INDIVIDUAL DIFFERENCE FACTORS FOR SECOND LANGUAGE VOCABULARY

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Background

Individual differences (IDs) have long been observed to account for variability in second language (L2) vocabulary learning. In the 70s and 80s, studies of IDs investigated age (e.g., Snow & Hoefnagel-Höhle, 1978) and motivation (e.g., Gardner, Lalonde, & Morrocoff, 1985). In the 1990s, the number of studies steadily increased and there has been a greater focus on other IDs such as cognitive (e.g., working memory) and affective (e.g., anxiety) differences. More recently, IDs (e.g., previous L2 vocabulary knowledge) have been considered variables moderating the effects of vocabulary learning in meta-analyses (e.g., Uchihara et al., 2019). In this chapter, we discuss research related to the most common IDs that have been found to affect vocabulary learning such as working memory, aptitude, perceptual style, learning strategies, motivation, anxiety, previous L2 vocabulary knowledge, and age. We introduce the components of each ID variable, explain how vocabulary learning is influenced by the construct, synthesize the research findings, and describe what these imply for a pedagogical intervention.

Working memory (WM) refers to the ability to not only temporarily store information but also manipulate it for learning (Baddeley et al., 2015). The history of WM research in L2 vocabulary learning dates back to the late 1980s when Baddeley and Hitch (1974) proposed the WM framework. The framework assumes that WM consists of a phonological loop: a space where spoken information of an item is stored and rehearsed; a visuospatial sketchpad: a space dealing with visual and spatial information of an item; a central executive: a device for attention control; and an episodic buffer: the linking of storage devices with the central executive and long-term memory. Particularly, the phonological loop has been considered a crucial component in the learning of L2 words (Service, 1992) by storing new spoken information for seconds and rehearsing decaying information.

Language aptitude refers to a set of cognitive abilities used to learn foreign languages (Carroll, 1981; Li, 2016), and it is made up of several components, which are rote memory, phonetic coding ability, language analytic ability, and inductive language learning ability. Among the components, rote memory, which refers to the ability to learn lexical forms and their meanings, has putative links with vocabulary learning. Phonetic coding ability is the ability to identify and analyze speech sounds, and supposedly this ability is central to learning the spoken forms of words. Language analytic ability and inductive learning are essential for learning the morphosyntax of a second language and are theoretically less relevant to vocabulary learning.

Perceptual style refers to preferred ways the individual perceives, interacts with, and responds to the learning environment (Dörnyeyi & Ryan, 2015), and has been considered an important factor in
vocabulary-learning outcomes (Tight, 2010; Boers & Littlemore, 2000). For example, some learners may prefer to learn words through studying with visual information, other learners may prefer to learn words through listening, or using whole-body (i.e., walking) or muscle (i.e., facial expression) movement. This domain can also be used to characterize learners' cognitive styles. Cognitive style refers to the way in which a learner habitually perceives, organizes, and analyzes information (Riding, 2002). Cognitive styles have been classified into holistic or analytic and imagier or verbalizer (Riding & Cheema, 1991). For example, some learners may process information as chunks, while other learners analyze information into its parts; some learn phrasal verbs (e.g., take out) as whole items, whereas others may analyze phrasal verbs separately (e.g., take as a verb and out as a particle). Learning might also involve thinking in words or thinking in images. Learners who more frequently think in images can easily form a clear mental image from the concept of a word (Ernest, 1977). For example, when learning phrasal verbs (e.g., steam up or boil over), the learner may form an interactive mental image between the emotion angry and the scene of heating. Other learners may prefer using pictures or diagrams which can help them understand the meanings of words (Cohen et al., 2001).

Vocabulary-learning strategies refer to behaviors or techniques taken by learners to help them understand the meanings of unknown words, retain them, and use them in a spoken or written mode (Muñoz, 2001). Vocabulary-learning strategies are part of language learning strategies (Nation, 2013). Nation points out that vocabulary-learning strategies need to involve choice (choosing from several strategies or choosing not to use the strategy), require deep processing, and increase the efficiency and effectiveness of learning. A number of researchers (e.g., Gu & Johnson, 1996; Oxford, 1990; Schmitt, 1997) have suggested different categorizations of vocabulary-learning strategies. For example, Schmitt (1997) refined Oxford's (1990) taxonomy with five different vocabulary-learning strategies for the discovery of new word meaning and consolidating knowledge of a word that has been encountered: determination (e.g., using dictionaries or guessing from context), social (e.g., asking teachers or classmates), memory (e.g., imaging word meaning or using action), cognitive (e.g., repetition or taking notes), and metacognitive (e.g., using English-language media).

