vocabulary gain by a word-form and a word-meaning recall task. The findings again showed that L2 students could gain a sizeable amount of lexical knowledge on both measures and the vocabulary gains were also positively associated with their content comprehension.

As shown in the above review, although content comprehension cannot guarantee incidental language learning to occur in meaning-focused input activities, it does facilitate this learning. It is because when L2 learners do not have struggle to comprehend the input content, they can allocate part of their mental resources for noticing and processing new lexical or grammatical knowledge in the input materials (R. Ellis, 1999). In addition, a sufficient understanding of reading content also offers them more co-textual clues for their interpretation of new word or structure meaning (Haastrup, 1991). It should, however, be noted here that while the mediating role of content comprehension for incidental vocabulary learning has been relatively well-researched and well-established as reviewed above, this is not the case for its incidental grammar learning counterpart. One aim of the present study is thus to address this issue and to see how the effects of in-text encounters with grammar structures on the above learning interact with those of reading comprehension as also suggested by Gass and Mackey (2002).

Research Questions

This study aimed to examine incidental grammar acquisition through meaning-focused reading and its relationship with the two factors mentioned above, in-text encounters with grammar structures and reading comprehension. Specifically, it sought answers to the following research questions:

1. To what extent can L2 learners acquire and retain new grammatical knowledge after encountering the target structure four, six, eight and ten times in meaning-focused reading?

2. If so, does reading comprehension also play a role in the acquisition of new grammatical knowledge?

To answer these research questions, this study employed a between-group pretest-posttest-delayed-posttest classroom-based experiment. In this experiment, incidental grammar acquisition and in-text encounters with grammar structures were respectively set as a dependent and an independent variable, while reading comprehension was set as a mediating factor. The degree to which in-text encounters with grammar structures and reading comprehension influenced the size of grammar gains as well as their interaction (if any) would be gauged via their predictive power in a general linear regression model.

Method

Participants

Research participants were 162 first-year students recruited from five different classes in a state-run university in Vietnam. Prior to their participation in this study, they all had a total of nine years of learning English as a foreign language in the K-12 education system in Vietnam. None of the participants ever lived in an English-speaking country for more than six months. Having graduated from the K-12 education system in Vietnam, they were all supposed to have mastered at least Level 3 on a six-level Foreign Language Proficiency Vietnam-based framework, or Level B1 on the Common European Framework of Reference for Languages (CEFR). This was then reaffirmed by the results from the *Oxford Placement Test* (Allan, 2004) with 146 participants achieving Level B1 on the *CEFR* scale and the other 16 Level B2. Since their Oxford Placement Test scores were normally distributed, a one-way ANOVA test was computed to examine any between-group differences in their test scores. No difference was found: $F(4, 157) = 0.36$ ($p = .78$).

To prepare the reading materials for these students, their entering L2 vocabulary knowledge was also measured, using Webb, Sasao, and Balance's (2017) updated Vocabulary Levels Test (VLT). Participants' VLT scores indicated that they might have already known most, if not all the first 5,000 most frequent word families in Nation's British National Corpus (BNC)/Corpus of Contemporary American English (COCA) wordlists (2012). Neither was there any difference in their VLT scores across the above groups: $F(4, 157) = 0.42$ ($p = .65$). In their intact classes, these students were assigned either to a control group ($n = 30$) or one of the four treatment conditions in which they were required to read two sets of ten short paragraphs over two consecutive learning days and had the opportunity to encounter two novel grammar structures four ($n = 32$), six ($n = 37$), eight ($n = 30$) or ten ($n = 33$) times.

Target Structures and Reading Materials

Two target structures in this experiment were the conditional sentence type III which denotes an imagined situation in the past (e.g., *All this could have been avoided, if the plan had been more flexible.*) and the reduced concession sentence that expresses a contrast (e.g., *Although committed to her job, she successfully maintains her social contacts all over the world.*). These structures were first selected because they were less likely known to the students before they participated in this study. The results from the English Grammar Profile program (https://www.englishprofile.org/) indicated that these two structures belong to Level C1 and C2

on the *CEFR* scale, respectively. Thus, they were both at least one level beyond the current English proficiency level of these students. A quick cross-check with their English language teachers also showed that neither of these structures had ever been covered in participants' past courses. In addition, as these structures are often found in corpus-based studies to figure relatively high in academic written discourse (Biber, 2006), the learning of these grammar structures in the present study was both ecologically valid and useful for the above students. As the meanings of these two structures (i.e., their semantics dimension) sharply differ from each other, this may also reduce the chance they adversely influenced the students' form-meaning mapping process.

