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The role of individual differences in L2 vocabulary learning: A review of out-of-class exposure, strategic learning and motivation

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Abstract

This review paper explores the role of individual differences in second language vocabulary learning, focusing on three key factors: out-of-class exposure (e.g., viewing TV, playing video games and listening to songs), strategic vocabulary learning, and motivation. Individual differences significantly impact vocabulary learning, making it crucial to understand how these factors contribute to learning outcomes. Yet, previous reviews have mainly overlooked out-of-class exposure in their discussion of individual differences. The current review shows that the three factors can have a positive effect on lexical development. There are some points to consider such as the need for a large amount of input for out-of-class exposure to be effective. Additionally, the review shows that both motivation and self-regulation are important for vocabulary learning and that they are positively related to vocabulary knowledge. It shows that more self-regulated and motivated students tend to have significantly larger and more developed vocabulary knowledge. By synthesizing findings from empirical studies on individual differences and vocabulary learning, this review provides insights into making vocabulary learning more effective.

Keywords: vocabulary, learning, individual differences, review

Introduction

Language learners vary greatly in their vocabulary development (Dóczi & Kormos, 2015; Laufer, 1998; Webb & Chang, 2012; X. Zhang & Lu, 2014). One of the main sources of variation in vocabulary and language learning is the individual differences between learners (Dörnyei, 2015; Dörnyei & Skehan, 2003; S. Li et al., 2022; Skehan, 1989). Individual differences refer to:

> traits, dispositions, and characteristics, be they biological, social, psychological, or a combination of these, that make learners unique individuals, cause variation

> among learners, and are hypothesized to have a direct and/or indirect impact on learning outcomes (S. Li et al., 2022, p. 4).

Individual differences in second language acquisition (SLA) serves as an umbrella term that includes several factors that have been found to influence language learning. These factors are commonly divided into three main categories: *cognitive*, *conative*, and *affective* (Cronbach, 2002). Cognitive factors refer to factors that influence language processing, storing and retrieval. The main factors under this category include language aptitude (Wen et al., 2019), working memory (Baddeley, 2003) and learning strategies (Oxford, 2017). Conative factors affect learners' goal-setting abilities and their abilities in persisting to achieve this goal. The major factor in this category is motivation, which has been researched extensively in SLA (Ushioda, 2020). Finally, affective factors influence learners' feelings and emotions which include attitude (Mantle-Bromley, 1995), anxiety (Horwitz, 2001), enjoyment (Botes et al., 2022) and self-efficacy (C. Wang & Sun, 2020).

Ellis (2008) points out that the main objective of individual differences research in the past was to predict which learners will succeed in L2 learning. This was done to guide the selection of which learners are more fit to receive foreign language instruction. There has been a shift in the research objectives over the years and now researchers are mainly interested in explaining why some learners are more successful in L2 learning than others. This is pursued by analyzing the characteristics of the more successful learners with the practical aim of using these findings to guide learners on how to maximize their learning (for example, through teaching effective language learning strategies, Oxford, 2017).

Some individual differences (mainly learning strategies) have received substantially more attention in vocabulary research than other factors. For example, there is a full-length book (Takač, 2008) and book sections (Nation, 2022; Webb & Nation, 2017) on vocabulary and learning strategies, while little research exists on, for instance, the role of self-efficacy in vocabulary development (Mizumoto, 2013). It is only recently that there has been an increase in research aiming to provide an overview of the role of individual differences in vocabulary research (Dóczi & Kormos, 2015; Kim & Webb, 2022). Kim and Webb (2022) briefly reviewed the relationship between vocabulary knowledge and individual differences: working memory, aptitude, perceptual style, learning strategies, motivation, anxiety, previous L2 vocabulary knowledge, and age. They found more agreement on the relationship between vocabulary knowledge and some individual differences (e.g., vocabulary learning strategies, prior L2 vocabulary knowledge), while the effects of some factors (e.g., age) show more conflicting findings. Dóczi and Kormos (2015) focused on working memory, motivation and self-regulation. They concluded that these factors have significant effects on vocabulary growth based on the reviewed studies. A key factor missing from both reviews is out-of-class exposure (Sundqvist, 2024), which has emerged in vocabulary research in the past ten years, possibly due to the widespread access of learners to the internet and the emergence of smartphones, gaming and social media (Reynolds, 2023; Sundqvist, 2009, 2024; Sundqvist & Sylvén, 2016). This research area is gaining momentum but is still in need of further research (Kim & Webb, 2022; Schmitt, 2019). This review aims to provide an overview of the role of individual differences in vocabulary learning. In particular, it focuses on out-of-class exposure, strategic vocabulary learning, and motivation which the literature suggests to be key factors in vocabulary development (Dóczi & Kormos, 2015; Peters, 2018; Sundqvist & Sylvén, 2016). Each one of these three factors is discussed in the following sections.

Out-of-Class Exposure

Beyond the confines of structured classroom instruction, out-of-class exposure emerges as a key component in fostering lexical development. Out-of-class vocabulary learning can be categorized into *extramural* learning, *extra-curricular* learning and *self-directed* learning (Nation, 2022). Extramural learning (Sundqvist, 2009; Sundqvist & Sylvén, 2016) refers to learning from entertainment such as learning from watching television, playing video games, listening to songs and social media interactions, none of which is under the control of the teacher. Extra-curricular learning (Benson, 2011) involves learning that is directed by the course or the teacher to supplement in-class learning. This can take the form of giving students a list of the target vocabulary in a course for them to learn intentionally at home. Self-directed learning (Z. Li & Bonk, 2023; Nation & Yamamoto, 2014) is characterized by the learner taking full control of their own learning without the help of a language teacher during independent language learning or in conjunction with formal instruction. One example of self-directed language learning is learning a language from mobile-assisted language learning apps such as Duolingo (Z. Li & Bonk, 2023). The type of out-of-class exposure investigated in this study falls under the category of extramural learning (hereon, "out of class exposure" will refer solely to extramural learning").

