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Incidental L2 vocabulary learning: Recent developments and implications for future research

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Abstract

The incidental or implicit learning of vocabulary has long been a topic of interest in various disciplines. In studies on foreign language acquisition, reading is often the activity that researchers use to generate their findings. *Reading in a Foreign Language* has maintained its position at the forefront of this research, consistently publishing manuscripts that support or refute previous findings, improve upon past research designs, or offer new perspectives on existing issues. The current article adds to this ongoing collection of texts by first discussing, in brief, the extent to which incidental vocabulary learning has been shown to be possible in past research. It then discusses recent innovations in research, homing in on two studies in particular that have been selected due to their unique implications for research and practice: the use of codeswitched texts and a new construct, dynamic exposure. The discussion section will expand on the ideas these studies introduce, suggesting future directions for research and further implications for practitioners.

Keywords: incidental learning, implicit learning, extensive reading, vocabulary learning, vocabulary knowledge

Introduction

Vocabulary knowledge is complex and yet linked to all other language skills (Milton & Fitzpatrick, 2014). Without a sound knowledge of vocabulary, it would be impossible to comprehend material when reading or listening, much less communicate with speaking or writing (Schmitt, 2010). So what then is the best way for students to learn vocabulary? Numerous books have been written about teaching vocabulary to second or foreign language (L2) learners, and yet there is not enough time for practitioners to teach all of the words students will need to know to function well in an L2 (Nation, 2013; Webb & Nation, 2017). Incidental vocabulary learning has, therefore, become a popular, sometimes controversial, topic of discussion (see Cobb, 2016; McQuillan, 2016; Nation, 2016). Loewen and Reinders (2011) define incidental L2 learning as "[l]earning that happens without the learner intending for it to occur" (p. 88). A scoping review of studies on incidental L2 learning indicates that vocabulary learning is the most prominent area of investigation and reading the most common medium.

Moreover, several recent studies have pushed the boundaries of what we know about incidental vocabulary learning by using innovative research methods. In this article, I will use two of these studies as a launch pad for my discussion, attempting to determine the extent to which incidental vocabulary learning is possible and to what extent it is effective. I reference other empirical studies and conclude by discussing the implications this research has for language teaching, learning, and research.

Clarifying Terminology

Before delving into the research, it is important to clarify some key terms. Many experts are uncertain about the merits of classroom instruction given the vast divide between the nature of communication in these controlled spaces and language usage in the "real-world" (Ortega, 2009). Krashen (1985), for instance, takes a hard stance in his distinction between learning and acquisition. Learning, he describes, is a process that requires conscious effort and attention that results in explicit knowledge. Acquisition, on the other hand, is a subconscious process that occurs naturally without concerted effort. For Krashen, language that is learned cannot be used as fluently or as spontaneously as language that is acquired; the two are distinct (a non-interface position; see Ellis, 2008). In a seminal critique of Krashen's theories, McLaughlin (1987) argued against this bifurcation, highlighting a number of problematic issues. Since then, rather than pursuing learning and acquisition as isolated constructs, many writers, although not all, use the terms interchangeably, as the relationship between the constructs of learning and acquisition is, at least at this time, impossible to investigate empirically (Ortega, 2009). Consequently, many researchers have turned to examine explicit versus implicit knowledge (e.g., Ellis, Loewen, Elder, Erlam, Philp, & Reinders, 2009). Explicit knowledge indicates knowledge that is "consciously available to learners," while implicit knowledge is subconscious and may be available to use even though the learner is unaware of it (Loewen & Reinders, 2011, p. 86). Similar distinctions have been made between explicit and implicit instruction as well as explicit versus implicit learning and intentional versus incidental learning, each drawing on similar ideas with subtle differences beyond the scope of this introduction.

Leow (2018) notes that there has yet to be consensus over how L2 input must be processed by learners in order for it to be internalized, citing several recent papers (e.g., Hulstijn, 2013; Ellis, 2015; Leow, 2015) that have different postulations about the role of explicit (or intentional) learning and implicit (or incidental) learning (see Nassaji, 2017 for a review). According to Leow (2018), incidental learning can lead to both implicit and explicit knowledge. Based on these distinctions, in this paper, incidental learning—and more specifically, incidental L2 vocabulary learning—falls into the implicit learning category, most likely acquired through implicit instruction (including self-initiated learning activities in which content and meaning are the foci) and which can be stored as implicit or explicit knowledge. In regards to learning versus acquisition, I make no distinction between the terms and use them interchangeably throughout this paper.