To prepare the reading materials, I made full use of Web Concordance English Program in the Lextutor.ca website. The two keywords *if* and *although* were first put in the searching string and the instances of their authentic use were then browsed in the British Academic Written English Corpus. This corpus was a record of proficient university-level student writing since the beginning of the 21st century and consisted of about 08 million running words in total. At time data for this study was collected (as to September 15th, 2021), it was the largest academic written English corpus in this website. From the searching results, ten short paragraphs of around 100 words long and about five different topics were selected for each target structure. Lexical profiles of these paragraphs were subsequently checked against the VocabProfilers program in the same website above to ensure that they did not include more than 2% of new words to the students (compared to participants' VLT scores). In case more than 2% of new words existed in each paragraph, these words were then replaced by their higher-frequency synonyms. Apart from the twenty short paragraphs for the two target structures (10 paragraphs/structure), six other paragraphs were also selected from the above corpus as distractors. These distracting paragraphs had roughly the same length and exactly the same topics as those of the twenty paragraphs above. Their lexical profiles were also checked and modified (if required) so that less than 2% of new words occurred in each paragraph.

Measures of Grammar and Content Gain

As reviewed above, the size of grammar gains through meaning-focused reading is generally small. This might also be attributed to the fact that most of previous research has only focused on the learning of grammatical form (e.g., Saffran, 2001; Leung & Williams, 2012; Song & Sardegna, 2014; Tammenga-Helmantel et al., 2014; Rebuschat et al., 2015; Tagarelli et al., 2016; Aka, 2020), but very few on that of grammatical meaning or use (e.g., Lee, 2002; Bordag et al., 2016). According to Larsen-Freeman (2015), however, grammatical knowledge involves three dimensions – Form (Morphosyntax), Meaning (Semantics) and Use (Pragmatics), as already discussed above.

In incidental grammar acquisition through meaning-focused reading, L2 learners might pick up knowledge other than the form dimension (e.g., Lee, 2002; Aka, 2020). It is even found that the incidental acquisition of grammatical meaning is more likely to occur during meaning-focused reading than that of grammatical form (Lee, 2002). As a consequence, previous research's mere focus on the incidental acquisition of grammatical form might have underestimated the size of grammar gains through meaning-focused reading. Hence, the present study aimed to look at L2 students' gain of all three dimensions above using a self-report grammatical knowledge scale.

Specifically, these students were required to self-report their learnt knowledge for the target structures in the written form, using the five-point scale in Table 2 below:

Table 2. *Self-report grammatical knowledge scale*

Scale	Categories	Point
I	I don't remember having seen this structure before. [Although + a reduced clause, a main clause]	1
II	I have seen this structure before, but I don't know what it means.	2
III	I have seen this structure before, and I think it means _____ (L2 explanation or L1 translation)	3
IV	I know this structure. It means _____ (L2 explanation or L1 translation)	4
V	I can use this structure in a sentence: _____ (Write a novel sentence)	5

This scale was specially developed to tap into all three dimensions of grammatical knowledge – Form (Morphosyntax), Meaning (Semantics) and Use (Pragmatics) as well as the interaction between them. Receptive knowledge of the structure form was mainly tested in Item I and II in the above scale (i.e., form recognition). Receptive knowledge of the structure meaning was mainly gauged in Item II and III (i.e., meaning recall). Productive knowledge of the structure use was measured in Item V. The overall knowledge of each student for each structure was holistically scored using the above scale and the maximum score for each structure was 5 points. This test was implemented three times: two weeks before the experiment, right after each learning day, and two weeks later.

Two different, but learnt structures were also used as distractors in this dependent measure. These two distracting structures also differed from the pretest to the immediate posttest and yet to the delayed posttest. It should also be noted here that most of previous research in this area often included several test items in the dependent measure which, however, all targeted one grammar point. On the plus side, it could collect more evidence for any growth in the knowledge of the above grammar point. On the downside, however, such a measure could also trigger more attention of test-takers towards this grammar point in the pretest, which in turn prompted them to direct their attention to this grammatical item during meaning-focused reading and thus converted the process of incidental learning into that of intentional or at least semi-intentional learning. Therefore, the dependent measure of the present study just gauged the research participants' knowledge of the target structures once, but in depth.

Scoring. Two EFL Vietnamese teachers were invited to independently rate the test responses. Out of the total 972 test responses (162 test-takers x 2 test items x 3 testing times), they agreed on 968 responses, but not on the other four. For two responses, one awarded 3 points, while the other 2 points. For the other two responses, one gave 4 points, whereas the other 3 points. Cohen's Kappa k value was then computed to examine their agreement degree (Sweet & Grace-Martin, 2010). The result showed that these two raters had an almost perfect agreement level with $k = 0.999$.