A number of studies have shown that out-of-class exposure enhances vocabulary development (Arndt & Woore, 2018; González Fernández & Schmitt, 2015; Peters, 2018, 2019). There is even some evidence from Peters (2018) that out-of-class exposure might have more effect on vocabulary learning than classroom instruction. She examined the relationship between gender, length of instruction (3 years vs. 6 years) and out-of-class exposure and receptive vocabulary knowledge. The results of the ANCOVA analysis showed that out-of-class exposure explained more variance (13%) than length of instruction (7%), while gender had no effect on test scores. The following sources of out-of-class exposure were selected for review since they are common sources of language input for many EFL learners around the world. The types of out-of-class exposure discussed are: extensive reading, extensive viewing of TV, listening to songs, playing video games and social media. Each is discussed to investigate whether these sources can lead to significant vocabulary learning and to examine the factors that affect vocabulary gains.

Extensive Reading

Extensive reading is the type of reading that students do primarily for pleasure. Bamford and Day (2004, p. 1) define extensive reading as:

> an approach to language teaching in which learners read a lot of easy material in the new language. They choose their own reading material and read it independently of the teacher. They read for general, overall meaning and they read for information and enjoyment.

This is usually contrasted with *intensive reading*, which is the traditional reading conducted with the aim of learning language features such as grammar or vocabulary (Nation & Macalister, 2020). Extensive reading is perhaps the most researched type of out-of-class exposure with full-length books (Bamford & Day, 2004; Nation & Waring, 2020) and several journal articles (Al-Homoud & Schmitt, 2009; Nakanishi, 2015; Stoeckel et al., 2012) published on this topic. What these studies tend to show is that extensive reading can lead to

significant vocabulary learning (Day & Robb, 2015; Suk, 2017). Extensive reading provides learners with a large amount of comprehensible input, which is a necessary condition for SLA (Krashen, 1989).

A meta-analysis including 34 studies and 3,942 learners found that extensive reading contributes to language development with a medium effect size of d = 0.46 (Nakanishi, 2015). Suk (2017) examined the effectiveness of extensive reading on vocabulary development over a 15-week school semester. One hundred and ninety-one Korean EFL learners from four intact classes were assigned to two experimental groups and two control groups. Both the experimental and control groups had 100 minutes of in-class reading per week. The control groups received 100 minutes of intensive reading while the experimental groups received 70 minutes of intensive reading plus 30 minutes of extensive reading. In addition to in-class reading, students were asked to do out-of-class work. Students in the intensive reading classes were asked to do two to three hours of intensive reading and vocabulary exercises while the students in the extensive reading classes were asked to do two to three hours of additional extensive reading. The study used a self-made recall vocabulary test where the words were sampled from an extensive reading corpus. Results showed that the extensive reading classes made significantly more gains (mean difference:13.07) than the intensive reading classes (mean difference: 3.41). One limitation of the study is the use of target words from an extensive reading corpus which might have favored the extensive reading group. Nevertheless, there is a large body of research that supports Suk's finding that extensive reading can indeed lead to vocabulary gains (Nation, 2022; Nation & Waring, 2020; Schmitt, 2020).

The gains from extensive reading (and incidental vocabulary learning in general) are usually small. Based on meta-analysis studies, the percentage of target words learned from incidental activities such as reading is 9–18% on immediate posttests and 6–17% on delayed posttests. These rate gains are substantially smaller than the gains resulting from intentional vocabulary learning activities (e.g., flashcard learning) on immediate (18–77%) and delayed posttests (23–73%). Incidental vocabulary learning such as learning from reading involves less noticing and engagement with word forms which could explain the lower learning and retention rates (Laufer, 2003, 2005, 2010; Long, 1991; Schmidt, 1990). What this suggests is that students would need to read very large amounts of books to make substantial vocabulary gains (Cobb, 2007; Nation & Waring, 2020).

Extensive reading has become part of the language learning program of many language learning institutions (Stoeckel et al., 2012). Yet, some learners and teachers might find the concept of extensive reading vague and might prefer more clear guidance. Day and Bamford (2004) suggest ten principles for effective implementation of extensive reading which provide guidance for both learners and teachers. The first five are relevant to out-of-class language learning (Day & Robb, 2015, p. 5):

- The reading material is easy (students are unlikely to enjoy a book if it is too difficult).
- A variety of reading material on a wide range of topics must be available (so students can find books they find interesting).
- Learners choose what they want to read (to enhance motivation).
- Learners read as much as possible (to make substantial gains).
- Reading speed is usually faster rather than slower (i.e., slow word-for-word reading might lead to poor comprehension).

Overall, most previous studies show that extensive reading can be an effective approach to vocabulary development. The gains are usually small, therefore, it needs to be done in large quantities.

Extensive Viewing

In addition to traditional television, language learners today have unprecedented on-demand access to millions of online videos, TV shows and movies. YouTube, for example, has millions of videos and more than 500 hours of video are uploaded to YouTube every minute (Statista, 2022). These online videos can offer free, authentic, entertaining and informative content (Benson, 2015).