Incidental Vocabulary Learning: Is it possible? To what extent?

Incidental vocabulary learning has been proven to be possible in numerous, some now classic, studies (e.g., Day, Omura, & Hiramatsu, 1992; Horst, Cobb, & Meara, 1998; Kweon & Kim, 2008; Nation & Wang, 1999; Pigada & Schmitt, 2006; Pitts, White, & Krashen, 1989; Waring & Takaki, 2003). However, the percentage of vocabulary acquired in these studies is relatively low when compared with studies that examine its inverse, intentional vocabulary learning. Leow's (2018) review, for instance, reports the mean percentages obtained by incidental learning groups between 13-64%, while the means of intentional learning groups sit significantly higher at 45-73%. Three meta-analyses comparing explicit and implicit instruction (affording intentional and incidental learning, respectively) corroborate these numbers by reporting larger effect sizes for the explicit groups on immediate post-tests (see Goo, Granena, Yilmaz, & Novella, 2015; Norris & Ortega, 2000; Spada & Tomita, 2010). It is agreed that, typically, implicit and incidental learning has a low depth of processing, a lower amount of cognitive effort in order to process L2 input (Leow, 2015, 2018). Nevertheless, numerous studies have shown with robust empirical data that higher depth of processing correlates with more significant L2 acquisition (e.g., Adrada-Rafael, 2017; Bird, 2012; Rosa & Leow, 2004). Therefore, studies on vocabulary learning often draw upon Laufer and Hulstijn's (2001) Involvement Load Hypothesis as a gauge to determine the depth of processing during certain implicit and incidental vocabulary learning activities (e.g., Hulstijn & Laufer, 2001; Ong & Zhang, 2018; Rott, 2005).

The Involvement Load Hypothesis (Laufer & Hulstijin, 2001) consists of one motivation aspect, need, which represents the importance of knowing a word to the learner, and two cognitive, information processing aspects, search and evaluation. Search is the learner's attempt to find the meaning of the unknown word, while evaluation is the comparison of that word or meaning with other words and meanings to assess whether it fits in a specific context. The hypothesis is that incidental vocabulary learning tasks that include these variables to a high degree require more depth of processing from learners and, subsequently, result in more learning. This would explain Kang, Sok, and Han's (2019) more recent meta-analysis which found that explicit and implicit instruction were comparable in immediate post-tests, while delayed post-tests showed larger effect sizes for implicit instruction, as individual (cognitive) learning processes and task conditions may have differed, varying the involvement load. Several researchers have manipulated this theory to create innovative research studies, two of which will be reviewed in detail below. Both of these studies use reading as the source of input, so perhaps it is necessary to explain why studies using other forms of input (e.g., listening or multimodal input) were not included.

To acquire L2 vocabulary incidentally, learners need to be exposed to the target language. Based on a synthesis of previous research, Grabe (2009) maintains that the number of unknown words learned incidentally through reading is typically only 5-15%, but this percentage is still higher than similar studies on listening (see also Brown, Waring, & Donkaewbua, 2008). Moreover, Vidal (2011) found reading to be more effective for incidental vocabulary learning than listening for all but the highest proficiency students in her study. Regarding research on incidental vocabulary learning in studies that use multimodal input and input enhancement (e.g., pictures, video, or glosses), the number of studies is on the rise (see Malone, 2018; Nguyen & Boers, 2019; Peters & Webb, 2018). However, the relative newness of this area and the sheer number of

studies investigating incidental vocabulary acquisition through reading (compared to listening and multimodal input) enables a more empirically-supported discussion of the area by basing the review on studies that have examined reading. What is more, Mestres and Pellicer-Sánchez (2019) noticed that learners focused on text more so than other visual information in their study of multimodal learning, further justifying my focus on text-based resources. Therefore, I have decided to home in on two innovative studies that use reading as the source of input for incidental vocabulary learning.

Recent Innovations in Research

I have chosen two recent studies to highlight innovations in research design, both with implications for research and practice. In the first study, Ong and Zhang (2018) used a codeswitched text as a source of input for incidental vocabulary learning. This study is particularly interesting because it is the first to explore involvement load effects (see Laufer & Hulstijn, 2001) while reading a codeswitched text. In the second study, Mohamed (2018) utilized eye tracking—a data collection technique that records the eye movements of learners to determine their reading behavior—and introduced a now much-needed concept: dynamic exposure.