Reading comprehension and scoring. For their content gain, the students' reading comprehension level was gauged by a topic-matching task. As mentioned above, each set of ten short paragraphs (for each target structure) was all about five different topics. After these students completed their reading, they were asked to match each paragraph to its relevant topic. On this measure, they were given 1 or 0 point for each correct or incorrect answer, respectively. Therefore, the maximum score on this measure was 10 points per reading set. One of the two teachers above was invited again to score 264 test papers or 2640 test responses for this measure (132 test-takers x 10 test items x 2 testing times (2 learning days)). The students in the control group did not take this test as they did not do any reading as such. The other teacher this time was asked to score only 53 test papers or 530 test responses which were randomly selected from the above pool of 2640 test responses (more than 20%). No difference was found between their rating outcomes.

Data Collection and Data Analysis

Data for this study was collected, using the following procedure:

Table 3. *Chronological procedure for data collection*

	Group A (n = 32)	Group B (n = 37)	Group C (n = 30)	Group D (n = 33)	Group E (n = 30)
Week 1	Research purpose, procedure, and other ethical issues *Oxford Placement Test* Grammatical Knowledge Pretest				
Week 3 Day 1 Conditional sentence type III (CIII)	Para. 1 (CIII) Para. 2 (CIII) Para. 3 (CIII) Para. 4 (CIII) Para. 5 (Distractor) Para. 6 (Distractor) Para. 7 (Distractor) Para. 8 (Distractor) Para. 9 (Distractor) Para. 10 (Distractor)	Para. 1 (CIII) Para. 2 (CIII) Para. 3 (CIII) Para. 4 (CIII) Para. 5 (CIII) Para. 6 (CIII) Para. 7 (Distractor) Para. 8 (Distractor) Para. 9 (Distractor) Para. 10 (Distractor)	Para. 1 (CIII) Para. 2 (CIII) Para. 3 (CIII) Para. 4 (CIII) Para. 5 (CIII Para. 6 (CIII) Para. 7 (CIII) Para. 8 (CIII) Para. 9 (Distractor) Para. 10 (Distractor)	Para. 1 (CIII) Para. 2 (CIII) Para. 3 (CIII) Para. 4 (CIII) Para. 5 (CIII) Para. 6 (CIII) Para. 7 (CIII) Para. 8 (CIII) Para. 9 (CIII) Para. 10 (CIII)	No Reading
	Reading Comprehension Test Grammatical Knowledge Posttest				
Week 3 Day 2 Reduced concession sentence (RC)	Para. 1 (RC) Para. 2 (RC) Para. 3 (RC) Para. 4 (RC) Para. 5 (Distractor) Para. 6 (Distractor) Para. 7 (Distractor) Para. 8 (Distractor) Para. 9 (Distractor) Para. 10 (Distractor)	Para. 1 (RC) Para. 2 (RC) Para. 3 (RC) Para. 4 (RC) Para. 5 (RC) Para. 6 (RC) Para. 7 (Distractor) Para. 8 (Distractor) Para. 9 (Distractor) Para. 10 (Distractor)	Para. 1 (RC) Para. 2 (RC) Para. 3 (RC) Para. 4 (RC) Para. 5 (RC) Para. 6 (RC) Para. 7 (RC) Para. 8 (RC) Para. 9 (Distractor) Para. 10 (Distractor)	Para. 1 (RC) Para. 2 (RC) Para. 3 (RC) Para. 4 (RC) Para. 5 (RC) Para. 6 (RC) Para. 7 (RC) Para. 8 (RC) Para. 9 (RC) Para. 10 (RC)	No Reading
	Reading Comprehension Test Grammatical Knowledge Posttest				
Week 5	Grammatical Knowledge Delayed Posttest				

Data analysis. For the data analysis for Research Question #1, the mean scores on the Grammatical Knowledge Test were first reported by learning condition and by testing time. As all test scores were normally distributed, two-way ANOVA tests were then carried out to examine the difference in the test scores (if any) across the three testing times (i.e., pretest, posttest and delayed posttest) and the five learning conditions (i.e., one control and four treatment conditions). Finally, for Research Question #2, the size of grammar gain was introduced into a linear regression model as the dependent variable, while the in-text encounters with grammar structures and the reading comprehension as the two predicting factors. The explanatory power of these predicting factors and of the above model as the whole was then generated from the bootstrapped and thus the best generalized linear regression model. A *p* value of .05 was set as the minimum threshold of significance for all tests above. These analyses were implemented, using the *Statistics Analysis R Package* Version 3.2.1.