Several studies have investigated the effect of viewing audio-visual material (hereafter, *viewing*) on vocabulary learning and the common finding is that viewing can lead to lexical gains (Montero Perez et al., 2018; Peters & Webb, 2018). For instance, Peters and Webb (2018) examined the effects of viewing by having learners watch a one-hour documentary, followed by assessments of their knowledge of 64 specific words through meaning recall and recognition tests. The results indicated that watching the documentary led to substantial incidental learning, influenced by factors such as word frequency, cognateness, and the learners' prior vocabulary knowledge. Extensive viewing offers learners a substantial amount of comprehensible input, which can be enhanced with subtitles in both the learners' first and second languages (as discussed in the next paragraph).

Several potential factors that may influence lexical gains from viewing have been investigated. One key factor is subtitling (Frumuselu et al., 2015; A. Wang & Pellicer-Sánchez, 2022). The aim of these studies has been usually 1) investigating whether subtitles enhance vocabulary learning and 2) comparing L1 and L2 subtitles. The general findings emerging from these studies are that subtitles usually improve vocabulary learning and that L2 subtitles tend to lead to more vocabulary learning than L1 subtitles. For example, one of the early studies to show that viewing with subtitles leads to more vocabulary learning than viewing without subtitles is Koolstra and Beentjes (1999). They divided 246 bilingual 4th and 6th grade students into three experimental conditions: subtitles, no-subtitles and no-viewing (control). After watching a 15-minute documentary about grizzly bears, the subtitles group outperformed the no-subtitles group (on a written meaning recognition test and spoken form recognition test). Additionally, both viewing groups outperformed the control group. The majority of later studies have confirmed the advantage of viewing with subtitles compared to no-subtitles (Pujadas & Muñoz, 2019). The advantage seems to be due to subtitles helping language learners segment the speech stream (L2 subtitles only), guide their attention to unknown words and establish the form-meaning link (A. Wang & Pellicer-Sánchez, 2022; Winke et al., 2010). Meanwhile, there is less consensus on which subtitle type (L1 or L2) leads to more vocabulary learning. Most studies (Peters, 2019; Peters et al., 2016; A. Wang & Pellicer-Sánchez, 2022) found that L2 subtitles lead to more vocabulary learning. For example, Frumuselu et al. (2015) asked university students with mainly (90%) Spanish/Catalan L1 background (other L1s included Dutch, German, Russian, Romanian and Moldavian) to watch the TV series 'Friends' over seven weeks. The 40 EFL participants were assigned randomly to either watch the show in L1 subtitles (Spanish) or in L2 subtitles (English). Results of multiple recognition and recall tests (15 each), showed the L2 subtitles group (English) significantly outperformed (posttest mean = 14.68) the L1 subtitles group (mean = 10.95).

On the other hand, some studies found no significant differences between the two types of subtitling (Lwo & Chia-Tzu Lin, 2012; Muñoz et al., 2021). Muñoz et al. (2021), for instance,

examined the effect of subtitling from watching 24 episodes of a TV series distributed over an academic year. Results of mixed effects models showed no significant effect for subtitling on form and meaning recall tests. Pujadas & Muñoz (2019) suggested that the different results could be due to differences in research methodology (e.g., test modality, length of exposure) and learners' characteristics (e.g., proficiency and L1). In terms of proficiency, L1 subtitles might be more appropriate for beginning learners than L2 subtitles (Danan, 2004). This is based on the finding that to understand TV and movies (95% coverage), learners need to be familiar with the most frequent 3000 word-families (Webb & Rodgers, 2009a, 2009b). Empirical evidence gives support to this position. In an eye-tracking study, beginners with slow reading rates spent surprisingly very little time on each fixation[1] when L2 subtitles were used (Muñoz, 2017). Muñoz (2017) suggested that learners, due to their low proficiency, did not attempt to understand the audiovisual material.

Despite the mixed findings from the individual studies, results of a meta-analysis (Reynolds et al., 2022) and a review (Wei & Fan, 2022) on the topic suggest overall an advantage for L2 subtitles. One commonly provided explanation for the advantage of L2 subtitles over L1 is that L2 subtitles can help language learners segment the speech stream, facilitating form-meaning mapping (Peters, 2019; Peters et al., 2016; Winke et al., 2010) which is a missing feature when L1 subtitles are used (Wei & Fan, 2022).

L1 and L2 subtitles are not the only types of subtitling. In some countries such as China, bilingual subtitles (i.e., where both L1 and L2 subtitles appear on the screen simultaneously) are widespread (M. Li & Hennebry-Leung, 2022; A. Wang & Pellicer-Sánchez, 2022). An eye-tracking study compared the eye movements and learning gains of 112 Chinese EFL learners in three conditions: L1 subtitles, L2 subtitles and bilingual subtitles (A. Wang & Pellicer-Sánchez, 2022). Form recognition, meaning recall and meaning recognition tests of novel target words were used. Results showed an advantage for bilingual subtitles over L2 subtitles in meaning recognition and over L1 subtitles in meaning recall. These advantages might be due to bilingual subtitles providing L1 meaning (facilitating access to meaning) and L2 form (facilitating attention to L2 form) simultaneously on the screen which might support establishing the form-meaning link. On the other hand, L2 subtitles were more effective in form recognition, possibly because the lack of another form of subtitling (i.e., L1) makes more attention resources available for learning L2 form. A similar advantage was found in another within-subject design study where students watched videos with L1 subtitles, L2 subtitles and bilingual subtitles (M. Li & Hennebry-Leung, 2022). After seven weeks of treatment, results of immediate and delayed tests (meaning recall and recognition) showed an advantage for bilingual subtitles over L1 and L2 subtitles. Although current research on bilingual subtitles shows positive effects, it is still in the early stages. Both studies were conducted with intermediate to advanced learners, therefore, we are unsure if the same advantage applies to low-proficiency learners. More research is needed to know if bilingual subtitles indeed bring the best of both worlds (of L1 and L2 subtitles) or merely introduce distraction to learners' limited cognitive resources, especially beginners (Wei & Fan, 2022).