Ong and Zhang (2018)

This study investigated whether codeswitched reading would enhance incidental vocabulary learning and is the first study to explore involvement load effects (Laufer & Hulstijn, 2001) while reading a codeswitched text. The participants (N = 154; male = 77, female = 77) were high-achieving mainland Chinese students studying at a university in Singapore. They were randomly divided into an experimental group that engaged in codeswitched reading (n = 78) and a comparison group that engaged in graded reading (n = 76). Each group was asked to read the same 535-word passage. However, the experimental group's passage had been translated into Chinese, except for five target vocabulary words which were kept in English. The comparison group's passage remained entirely in English. No teaching was conducted for either group, nor were the students informed that there would be a post-test on the five target words. One week after the immediate recall test, the students were given a delayed retrieval test without prior notification[1].

On the immediate recall test, the experimental group (M = 9.76, SD = 3.79) outperformed the comparison group (M = 6.95, SD = 4.57), with a 95% confidence interval for the difference in mean at 1.47, 4.15 (t = 4.14, p < .005, df = 145.51) and a medium effect size (d = 0.69). The group difference is even more significant in the delayed retrieval test, with the experimental group (M = 8.21, SD = 4.58) outperforming the comparison group (M = 3.18; SD = 3.19) with a 95% confidence interval for the mean difference at 3.77, 6.28 (t = 7.92, p < .0005, df = 137.77) and a large effect size (d = 1.27). The experimental group not only performed better at immediate recall and retrieval but also had better retention, regardless of ability level. These results

[1] This is important to mention because not being told in advance that there will be a post-test is a key criterion of incidental learning research (Hulstijn, 2003). Many studies do not report this, so it becomes difficult to know if the learning is truly incidental (De Vos, Schriefers, Nivard & Lemhöfer, 2018).

demonstrate that L2 vocabulary can be learned incidentally by reading both codeswitched[2] and L2 passages. However, codeswitched texts appear much more beneficial for incidental vocabulary learning. Ong and Zhang (2018) contend that this is most likely due to the additional cognitive demands required by the need to infer and evaluate the meaning of the words in the L2—a higher involvement load—as well as the visual salience of L2 words in the mostly first language (L1) text. The distinctiveness of these words is likely to increase the attention that is paid to them (Bishop & Peterson, 2010), resulting in increased retrieval and retention (Macaro & Mutton, 2009). Similar conclusions can also be drawn from Godfroid, Boers, and Housen's (2013) study on the role of attention in incidental L2 vocabulary learning, as more attention resulted in higher levels of acquisition, and more processing time is often given to novel words than familiar ones (see also Mohamed, 2018; Pellicer-Sánchez, 2016).

The design of Ong and Zhang's (2018) study is quite interesting, as previous research has shown that in order for learners to have minimally acceptable comprehension, 95% coverage of a text is needed (Hirsh & Nation, 1992; Laufer, 1989; Laufer & Ravenhorst-Kalovski, 2010). For fluent, unassisted reading, at least 98% coverage may be needed (Hu & Nation, 2000; Nation, 2006; Schmitt, Jiang, Grabe, 2011). Because the codeswitched text in Ong and Zhang's (2018) study contained 530 words in the L1 and only the five target words in L2, the passage was well within the optimal threshold of 98% lexical coverage, making it theoretically suitable for unassisted reading and enabling the participants to guess unknown word meanings from the context. Nation (2013) and Pulido (2009) maintain that having unknown words in the immediate context makes it more difficult for incidental learning to occur. Grabe (2009) points out that nearly all of the co-text (words surrounding the target word; smaller in scope than the context) needs to be known, and even then, incidental word learning only occurs with 5-15 percent of unknown words. It would appear then that the salience of L2 words in a mostly L1 text enhanced noticing and attention. If the sole purpose of reading were to learn vocabulary, then this would be a major finding; however, intentional learning of lexical items has been proven to be much more effective than incidental learning (see discussion above). Therefore, the additional time and effort required to learn vocabulary incidentally appears rather inefficient when the likelihood of acquisition is quite low.

Although codeswitched reading appears to support incidental vocabulary learning, it is important to remember that the purpose of reading texts with coverage at 98% or higher is not to learn new vocabulary exclusively; extensive reading at this level reinforces other aspects of word knowledge and provides readers with exposure to words in different contexts through multiple encounters (Grabe, 2009; Grabe & Stoller, 2011). Having a short, single text predominantly written in the L1 does not provide L2 context and repeated exposures that could enable these other learning processes to take place. It would also be interesting to see what would happen with a longer text, or multiple texts, which offers repeated exposure to the target vocabulary (see below).