Findings

RQ #1: Grammar Gains

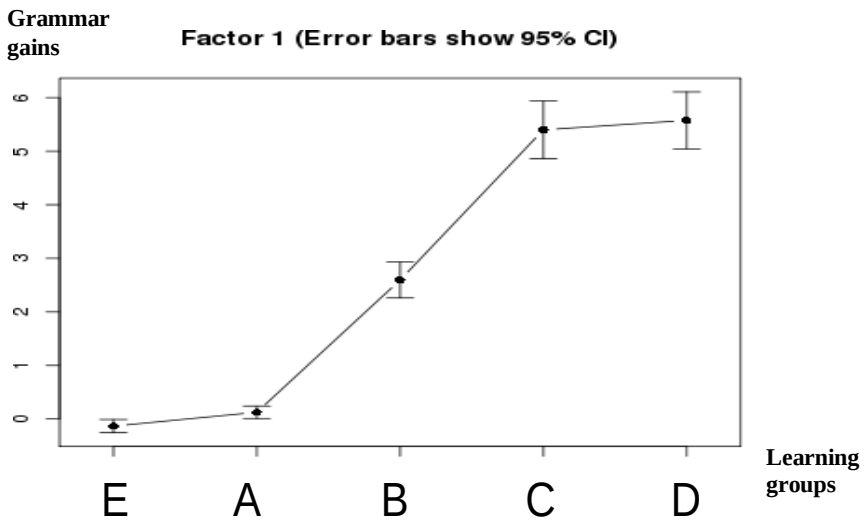
Table 4 presents the mean scores that the students achieved on the Grammatical Knowledge Test by the learning condition and by the testing time. It also includes the mean uptake and retention scores which are computed by subtracting their pretest scores from their posttest and delayed posttest scores, respectively.

Table 4. *Grammar gain*

	Pretest	Posttest	Delayed Posttest	Uptake	Retention
Group A (*n* = 32) 4 encounters	2.94 (1.01) [2, 4]	3.19 (0.93) [2, 5]	3.06 (0.95) [2, 4]	0.25 (0.44) [0, 1]	0.13 (0.34) [0, 1]
Group B (*n* = 37) 6 encounters	2.60 (0.93) [2, 4]	5.41 (1.24) [4, 8]	5.19 (1.00) [4, 6]	2.81 (1.00) [2, 4]	2.60 (1.04) [1, 4]
Group C (*n* = 30) 8 encounters	2.33 (0.76) [2, 4]	8.07 (1.53) [4, 10]	7.73 (1.36) [6, 10]	5.73 (1.72) [2, 8]	5.40 (1.50) [2, 8]
Group D (*n* = 33) 10 encounters	2.73 (0.98) [2, 4]	8.61 (1.27) [6, 10]	8.30 (1.59) [4, 10]	5.88 (1.32) [4, 8]	5.58 (1.56) [2, 8]
Group E (*n* = 30) Control	2.53 (0.90) [2, 4]	2.57 (0.82) [2, 4]	2.40 (0.73) [2, 4]	0.03 (0.41) [-1, 1]	-0.13 (0.35) [-1, 0]

Note. Max. score = 10 points, () Standard deviations in round brackets, [] Ranges in square brackets

The results from the two-way ANOVA test and its relevant post-hoc analyses for pairwise comparisons showed that while no difference was found for the pretest scores across the five learning conditions: $F(4,157) = 1.85$ ($p = .22$), a significant difference was then found for both immediate ($F(4,157) = 209.73$, $p < .001$) and delayed posttest scores ($F(4,157) = 196.08$, $p < .001$). In both cases, the between-group difference in the learning gains can be summed up as: Group E = Group A < Group B < Group C = Group D, and visually illustrated in Figure 1 below.



E = Control group; A = Learning group with 4 in-text encounters with target structures; B = Learning group with 6 in-text encounters with target structures; C = Learning group with 8 in-text encounters with target structures; D = Learning group with 10 in-text encounters with target structures

Figure 1. Comparison of grammar gains across groups

It is clear from the above figure that incidental grammar learning occurred in all treatment groups; however, this learning was only sizable after six encounters with the target structures. The gain size also significantly enlarged after eight and ten encounters with these structures. It should also be noted here that the maximum gain score was hit several times after the students encountered the target structures for eight and ten times.

RQ #2: Predictive Power of In-text Encounters with Grammar Structures and Content Comprehension

To gauge the predictive power of in-text encounters with grammar structures and content comprehension for the size of grammar gains, these three variables were introduced into a linear regression model with the size of grammar gains as the dependent variable, the frequency of in-text encounters with grammar structures and the level of content comprehension as the two predicting factors. In the immediate posttest, the above model as a whole could predict the learning gains: $F(2, 129) = 253.3$ ($p < .001$) with adjusted $R^2 = .79$. See Figure 2.