In sum, viewing audio-visual input can lead to significant incidental vocabulary learning. There is a wide agreement that viewing with subtitles leads to more vocabulary learning than viewing without subtitles. Although there is less agreement on which subtitle type (L1 or L2) leads to more learning, results overall suggest an advantage for viewing with L2 subtitles, perhaps because it helps learners segment the speech stream (which is lacking in L1 subtitles),

[1] "The interval between the eye's movements, when the eyes 'stop', are called *fixations*." (Conklin et al., 2018, p. 30).

facilitating attention and learning of unknown words. Bilingual subtitles seem to be more effective than monolingual subtitles (L1 or L2 only) in learning meaning, yet further research is needed given the limited number of studies in this area.

Gaming

One key reason for the interest in the area of gaming and vocabulary learning is possibly due to the intrinsically motivating nature of playing video games (Nation, 2022; Zou et al., 2021). Boredom is one notable issue in foreign language classrooms (Pawlak et al., 2020) and games offer a way of combating this by blending enjoyment with learning. It is important to establish first whether vocabulary learning can occur from playing games. Several studies have shown a positive correlation between the amount of video game playing and vocabulary knowledge (Chen & Hsu, 2019; De Wilde et al., 2019; Sundqvist, 2019; Sundqvist & Wikström, 2015; Sylvén & Sundqvist, 2012). Sylvén and Sundqvist (2012) examined how the amount of time spent playing massively multiplayer online role-playing games (MMORPGs) correlates with vocabulary knowledge. Questionnaires and diaries were used to measure the weekly amount of gaming and English language exposure (e.g., reading, viewing and listening to music) of young Swedish language learners (aged 11–12). Self-made tests of receptive (most frequent 1000 and 2000 levels) and productive vocabulary (2000 level) were used. Based on the amount of playing video games every week, students were divided into frequent gamers (five hours or more), moderate gamers (less than five hours) and non-gamers (none). Results of total vocabulary test scores showed that frequent gamers outperformed (vocabulary test mean = 25.4) moderate gamers (mean = 18.5) who in turn, outperformed non-gamers (mean = 16.6). One limitation of this study and previous research on the relationship between playing video games and vocabulary learning is that most research has been correlational which makes it difficult to establish causality (Field et al., 2012).

In response to this, some studies have used experimental approaches to investigate the effect of gaming on vocabulary learning (Aghlara & Tamjid, 2011; Mohsen, 2016). For example, Mohsen (2016) randomly assigned 43 Arab adult students to either an experimental or control group. The experimental group engaged in a computer simulation game where they played the role of doctors performing knee surgery. The game involved following written instructions of the tasks to be completed (e.g., "Grab the sponge from the tool bar below so we can swab the leg with Betadine"). The control group only watched a video of the same surgery being performed. Following a pre and posttest design, results of vocabulary recognition tests (image association with words) showed that the experimental group (mean = 11.61) significantly outperformed the control group (mean = 7.90) on the posttest. Another study compared vocabulary learning (e.g., animal names) from a video game to learning vocabulary using traditional methods (Aghlara & Tamjid, 2011). After a month and a half of instruction (90 minutes a week), the experimental group (mean = 7.8) significantly outperformed the control group (mean = 6.6) on a 10-item vocabulary test. Although no delayed posttests were used in both studies, the results of both show that playing video games can result in significant vocabulary learning.

Games can also be developed specifically for learning and training purposes (Johnson, 2007; Johnson et al., 2005). A common distinction is made between *commercial off-the-shelf* (COTS) games and *serious games* (Chen & Hsu, 2019). Serious games are games that are designed primarily for learning (Chen & Hsu, 2019; Johnson, 2007; Johnson et al., 2005). COTS games, on the other hand, are games designed mainly for entertainment and not learning. Although COTS games can result in vocabulary learning (Sundqvist, 2019), they might not be ideal for language learning due to linguistic and content factors (Chen & Hsu, 2019). In terms of language, the primary audience of many COTS games is native

speakers, which means that how vocabulary is treated might not be optimal for learning (e.g., including too many low frequency words, lack of repetition). Secondly, the content of some video games might not be appropriate in educational settings due to, for example, excessive violence. These factors have led to the development of serious games which aim chiefly to educate but not at the expense of solid game design principles such as engaging game experience and immersing storylines (Chen & Hsu, 2019). Chen and Hsu (2019) examined vocabulary learning from a serious game that follows these guidelines. The game, *Playing History*, places the players in historical settings (e.g., one of its episodes is entitled *The Slave Trade*) and requires them to collect objects and complete missions. The game is suggested to be engaging, has rich language input and appealing storylines. Sixty target words were selected: words that occurred only once were labeled low frequency, words with two to five occurrences were labeled intermediate and words occurring more than six times were labeled high frequency. The same 60 words were used in a pre and posttest design with 66 university students in Taiwan (age mean = 19 years old). Results were organized by word frequency and showed that the largest gains occurred in the high frequency words (mean increase from the pretest = 28.36), followed by the intermediate frequency words (mean = 21.41) and finally the low frequency words (mean = 17.79). T-tests showed that all of these gains from the pretest to the posttest were significant ($p < .05$). The findings suggest that vocabulary learning can occur from playing serious games and that the amount of learning seems to increase as word frequency increases.