Motivation or goal-oriented behavior (Dörnyei, 2001) is considered to be a factor affecting L2 vocabulary learning. Tseng and Schmitt (2008) developed a model of motivated vocabulary learning including five variables—initial motivational conditions, self-regulating capacity, strategic vocabulary-learning involvement, mastery of vocabulary-learning techniques, and vocabulary knowledge—involving in three stages of learning: instigating, sustaining, and evaluating. Tseng and Schmitt examined how motivation is integrated with L2 vocabulary learning and demonstrated that motivation appears to be involved in all three stages of learning. This suggests that motivation can play a significant role in both the process and outcome of vocabulary learning. Tseng and Schmitt’s model is based on Dörnyei and Ottó’s (1998) process model of L2 motivation including pre-actional (e.g., setting goals and forming intentions), actional (e.g., carrying out subtasks and action control), and post-actional (e.g., dismissing the intention and further planning) stages. In Tseng and Schmitt’s (2008) model, the pre-actional stage is conceptualized as an initial vocabulary-learning experience. The actional stage is conceptualized as three variables (self-regulating capacity, strategic vocabulary-learning involvement, and mastery of vocabulary learning techniques), and the post-actional stage is conceptualized as the level of vocabulary knowledge attained.

Language anxiety refers to “a distinct complex of beliefs, feelings, and behaviors that occur during learning languages in the classroom” (Horwitz et al., 1986, p. 128). Anxiety is a consequence of issues in language learning, which leads to worry, and worry may deplete learners’ cognitive resources and affect performance (MacIntyre, 1995). Therefore, the more anxious the learners, the poorer their performance (Teimouri et al., 2019). Anxiety can cause learners’ inability to obtain enough information about L2 vocabulary to link the forms and meanings of words, thus having a debilitating effect on vocabulary learning (MacIntyre & Gardner, 1994).

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Previous L2 vocabulary knowledge may influence the learning of new words. The conceptualization of vocabulary knowledge includes vocabulary size (the number of known words) and depth (how well words are known). Learners with greater vocabulary knowledge are likely to have greater potential for vocabulary learning. For example, learners who know more words may have more examples of prefixes (e.g., re-, hyper-) and suffixes (−ery, −ure) in their mental lexicon, which makes it easier for them to acquire morphological aspects (i.e., word parts) of vocabulary (Schmitt, 2014). Additionally, learners who have a larger vocabulary size may pay more attention to unknown words when they read a text, and their vocabulary knowledge can be used to help infer the meanings of unknown words, which gradually enriches and strengthens meaning and knowledge of form (Nation, 2013; Webb & Chang, 2015). Therefore, previous L2 vocabulary knowledge can have an impact on the development of the size and depth of that knowledge.

Age in L2 vocabulary studies has often been defined by grade (e.g., Grade 3) or institutional (e.g., primary) levels. It is commonly believed that older learners tend to have more years of experience with the L2. In the learning of L2 vocabulary, learners with more language experience may produce better performance because they have greater vocabulary knowledge and more developed cognitive skills. Furthermore, it should be noted that learner performance can be dependent on WM capacity (the ability to temporarily store information and manipulate it for learning), which develops with age (Gathercole et al., 2004).

Research

This section is divided into two parts: evidence and data elicitation. Research evidence summarizes the findings of empirical research, and data elicitation focuses on the methods of the research. Studies of IDs in L2 vocabulary learning are of two types: interactional and predictive. Interactional studies examined IDs as moderators of the effects of different instructional treatments (e.g., form-focused learning and incidental learning through reading or viewing), while predictive studies have focused on whether IDs are predictive of learners’ vocabulary knowledge (size or depth) without manipulating instruction. In the following section, we synthesize the findings of interactional studies on IDs such as WM, aptitude, anxiety, previous L2 vocabulary knowledge, age, and perceptual style, as well as of predictive studies of strategy use and motivation. We then describe the instruments that have been used to elicit ID data in the research.

Evidence

Research has investigated how WM contributes to L2 vocabulary learning after instructional conditions. Ruiz et al. (2019) found that WM (measured via an Ospan task) was predictive of learning semantic knowledge of English phrasal verbs (measured by a multiple-choice test for receptive knowledge and a cloze task for productive knowledge) for learners in a form-focused condition (i.e., reading and completing multiple-choice gaps), but not for learners in a meaning-focused condition (i.e., reading). Yang et al. (2017) examined the role of WM (measured in a reading span task) in post-reading activities (comprehension, gap-filling, and sentence-writing tasks) in English word learning. They found that WM was a significant predictor of vocabulary learning under the comprehension and gap-filling conditions, but not under the sentence-writing condition. Yang et al. (2017) point out that the sentence-writing condition used in their study required learners to simply make isolated sentences using target words and thus may have overridden the role of WM. These findings seem to indicate that the influence of WM is dependent on whether a task imposes a heavy processing load. Furthermore, research shows that phonological short-term memory (PSTM) facilitates word learning (e.g., Martin & Ellis, 2012; Masoura & Gathercole, 2005; Speciale et al., 2004). It is noteworthy that while WM shows a large effect with advanced learners (Yang et al., 2017), PSTM has no effect with advanced learners. These findings suggest that PSTM
is more associated with the initial stages of learning than advanced stages. Masoura and Gathercole (2005) reported that PSTM represents an important variable in early vocabulary development, whereas long-term memory is more of a factor at more advanced stages of vocabulary learning.