The frequency of in-text encounters with grammar structures predicted these gain sizes: t = 8.386, $p < .001$. So was content comprehension: t = 6.963, $p < .001$. However, the predictive power of in-text encounters with grammar structures (standardized beta = 0.519) was stronger than that of reading comprehension (standardized beta = 0.431). No interaction was found for these two factors (p = .38).

```
Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) -4.55875   0.38647 -11.796  < 2e-16 ***
CC           5.55348   0.79759   6.963 1.52e-10 ***
SE           0.60019   0.07157   8.386 7.53e-14 ***
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 1.172 on 129 degrees of freedom
Multiple R-squared:  0.7971,    Adjusted R-squared:  0.7939
F-statistic: 253.3 on 2 and 129 DF,  p-value: < 2.2e-16
Standardized beta estimates:
Standardized beta: CC = 0.431; SE = 0.519
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Figure 2. Predictive powers of in-text encounters with grammar structures and content comprehension for grammar uptake

Note. CC: Content comprehension; SE: in-text encounters with grammar structures

When it comes to the case of the delayed posttest, the above model was still able to explain the variance in the delayed posttest scores ($F(2, 129) = 246.8$, $p < .001$, $R^2 = .79$). Again, the explanatory power of in-text encounters with grammar structures for the learning gains on this measure (t = 7.982, $p < .001$, standardized beta = 0.499) was still stronger than that of content comprehension (t = 7.174, $p < .001$, standardized beta = 0.448). No interaction was found for these two variables (p = .71).

```
Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) -4.59630   0.38052 -12.079  < 2e-16 ***
CC           5.63405   0.78531   7.174 5.07e-11 ***
SE           0.56248   0.07047   7.982 6.85e-13 ***
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 1.154 on 129 degrees of freedom
Multiple R-squared:  0.7928,    Adjusted R-squared:  0.7896
F-statistic: 246.8 on 2 and 129 DF,  p-value: < 2.2e-16
Standardized beta estimates:
Standardized beta: CC (Content comprehension) = 0.448; SE (In-text encounters with
grammar structures) = 0.499
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Figure 3. Predictive powers of in-text encounters with grammar structures and content comprehension for grammar retention

Put altogether, the size of grammar gains through meaning-focused reading in this experiment was moderated by both in-text encounters with grammar structures and content comprehension. Specifically, the more frequently the target structures were encountered in the reading materials, the more likely their underlying knowledge was acquired. Similarly, the students who were able to cultivate a better understanding of the reading content also tended to be those who made larger grammar gains. However, the predictive power of in-text encounters with grammar structures for these learning gains was consistently more robust than that of content comprehension. This holds true for both grammar uptake and retention.

Discussion and Implications

Regarding the first research question, as clearly shown from the above report, L2 students in the present experiment could learn new grammatical knowledge right after encountering the target structures only four times in the reading materials. Such a learning gain, however, was more pronounced after six and especially eight encounters with these structures. These results align with what Lee (2002) and Aka (2020) found in their experiments. These findings altogether reaffirmed that meaning-focused reading was indeed a source for incidental grammar acquisition and the chance for this learning was not actually so slim as VanPatten (1990, 1996, 2014), Greenslade, Bouden, and Sanz (1999) or Berne (2000) believed.

A Role for Meaning and Use

There might be three plausible explanations for this difference. First of all, the studies by VanPatten (1990, 1996, 2014), Greenslade, Bouden, and Sanz (1999) or Berne (2000) only

focused on the incidental uptake of grammatical form, but largely ignored that of grammatical meaning and use. As a consequence, they might have underestimated the effects of meaning-focused reading on incidental grammar acquisition. Second, the way these experiments prompted L2 students to attend to grammatical form during their meaning-focused reading was not meaningful. On the one hand, such a focus-on-form incident did not stem from these students' comprehension problems. On the other hand, these students were only required to check the presence/absence of the target grammar points in the reading materials, but not to decipher the meanings of these grammar points and then map these meanings to the respective forms. Therefore, hardly did incidental grammar acquisition happen in these cases. Finally, the above studies all gauged the size of grammar gains in a so-called "*natural*" condition in which the target structures were neither essential for the students' interpretation of the reading content nor reoccurred a sufficient number of times in the input text as in the present study. Therefore, one clear pedagogical implication from the above finding is that L2 instructors might need to pay due attention to the importance of the target structures for content comprehension as well as the frequency of in-text encounters with grammar structures in their selection and/or development of reading materials if they aim to foster incidental grammar acquisition through meaning-focused reading.