Overall, the findings from previous studies show that vocabulary learning can occur from both commercial off-the-shelf and serious games. More frequent gamers tend to have larger vocabulary size than less frequent gamers. Finally, like other sources of incidental vocabulary learning (e.g., reading a book), words that occur more frequently are more likely to be learned.

Songs

It is perhaps more common to read a book or watch a movie once than multiple times, but this is not the case when listening to songs where repeated listening is the default (Abbott, 2002; Conrad et al., 2019). Repetition in turn is a key factor in vocabulary learning (Webb & Nation, 2017).

Songs are more similar to spoken language than written language and comprise mostly high frequency words (Romanko, 2017; Tegge, 2017). This makes songs particularly useful for the learning of these words (Nation, 2022). Tegge (2017) examined two corpora, one consisting of 408 pop songs from US billboard charts and the other consisting of 635 songs selected by teachers for language learning purposes. The most frequent 3000 word-families provided 95.1% coverage of chart songs and knowledge of 6000 word families was necessary to reach 98.2% coverage. For the teacher-selected songs, knowledge of the most frequent 2000 word-families provided 95.5% coverage, while knowledge of the most frequent 4000 word-families provided coverage of 98.2%. These findings suggest that assistance is likely to be needed for understanding when listening to songs for beginners who have not mastered high frequency vocabulary.

Medina (1993) conducted one of the few empirical studies that have examined incidental vocabulary learning from listening to songs. She compared a story conveyed through song and the same story presented in a spoken format. Medina also examined the effect of using illustrations. The combinations of these factors resulted in four experimental conditions: narration, song, narration and illustration and song and illustration. Results showed no significant differences between the four conditions. However, the mean scores of the song group were higher

than the narration group. Medina suggested based on the descriptive statistics that listening to songs may lead to vocabulary learning. She suggests that songs might provide learners with extra-linguistic support (rhythm) that might aid in word retention.

A more recent study was conducted by Pavia et al. (2019), who examined word learning (spoken form recognition and form-meaning link recognition) from listening to two different songs. It also examined the effects of repeated listening to the same song (one, three or five times) and the relationship between frequency of occurrence (3–18) to the target words and learning gains. The participants were 300 low level EFL students in Taiwan aged between 10 and 14. There were eight groups in total: three listened to song A (one group listened once, another listened three times and the final group listened five times), three listened to song B (similarly, one group listened once, another listened three times and the final group listened five times) and two control groups. The data was collected in five 60-minute sessions each separated by a week. Three key findings were highlighted. First. listening to songs contributed to vocabulary learning yet the gains were small (0.52 words for song A and 1.64 words for song B, which is common in incidental word learning) and limited to spoken form recognition (i.e., not deep to the level of form-meaning learning; the authors hypothesized that this might be due to songs not having as informative context as other types of input such as reading). Second, repeated listening had a positive effect on vocabulary gains (the group who listened to song B five times outperformed other groups). Similarly, frequency of occurrence positively affected vocabulary learning. The authors recommend listening to songs both in-class and out-of-class as they appear to result in initial word learning (i.e., form recognition).

It is worth mentioning that not all songs are equally beneficial to vocabulary learning (Abbott, 2002). Abbott (2002) suggests a number of factors that may influence language learning from songs which include tempo, clarity of vocalization and enunciation, stress, amount of repetition, language level, word order, vocabulary, and the extent of metaphorical usage. Like video games, the content of some songs may not also be appropriate to due being offensive or explicit.

The fact that we tend to listen to the same song multiple times makes listening to songs theoretically a desirable input for vocabulary learning. Overall, the findings from the discussed empirical studies show that incidental vocabulary learning from listening to songs is possible and that repeated listening seems to lead to more vocabulary gains. Like other sources of incidental vocabulary learning, there is a need for a large amount of input before substantial gains are observed.

Internet and Social Media

There are nearly 4.8 billion users of social media every day which is approximately 60% of the world population (Ali, 2023). The average person spends more than two hours a day on these social media platforms (Ali, 2023). Social media is defined differently by different researchers. Reinhardt (2019, p. 1) defines social media as "any application or technology through which users participate in, create, and share media resources and practices with other users by means of digital networking". Major social media platforms include Facebook, YouTube, WhatsApp, Instagram, TikTok and X (Twitter previously). Social media offer large quantities of authentic language input (listening to podcasts and reading blogs) and opportunities for language output (writing posts and speaking through engaging in online activities such as conversations and vlogs) which can help in language learning (Barrot, 2022).

There is little research (especially experimental) on the relationship between social media use and vocabulary learning (Nation, 2022). Some studies on overall out-of-class exposure include items regarding the frequency of visiting websites written in English and examine

how they relate to vocabulary knowledge (De Wilde et al., 2019; Peters, 2018). For example, De Wilde et al. (2019) found that 78% of young language learners in Flanders (N = 780, aged 10–12) use social media in English daily. Results of their analysis showed that social media use had the highest correlation (r = .39) with the Peabody Picture Vocabulary Test (a test in which children match the spoken form of a word with a drawing representing its meaning; Dunn & Dunn, 2007) compared to other sources of out-of-class inputs (e.g., games, songs, TV).

The use of instant messaging applications such as WhatsApp (a messaging application that allows users to send text messages, voice messages, images and videos over the internet) among learners may be a useful source of incidental vocabulary learning. A study examined this by creating a mobile immersion environment using WhatsApp with 45 seventh-grade students (Lai, 2016). Participants were divided into a mobile group and a control group with the experiment lasting three months. The students in the mobile group were informed that they can chat about any topic they want. The control group engaged in the same in-class learning activities as the experimental group, excluding the mobile immersion component. Gains were measured used vocabulary pre and posttest which provided learners with L1 meaning (Chinese) and students had to provide L2 English form (i.e., form recall). The target words were 200 high frequency verbs. Although no significant difference was found between the two groups' test scores, a significant correlation (r = 49) emerged within the mobile group between chat frequency and vocabulary gains. Analysis of chat histories suggested that the effectiveness of mobile immersion may depend on students' attitudes towards interactive learning and their willingness to socially engage with the second language on the platform.