[2] The text is referred to as codeswitched because two different languages were used. A translated text, on the other hand, would include text in only one language.

Mohamed (2018)

Mohamed's study builds on Ong and Zhang's (2018) findings but also provides insight into how learners are cognitively affected by repeated encounters in a text. Investigating repeated encounters is important because incidental learning is incremental and requires learners to see target vocabulary in different co-texts and contexts (Pellicer-Sánchez & Schmitt, 2010; Webb, 2007; Webb & Chang, 2015a, 2015b). Mohamed (2018) concentrated on incidental vocabulary learning through extensive reading by tracking the eye movements of 42 advanced learners of English. The participants read a graded text of 4,649 words (595 word types and 394 word families) and were then given comprehension and vocabulary post-tests on form recognition, meaning recognition, and meaning recall. Twenty pseudo words were used as targets, with 20 known words as control. Eye tracking data revealed that the participants spent more time on pseudo words than known words, but their total time spent processing each pseudo word decreased with each exposure, ranging from 1-30 encounters in the text.

Participants spent, on average, 8% more time on the target words than the control on the first fixation (264 versus 227 milliseconds). However, by the end of the passage, the first fixation duration for each encounter was similar (215 versus 218 milliseconds). On average, every time a target word was encountered, a decrease in the total word reading time of around 12% occurred. Participants were 10% more likely to return to a target word than to a control word, but the odds of regressing to a target word decreased by about 28% with each encounter. On the 20-word target vocabulary post-test, form recognition improved the most (M = 8.36, SD = 3.16), followed by meaning recognition (M = 6.06, SD = 3.27), and finally, meaning recall (M = 2.59, SD = 2.32). Every time a word was encountered, the probability of form recognition increased by approximately 21%, meaning recognition by 29%, and meaning recall by 43%. Furthermore, summed reading time was the strongest predictor for all vocabulary measures.

A decrease in reading time through repeated encounters was also found in other recent eye tracking studies (e.g., Godfroid et al., 2018; Joseph, Wonnacott, Forbes, & Nation, 2014; Pellicer-Sáchez, 2016). The respective authors seem to agree that repeated encounters increase familiarity with the target form, which contributes to an increase in reading fluency. In Pellicer-Sánchez's (2016) study, eight exposures enabled fixation times to stabilize between target and known words. In Mohamed's (2018) study, it took 11-12 exposures, but increased exposure beyond those numbers enhanced recognition to the point that target and control times were identical. What is unique about Mohamed's study is that total fixation time (the combined time of each encounter) was shown to be a more reliable predictor of learning outcomes than total encounters. Mohamed (2018) coined the terms dynamic exposure and static exposure to describe this: dynamic exposure is "the sum of all the information that readers have accrued from all encounters with a given word," and static exposure is, simply, "the number of exposures" (p. 286). Tracking dynamic exposure is a new aspect in incidental vocabulary learning research, as most studies have focused solely on static exposure. Nevertheless, studies on static exposure were indeed necessary to bring the research field to its current state and still provide relevant information regarding incidental vocabulary learning.

Discussion and Implications

One important implication from this line of research is that maximizing exposure to and interaction with vocabulary in rich contexts provides suitable conditions for the acquisition of unknown vocabulary. Mohamed (2018) notes that while familiarity with new vocabulary is enhanced through extensive reading, the process of internalization takes time and is unlikely to produce immediate results (see also Laufer, 2003, 2005; Macaro, 2003; Read, 2004). Incidental vocabulary learning is a longitudinal process; therefore, research benefits from tracking incidental learning over time and with more than one text (Horst, 2005; Schmitt, 2010; Webb and Chang, 2015a, 2015b). Follow up studies may also want to consider the variable of context quality.

Webb (2008) notes that the quality of the context is important for acquiring meaning, while the total number of encounters tends to affect form learning; context quality "provides an answer to why gains in knowledge of meaning have varied from word to word […] and study to study" (p. 238). If the context is informative, a word may be learned faster than if the word appears in a context that is less informative or potentially misleading (Webb, 2008). Future studies could include this under-researched variable alongside Mohamed's (2018) dynamic/static exposure distinction. Additionally, future studies may want to consider using only the target language rather than pseudo words or codeswitched texts.