In addition, the present study was the first one in the existing literature that measured the learning of the *use* dimension of grammatical knowledge. The range of posttest scores attested in the learning conditions where the research participants encountered the target structures eight and ten times (Table 4) consistently showed that the maximum test score was hit several times. This in turn suggested that some students were even able to use the newly learnt structures in a novel sentence. Therefore, once again, it is recommended that research in this area should examine the incidental acquisition of not only grammatical form but also grammatical meaning and use and Larsen-Freeman's FMU Model (2015) can be a plausible theoretical framework for such an investigation. Another plus point of the present study is that it also looked at the long-term effects of meaning-focused reading on incidental grammar acquisition. The results from the delayed posttest suggested that the initial uptake of grammatical knowledge tended to be resistant to decay at least two weeks after learning. This was in line with what Lee (2002) found. However, due to the paucity of research in this area, caution should be taken in interpreting this finding. I myself thus call for more studies in this research line to further investigate the long-term effects of meaning-focused reading on incidental grammar acquisition.

When it comes to the second research question, the size of grammar gains in the present study was found positively correlated with the level of reading comprehension. To be more specific, L2 students who were able to cultivate a better understanding of the given paragraphs also tended to be the ones who made a larger grammar gain. This finding suggests that reading comprehension could also foster incidental grammar learning through meaning-focused reading as in the case of incidental vocabulary learning (Pulido, 2007; Vidal, 2011). In the present study, the lexical profiles of the reading paragraphs were manipulated so that they did not present more than 2% of new words to the students, which in turn might have made this input more comprehensible to the students (compared to the original version), at least from the lexical perspective (Nation & Webb, 2011). Since their reading comprehension was mentally supported as above, the students in the present study could have more mental resources available to process knowledge related to the target structures as well as more co-textual clues for their interpretation

of the structure meaning and their form-meaning mapping for these structures. However, it should also be noted that this study was the first one which examined the relationship between incidental grammar learning and reading comprehension. Thus, more empirical research should be done to look into this relationship and to provide more validation for the above finding.

As reported above, the frequency of in-text encounters with grammar structures was even a stronger predictor for incidental grammar acquisition than reading comprehension. A pertinent question here is what might be a precise number of structure encounters that sustains this learning. In the present study, L2 students could pick up the form and meaning of the target structures right after four encounters with these structures; however, such a gain was only sizeable after six encounters. Lee (2002) also reported a similar learning after six encounters with the target structure, while Aka (2020) reported that such a learning could only happen after ten encounters and get more sizable after forty encounters. Again, as the number of studies in this area still remains limited, more studies are required before the answer to the above question can be found. In addition, the effect on incidental grammar acquisition of in-text encounters with grammar structures has also been consistently reported to be moderated by many other factors as the nature of the reading task, the availability of useful contextual clues for interpreting the structure meaning (Lee, 2002) or the level of reading comprehension as in the present study. Therefore, Gass and Mackey (2002) appeared to be right when they suggested that the frequency effects on incidental language acquisition should be examined in relationship with other input- or learner-related factors.

Pedagogical Implications

The above findings altogether provide various useful implications for L2 teachers, materials as well as course designers. First of all, they provide us with more empirical evidence supporting our current practice of implicit/incidental grammar instruction. Now L2 teachers will have another option to teach grammar communicatively apart from consciousness-raising or form-focused learning tasks. Second, as the frequency of in-text encounters with grammar structures was also found to foster this learning. This factor should be paid due attention to in our materials development. As found in the present study, L2 learners might need to have at least six encounters with the target structures to sustain their incidental grammar uptake. In addition, such encounters should be massed (i.e., the learners repeatedly reencountered the structures in a short period of time) to fine-tune their interpretation of the structure meaning as well as strengthen their memory of the relevant form-meaning connection (see Nakata, 2015) for a similar example, but in the context of incidental vocabulary learning). Therefore, if we aim to create a favorable condition for incidental grammar learning through meaning-focused reading to happen, the target structure should be reoccurred at least six times with short intervals in between in the reading materials. The chance for L2 learners to notice the presence of this structure and process its underlying knowledge will be higher if its meaning (i.e., its semantics dimension) is essential for reading comprehension and its form is textually enhanced (Boers, 2021).

Since reading comprehension is another facilitative factor in this learning, we might need to resort to different pedagogical interventions to foster reading comprehension. One way to do so is to reduce the lexical demand of the reading material so that L2 learners do not have to struggle with so many new words and therefore they can save part of their attentional capacity to process

knowledge related to the target structure and foster their form-meaning link for this structure. The size of grammar gain in the present study was also found to be relatively larger than what was reported in previous research in this area. This might be partly due to the fact that my students were required to read short paragraphs, but not long texts (as in most of previous research), which in turn enhanced the chance for my students to notice the presence of and process knowledge related to the target structures. Put differently, short paragraphs might be more conducive to incidental grammar learning through meaning-focused reading than long texts.