Arndt and Woore (2018) conducted one of the few experimental studies on incidental vocabulary learning from social media. They compared L2 vocabulary learning (i.e., form, meaning and grammatical function) from written blog posts and video blogs (both had the same script). In this online experiment, the video group (n = 38) watched three vlogs while the blog group (n = 42) read three blog posts. Both the videos and the blog posts included the same six nonwords each occurring 11–14 times. Each target word was tested on written form recall, meaning recall, grammatical function recall, grammatical function recognition and meaning recognition. Results of the posttests showed that both the video (total vocabulary gain = 20.77) and blog groups (total vocabulary gain = 19.76) learned the nonwords without significant differences in total gains. In terms of vocabulary knowledge aspects, the two groups differed only in form recall (i.e., spelling) in which the blog group scored significantly higher. This result is expected since the blog group saw the written form of the nonwords during reading while the video group did not. The study used written tests which provide little details about how the two media differ in spoken vocabulary learning. Another limitation is the lack of delayed posttests, which hinders assessment of long-term vocabulary retention. The findings overall suggest that incidental vocabulary learning can occur from social media content whether this is in text or video format.

This section on out-of-class language exposure has shown that vocabulary learning can occur from extensive reading, extensive viewing, playing video games, listening to songs and visiting social media platforms. One caveat is that sizeable gains will only be possible when there is a large amount of out-of-class exposure (Nation, 2022; Schmitt, 2020). This will likely require both motivation (to initiate and maintain out-of-class exposure) and self-regulation skills (e.g., to find and evaluate different types of out-of-class inputs, see next sections; Richards, 2015; Sundqvist & Sylvén, 2016).

Strategic Language Learning[2]

The research on *language learning strategies* (LLSs) has expanded considerably following Rubin's study (1975) on the good language learner, with researchers aiming to define, classify and measure LLSs (e.g., O'Malley & Chamot, 1990; Oxford, 1990; Wenden, 1991).

Oxford's (1990) volume on LLSs is one of the main studies in this area in which she defined and categorized LLSs and constructed an instrument for LLSs assessment. Oxford (1990) defined LLSs as "specific actions taken by the learner to make learning easier, faster, more enjoyable, more self-directed, and more transferrable to new situations" (p. 8). Her taxonomy (1990) was one of the most widely used taxonomies of LLSs where she classified LLSs into six groups: Memory strategies (e.g., using keywords to remember words), Cognitive strategies (e.g., reasoning and summarizing), Compensation (e.g., guessing from context), Metacognitive strategies (setting goals and objectives), Social strategies (e.g., asking for clarification) and Affective strategies (e.g., lowering anxiety). The Strategy Inventory for Language Learning (SILL) is the most widely used instrument in LLSs research. The SILL has 50 self-report items corresponding to the six strategies mentioned earlier and uses 5-point Likert-scale responses ranging from "never or almost never true of me" to "always or almost always true of me". The SILL was used by Green and Oxford (1995) to examine the relationship between language proficiency and LLSs. In this study, 374 EFL participants from the University of Puerto Rico were divided into three proficiency levels. Results showed that the more proficient learners used LLSs significantly more frequently and diversely than the less proficient ones. Similar findings have been reported in other studies (Rubin, 1975; Wharton, 2000). In addition, strategies that involved active use of language in naturalistic settings such as watching TV in English or seeking opportunities to speak in English (which explained a relatively large variance of 21.6%) were used more often by the more proficient learners. These findings suggest a significant relationship between LLSs and language proficiency.

In an attempt to help the less proficient learners develop their language skills through LLSs use, strategy instruction (or training) was investigated. The findings from the different studies, however, are not straightforward. A critical appraisal of the literature by Rees-Miller (1993) found little success in strategy instruction. He attributes this to cultural differences, different educational backgrounds, ages, beliefs of students and teachers about language learning and different cognitive styles. Others, however, cautiously suggest that strategy instruction seems to be effective when conducted over a longer period of time (Macaro, 2006). More positive results are found in a meta-analysis by Plonsky (2011) which included 61 studies and 6,791 learners. The study found a small to medium effect size (d = .49) of strategy instruction on language proficiency, which, according to the author, compares well with the overall average effect size of d = 0.40 found in educational research (Hattie, 1987). Overall, findings are not conclusive that LLS instruction leads to more effective language learning.

With the turn of the century, a number of scholars voiced some concerns regarding the validity of research on LLSs (Dörnyei & Skehan, 2003; Dörnyei, 2005; Skehan, 1989). The strongest of these is Dörnyei (2005), who called for abandoning the concept of language learning strategies altogether and replacing it with the more general concept of self-regulation (discussed in the next section). The main issue Dörnyei observed with LLSs research is definitional fuzziness, which results in the difficulty of distinguishing between "engaging in an ordinary learning

[2] The term strategic learning is used here to describe the general construct of strategic knowledge approached through language learning strategies or differently through the concept of self-regulation (Tseng et al., 2006).

activity and a strategic learning activity" (2005, p. 164). Dörnyei also criticized how LLSs are categorized. For example, he criticized separating memory strategies from cognitive strategies in Oxford's taxonomy (1990), arguing that memory strategies should be classified as cognitive strategies based on what later research has shown (Purpura, 1999). Finally, the decline of learning strategies in the field of psychology and the rise of self-regulation is an additional argument put forward as an indication of how the earlier is unfit for scientific research and that the latter should be pursued.