Leow (2018) avers that "the relatively popular use of a semi-artificial language or artificial lexicon as the experimental L2 input in many of the incidental or implicit learning condition studies may not reflect the processing of natural languages" (p. 7). Codeswitched texts, although shown to be more effective than L2 texts for individual word learning, face a similar problem in that they do not offer opportunities for learners to strengthen knowledge of existing words and word associations. There are also dimensions of vocabulary knowledge that extend beyond form and meaning, such as knowledge of grammatical usage, collocations, and pragmatics (see Milton & Fitzpatrick, 2014). L2 texts provide this language-specific contextual richness and, thus, are likely more beneficial for overall language development, especially when used with non-primary users of a language.[3]

Although success in previous incidental learning studies has been relatively low when compared with intentional learning, Nation (2013) has shown that significant time spent reading can lead to substantial vocabulary gains. Despite this, Leow (2018) cautions whether the findings from even the most robust studies on incidental learning can be extrapolated to classroom settings due to the need to meet curricular demands and various contextual constraints (e.g., time, resources, and standardized testing). I add that even if these conditions were met, the reality is that most students do not have the time nor motivation to engage in such activities, at least not for the duration of time that would be required to achieve noticeable results. To mitigate this issue, Takase (2007) found that introducing extensive reading in class (for incidental learning) can increase the amount of time students spend engaging in these types of activities outside of class. To add to this finding, in one recent study, Papi (2018) investigated individual motivational factors during incidental vocabulary learning. He found that participants in a gain condition (with

[3] Non-primary users are individuals who currently use the language being discussed less often than another language or languages (see Thomas & Osment, 2019).

potential for reward) generally performed better than those in a loss condition (which has potential for forfeiture). The significance of non-cognitive motivational factors in Papi's study demonstrates that incidental vocabulary learning may indeed be enriched by framing tasks in a gain condition where students are rewarded for their efforts. Punishment or a loss of points for non-participation, on the other hand, inevitably creates a loss condition and may lead to less significant learning outcomes. Further research on incidental learning may benefit from experimenting with different motivational variables. Teachers may also want to consider framing tasks in different conditions to see if doing so makes a difference in participation in their own contexts.

Finally, more studies are needed that compare incidental vocabulary learning with intentional vocabulary learning to generate findings on the effects of both in situated contexts (e.g., Barcroft, 2009) rather than those that only investigate one or the other. Conducting studies with the same group of learners in incidental and intentional learning conditions would enhance the claims made for one or the other by controlling different variables such as participants and context.

Conclusion

While intentional approaches provide more immediate learning of lexical items, incidental vocabulary acquisition has consistently proven to be effective. The extent to which incidental vocabulary learning is possible through reading depends on a number of factors including but not limited to the information provided by and percentage of known words in the co-text and context, target word salience, dynamic exposure, depth of processing, and learning motivation, as evidenced by the studies discussed in this article. Because learners might not notice, may skip over, or could assign incomplete and/or incorrect meanings to unknown words in texts, new word learning and retention can be supported with instructional support; intentional and incidental word learning are complementary (Grabe, 2009). Therefore, extensive reading and listening should be promoted to enable incidental learning, but class time may be better spent on activities that focus learners' attention on target vocabulary with a combination of explicit and implicit instruction. Teachers can play an important role in this process by teaching effective learning strategies, establishing conditions that enhance learner motivation to engage in incidental learning activities, and by providing intentional learning opportunities in classroom settings (Thomas & Brereton, 2019; Thomas & Rose, 2019; Thomas, Rose, Pojanapunya, 2019).

For researchers, this article has demonstrated that there is scope for future research on incidental learning using codeswitched texts, dynamic exposure as a construct, and the framing of tasks in a gain condition (where a possible reward is offered). Ong and Zhang's (2018) study took the first step in providing insights into incidental vocabulary learning from codeswitched texts and has left room for others to continue this line of work. Mohamed's (2018) study added to the existing yet still relatively new line of research using eye tracking with a slightly longer text. His study's most profound contribution, however, is the introduction of dynamic exposure as an essential construct to be investigated, potentially leading to even larger effect sizes when compared to previous research on static exposure. Finally, albeit discussed just briefly, Papi's (2018) study on motivational factors in incidental learning is another worth mentioning. It highlights the potential benefit of framing incidental learning tasks in a gain condition. It would be interesting to see

each of these areas pursued in future research, incorporating Webb's (2008) notion of context quality in study designs (see above). With more nuanced avenues to explore, the future is bright for this line of work.

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