Study Limitations and Conclusion

Although this study managed to address some methodological limitations of previous research into incidental grammar acquisition through meaning-focused reading, it could not proceed without flaws. One lay in the limited number of the target grammar structures. To be more specific, the research participants could possibly have remembered these structures from the pretest and then deliberately study them in the interval between the pretest and the two posttests. However, as suggested in the test scores obtained by the control group, this might not be the case, at least in this experiment. Another was associated with the nature of the reading comprehension test. If this measure prompted the research participants to process the input texts not only for the general topics (as in the present study) but also for the main ideas, factual and other details or even implicit meanings, they would be more engaged in meaning-focused reading and the resulting test scores would better reflect their level of content comprehension. Last but not the least, though the grammar knowledge scale was the first one of this type in the context of researching incidental grammar acquisition through meaning-focused reading, the evidence gathered from this measure might be still insufficient to substantiate any growth in grammatical knowledge. However, if more test items were added to measure the learning gain for the same structures, it would run the risk of triggering more attention of research participants towards these structures which would be more likely to convert the incidental learning into the intentional learning.

Albeit all limitations above, it is still clear from the present study that L2 learners are indeed able to learn new grammatical knowledge incidentally through meaning-focused reading. This learning is found for all three dimensions of grammatical knowledge (including even that of grammatical use) and this knowledge appears to be resistant to decay at least till two weeks after learning. In addition, this learning is also found to be mediated by both in-text encounters with grammar structures and reading comprehension. Therefore, L2 teachers, materials and course designers might need to consider these two factors in their lesson planning and materials development with a view to fostering their students' incidental grammar uptake and retention through reading-based lessons.

References

Aka, N. (2020). Incidental learning of a grammatical feature from reading by Japanese learners of English as a foreign language. *System, 91*, 1-14. https://doi.org/10.1016/j.system.2020.102250

Allan, D. (2004). *Oxford Placement Test 1*. Oxford: Oxford University Press.

Berne, J. (2000). The impact of enhanced comprehensibility on conscious attention to form and content. *Spanish Applied Linguistics, 4*, 133–159.

Biber, D. (2006). *University language.* Amsterdam: John Benjamins.

Boers, F. (2018). Intentional versus incidental learning. In J. I. Liontas (Ed.), *The TESOL encyclopedia of English language teaching* (pp. 1-6). John Wiley & Sons, Inc. https://doi.org/10.1002/9781118784235.eelt0074

Boers, F. (2021). *Evaluating second language vocabulary and grammar instruction: A synthesis of the research on teaching words, phrases, and patterns*. Routledge.

Bordag, D., Kirschenbaum, A., Opitz, A., Roganhn, M., & Tschirner, E. (2016). Incidental acquisition of grammatical features during reading in L1 and L2. *Studies in Second Language Acquisition, 38*, 445-483. https://doi.org/10.1017/S0272263115000315

DeKeyser, R. (2003). Implicit and explicit learning. In C. Doughty, & M. Long (Eds.), *The handbook of second language acquisition* (pp. 313–348). Oxford: Blackwell.

Elley, W.B., & Mangubhai, F. (1983). The impact of reading on second language learning. *Reading Research Quarterly, 19*, 53-67. https://doi.org/10.2307/747337

Ellis, N.C. (2002). Frequency effects in language processing: A review with implications for theories of implicit and explicit language acquisition. *Studies in Second Language Acquisition, 24*(2), 143-188. https://doi.org/10.1017/S0272263102002024

Ellis, R. (1999). *Learning a second language through interaction*. Amsterdam, the Netherlands: John Benjamins.

Gass, S. M., & Mackey, A. (2002). Frequency effects and second language acquisition: A complex picture?. *Studies in Second Language Acquisition, 24*(2), 249-260. https://doi.org/10.1017/S0272263102002097

Greenslade, T., Bouden, L., & Sanz, C. (1999). Attending to form and content in processing L2 reading texts. *Spanish Applied Linguistics, 3*, 65–90.

Haastrup, K. (1991). *Lexical inferencing procedures or talking about words: Receptive procedures in foreign language learning with special reference to English*. Tubingen, Germany: Gunter Narr.

Hulstijn, J. (2003). Incidental and intentional learning. In C. J. Doughty & M. H. Long (eds.), *The handbook of second language acquisition* (pp. 349–382). Malden, MA: Blackwell.

Krashen, S. D. (1985). *The input hypothesis: Issues and implications*. London: Longman.