Despite Dörnyei's criticism, the research on LLSs did not cease (Dörnyei, 2001; Dörnyei, 2015, p. 140; Griffiths, 2020; Rose et al., 2018). However, the continuation of research should not be regarded as an indication that all issues have been addressed but should rather be an indication that there is room for both LLSs and self-regulation to advance our understanding of strategic learning (Griffiths, 2020). This is manifested, for example, in Oxford's (2011) Strategic Self-Regulation Model of Language Learning which combines both concepts in one model.

Strategic Vocabulary Learning

Being a key component of language, vocabulary has received attention in the work of Oxford and other researchers on LLSs (O'Malley & Chamot, 1990; Oxford, 1990, 2017). The importance of vocabulary, manifested, for example, in vocabulary learning strategies (VLSs) being the most frequently used strategies by language learners (Schmitt, 1997), has contributed to VLSs becoming a key research area. Studies on VLSs have generally followed the same directions as LLS. Some studies have attempted to develop taxonomies (Gu & Johnson, 1996; Nation, 2022; Schmitt, 1997; B. Zhang & Li, 2011). Others have focused on the relationship between language proficiency and VLSs (Ahmed, 1989; Fan, 2003; Gu & Johnson, 1996). For example, Gu and Johnson (1996) correlated the VLSs of 850 college students with a vocabulary size test and a general proficiency test. From a number of strategies that were developed from previous research, Self-Initiation (being proactive and learning relevant and interesting vocabulary) and Selective Attention (knowing which words to focus on) were found to be positive predictors of the general proficiency test. Both of these two, along with Activation strategies (seeking opportunities to practice newly learned words), showed a small but significant positive correlation with the vocabulary size test (r = 0.35, 0.24 and 0.31 respectively). On the other hand, Visual Repetition strategy (writing words repeatedly to memorize them) was the most negatively associated with both tests (r = −0.2). In general, the study found that more proficient learners employed significantly more diverse strategies, which other studies support (Ahmed, 1989; Fan, 2003).

Another major line of research is developing methods and instruments for the investigation of VLSs (see Takač, 2008 for an overview). There are two main VLSs questionnaires commonly used in the literature: Gu and Johnson (1996) and Schmitt (1997), both of which are based on Oxford's (1990) SILL. According to Tseng et al. (2006), the items in SILL focus on specific strategic behavior instead of more general strategic traits. As a result, the SILL scales are not cumulative and calculating mean scale scores is unjustifiable psychometrically (Tseng et al., 2006). Due to the issues with LLS research and its instruments, Tseng et al. (2006) proposed replacing VLSs with the concept of *self-regulation* borrowed from educational psychology. Self-regulation is defined as "the ways that learners systematically activate and sustain their cognitions, motivations, behaviors, and affects, toward the attainment of their goals" (Schunk & Green, 2018, p. 1). Tseng et al. (2006) created the Self-Regulating Capacity in Vocabulary Learning scale (SRCvoc). SRCvoc aims to measure learners' self-regulating capacity of strategic learning, which is the driving force of LLSs use according to the authors. The next section goes into further detail about the study.

Motivation

Motivation is one of the strongest predictors of success in L2 learning, which is not surprising since it is critical to both initiating and maintaining language learning (Gass & Selinker, 2008). In terms of vocabulary, numerous studies have indicated that vocabulary learning is significantly influenced by motivation (Elley, 1989; Fontecha & Gallego, 2012; Gardner et al., 1985; Tremblay et al., 1995; Tseng & Schmitt, 2008).

The research on motivation proceeded through three main stages (Dörnyei, 2015). The first stage was the *social psychological period* which emerged in the 1960s. It is commonly known for the integrative and instrumental types of motivation (Gardner & Lambert, 1972). This was followed by the *cognitive-situated period* in the 1990s which was marked by a move towards capitalizing on the advancements made in cognitive psychology by borrowing concepts such as self-determination (Deci & Ryan, 1985) and Attributions (Weiner, 1992). Recognizing that motivation is a dynamic phenomenon led to the move to the *process-oriented period*, with the Process Model of L2 Motivation (Dörnyei & Otto, 1998) representing one of its seminal products. The Process Model of L2 Motivation sees motivation as composed of three stages: pre-actional (where motivation is generated), actional (where motivation is sustained and protected) and post-actional (where motivation is evaluated). Following a process-oriented perspective, Tseng and Schmitt (2008) used structural equation modeling (SEM) to examine the relationship between motivation, strategic learning and vocabulary learning with six latent variables using questionnaires and vocabulary tests. The pre-actional stage is represented

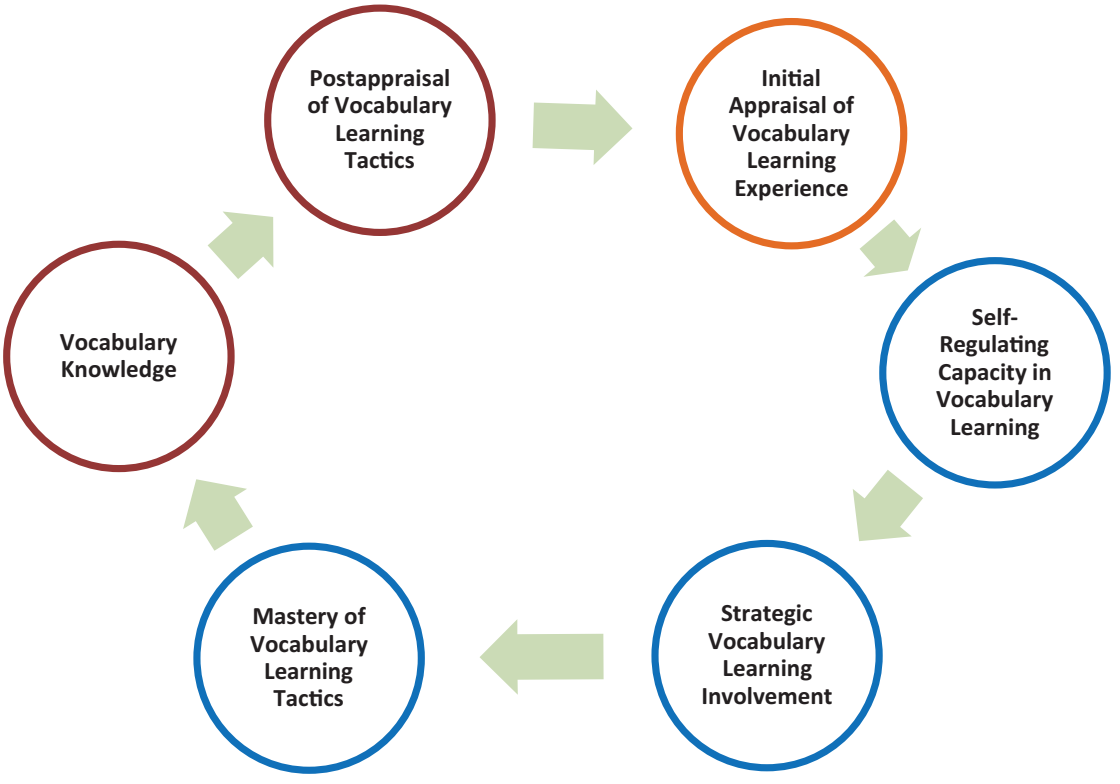

Figure 1 *A structural equation model of motivated vocabulary learning (Tseng & Schmitt, 2008, p. 381).*

by the Initial Appraisal of Vocabulary Learning Experience (measuring vocabulary learning anxiety, vocabulary learning attitude and vocabulary learning self-efficacy). The actional stage is divided into Self-Regulating Capacity in Vocabulary Learning (measured using the SRCvoc discussed in the previous section), Strategic Vocabulary Learning Involvement (measuring the quantity of strategies used), and Mastery of Vocabulary Learning Tactics (measuring the quality of strategies used). Lastly, the post-actional stage is represented by Vocabulary Knowledge (vocabulary breadth was measured using the Vocabulary Levels Test [VLT: Schmitt et al., 2001] while vocabulary depth was measured using the overall score of collocation, polysemy and form recall tests of the words in the VLT) and Postappraisal of Vocabulary Learning Tactics (measuring the self-reflection of learning process phase after the learning task). A questionnaire was used to test the model on 210 university students from Taiwan and China, and the results generally revealed a good fit. Motivated vocabulary learning was shown by the best-fit model (Figure 1) to be sequential, cyclic, and systematic where learning progresses from one stage to another. The authors suggest that the idea of cyclic learning aligns with the fact that learners typically need multiple encounters with a word to learn it. The model additionally suggests that motivation "is not just an "initial state" factor; it is an integral part of the whole system that drives the vocabulary learning cycle along" (Tseng & Schmitt, 2008, p. 383). The study overall highlights the significant effect of both self-regulation and motivation on vocabulary learning. It is one of the few studies that takes a joint perspective of both strategic learning and motivation.

Tseng et al.'s study is useful in improving our understanding of the relationship between vocabulary, strategic learning and motivation. Moving beyond the simple correlational studies and taking advantage of the potentials of SEM is a good step. However, the models need to be validated using different data (preferably from different contexts) to assess their generalizability. Also, given the fluctuating nature of motivation, longitudinal data is likely to provide more accurate results.

Conclusion

The current review provided an overview of the role of individual differences in shaping the trajectory of vocabulary development. It examined three key sources of individual differences: out-of-class exposure, strategic learning and motivation. It highlighted their key role in explaining why some learners have larger and more developed vocabulary knowledge than others. Unlike other individual differences such as working memory and aptitude, the factors discussed here are more amenable to improvement through instructional practices and support from teachers. (Kim & Webb, 2022). Students' motivation can be enhanced through teacher's motivational practice such as gamifying learning (Al-Hoorie & Albijadi, 2024) and offering praise for effort or achievement (Al-Hoorie & Albijadi, 2024; Guilloteaux & Dornyei, 2008). Self-regulation can also be improved through self-regulated language learning (SRLL) instruction (Zhang & Zou, 2022). One approach that was found effective (Ardasheva et al., 2017) involves fours steps: increasing students' awareness of SRLL, showing them examples of SRLL in practice, directing their SRLL practice, and conducting evaluations. Given the benefits of out-of-class exposure reviewed here in developing vocabulary knowledge, teachers should encourage students to increase their L2 exposure through activities such as watching movies and playing videos games (Sundqvist & Sylvén, 2016). Finally, the review points to some limitations in the literature in that most studies on the topic have used cross-sectional data. Future research should utilize longitudinal data since it provides a more accurate description of vocabulary development compared to cross-sectional data (Schmitt, 2010, 2019), which only offers a snapshot of the relationship between individual differences and vocabulary knowledge.

Additionally, future research should aim to examine multiple individual differences at once to gain a deeper understanding of how they collectively affect vocabulary learning.

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