Larsen-Freeman, D. (2015). Research into practice: Grammar learning and teaching. *Language Teaching*, *48*(2), 263-280. https://doi.org/10.1017/S0261444814000408

Lee, J.F. (2002). The incidental acquisition of Spanish: Future tense morphology through reading in a second language. *Studies in Second Language Acquisition, 24*, 55-80. https://doi.org/10.1017/S0272263102001031

Leung, J. H., & Williams, J. N. (2012). Constraints on implicit learning of grammatical form-meaning connections. *Language Learning, 62*, 634–662. https://doi.org/10.1111/j.1467-9922.2011.00637.x

Loewen, S., Crowther, D., Isbell, D. R., Kim, K. M., Maloney, J., Miller, Z. F., & Rawal, H. (2019). Mobile-assisted language learning: A Duolingo case study. *ReCALL, 31*(3), 293-311. https://doi.org/10.1017/S0958344019000065

Nakata, T. (2015). Effects of expanding and equal spacing on second language vocabulary learning. *Studies in Second Language Acquisition, 37*(4), 677–711. https://doi.org/10.1017/S0272263114000825

Nguyen, C. D. (2019). The effect of content retelling on vocabulary uptake from a TED talk. *TESOL Quarterly, 53*(1), 5-29. https://doi.org/10.1002/tesq.441

Pulido, D. (2007). The relationship between text comprehension and second language incidental vocabulary acquisition: A matter of topic familiarity? *Language Learning, 57*, 155-199. https://doi.org/10.1111/j.0023-8333.2004.00263.x

Rebuschat, P., Hamrick, P., Riestenberg, K., Sachs, R., & Ziegler, N. (2015). Triangulating measures of awareness: A contribution to the debate on learning without awareness. *Studies in Second Language Acquisition, 37*(2), 299-334. https://doi.org/10.1017/S0272263115000145

Robinson, P. (1996). Learning simple and complex second language rules under implicit, incidental, rule-search, and instructed conditions. *Studies in Second Language Acquisition, 18*(1), 27-67. https://doi.org/10.1017/S0272263100014674

Saffran, J. R. (2001). The use of predictive dependencies in language learning. *Journal of Memory and Language, 44*, 493–515. https://doi.org/10.1006/jmla.2000.2759

Schmitt, N. (2008). Instructed second language vocabulary learning. *Language Teaching Research, 12*(3), 329-363. https://doi.org/10.1177/1362168808089921

Shintani, N., & Ellis, R. (2010). The incidental acquisition of English plural–s by Japanese children in comprehension-based and production-based lessons: A process-product study. *Studies in Second Language Acquisition, 32*(4), 607-637. https://doi.org/10.1017/S0272263110000288

Song, J., & Sardegna, V.G. (2014). EFL learners' incidental acquisition of English prepositions through enhanced extensive reading instruction. *RELC Journal, 45*, 67-84. https://doi.org/10.1177/0033688214522623

Sweet, S.A., & Grace-Martin, K. (2003). *Data analysis with SPSS: A first course in applied statistics*. Boston: Alyn & Bacon.

Tagarelli, K. M., Ruiz, S., Vega, J. L. M., & Rebuschat, P. (2016). Variability in second language learning: The roles of individual differences, learning conditions, and linguistic complexity. *Studies in Second Language Acquisition, 38*(2), 293-316. https://doi.org/10.1017/S0272263116000036

Tammenga-Helmantel, M., Arends, E., & Canrinus, E. T. (2014). The effectiveness of deductive, inductive, implicit and incidental grammatical instruction in second language classrooms. *System, 45*, 198-210. https://doi.org/10.1016/j.system.2014.06.003

VanPatten, B. (1990). Attending to form and content in the input: An experiment in consciousness. *Studies in Second Language Acquisition, 12*, 287–301. https://doi.org/10.1017/S0272263100009177

VanPatten, B. (1996). *Input processing and grammar instruction in second language acquisition*. Greenwood Publishing Group.

VanPatten, B. (2014). Input processing in adult second language acquisition. In B. VanPatten, &, Williams, J. (Ed.), *Theories in second language acquisition* (pp. 115–135). Mahwah NJ: Lawrence Erlbaum Associates.

Vidal, K. (2011). A comparison of the effects of reading and listening on incidental vocabulary acquisition. *Language Learning, 61*(1), 219–258. https://doi.org/10.1111/j.1467-9922.2010.00593.x

Ward, D.F., & Lo, Y.Y. (2023). Incidental development of implicit and explicit grammar knowledge from reading: The case of lower-intermediate learners of English. *System*. Online view first. https://doi.org/10.1016/j.system.2023.103094

Webb, S., Sasao, Y., & Balance, O. (2017). The updated vocabulary levels test: Developing and validating the VLT. *International Journal of Applied Linguistics 168*(1), 33–69. https://doi.org/10.1075/itl.168.1.02web

Williams, J. N. (2009). Implicit learning in second language acquisition. In W. Ritchie, & T. K. Bhatia (Eds.), *The new handbook of second language acquisition* (pp. 319–344). Bingley: Emerald Group Publishing.

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