Language aptitude has also been examined in vocabulary research. Ellis and Beaton (1993) investigated the role of language aptitude in learning German-English word pairs and found that aptitude (measured by modern language aptitude test; MLAT) is predictive of vocabulary learning. Dahlen and Caldwell-Harris (2013) found that aptitude (measured by MLAT) can contribute to the initial learning of L2 words. Nagata et al. (1999) found that aptitude (measured by MLAT and Pimsleur language aptitude battery; PLAB) has an impact on vocabulary learning (using an information gap task; listening to and carrying out instructions that involved new words): rote memory, phonetic coding, and language analytic ability were significantly correlated with vocabulary learning. Dąbrowska (2019) measured learners’ knowledge of single and multiword items (collocations, e.g., blank expression, achieve one’s objectives) involving learners’ aptitude (language analytic ability measured by PLAB) as a predictor. Dąbrowska found that language analytic ability was not predictive of L2 learners’ performance on the vocabulary tasks (measured by vocabulary size test and a collocation test designed by Dąbrowska). An explanation for the contrasting results found by Nagata et al. (1999) and Dąbrowska (2019) might be that Dąbrowska sampled L2 learners with widely varied educational attainment (e.g., from eight to 24 years spent in full-time education). A meta-analysis by Li (2016) examined the construct validity of language aptitude and found a weak correlation between aptitude and vocabulary learning ($k = 8, r = 0.15$): phonetic coding ability ($r = 0.38$) showed a stronger correlation with vocabulary than rote memory ($r = 0.20$) and language analytic ability ($r = 0.29$). Li’s meta-analysis indicates that vocabulary learning is better predicted by learners’ phonetic coding ability than other aptitude components. Although different aptitude components demonstrated differential effects on vocabulary learning, it is clear that language aptitude is associated with L2 vocabulary learning.

Anxiety negatively influences language performance in general, and vocabulary learning specifically, as it may reduce the amount of attention that learners can allocate in completing a vocabulary-learning task (e.g., MacIntyre & Gardner, 1994). MacIntyre and Gardner (1994) examined the effects of anxiety arousal at each of the three stages (input, processing, and output) of learning French–English word pairs. They included three experimental groups that were exposed to a camera that appeared to be recording their learning at different times (the initial stage of learning for input, during learning, and the last stage for output). The control group was not exposed to the camera during the treatment. Results showed that learners’ anxiety levels increased significantly when the camera was introduced and that learners who were not exposed to the camera performed better than those who were exposed to it. However, the effect of anxiety may be different in incidental vocabulary-learning conditions (Sas, 2002; Zhao et al., 2016). For example, Zhao et al. (2016) examined how anxiety predicts L2 incidental vocabulary learning through reading, and they found that anxiety was a positive predictor of L2 incidental vocabulary learning. This may be due to the fact that when learners experience anxiety in the incidental vocabulary-learning condition, unfamiliar words in the text can capture their attention. However, more research investigating the relationship between anxiety and incidental vocabulary learning is needed.

Learners’ prior knowledge of L2 vocabulary has been examined in a number of empirical studies to determine its role in vocabulary learning. Horst et al. (1998) found that learners who knew more words had greater incidental vocabulary-learning gains than those who knew fewer words. Webb and Chang (2015) also found that learners’ vocabulary knowledge had a large impact on their vocabulary-learning gains, made through extensive reading. Nakata and Elgort (2021) found that learners with larger vocabulary sizes were better able to infer the meanings of the pseudowords from context. Several studies have also examined the relationship between learners’ prior vocabulary knowledge and their vocabulary learning through viewing videos (e.g., Montero Perez et al., 2014; Puimège & Peters, 2019), and these studies found that prior vocabulary knowledge corre-
lated positively with the effects of viewing. These findings indicate that learners’ prior knowledge of vocabulary in incidental learning conditions leads to a better comprehension of input materials, which in turn helps learners pick up new words.

Many studies have examined age differences in L2 vocabulary learning, but its effect seems to be inconsistent. Turner (1983) found that younger learners (first grade) significantly outperformed older learners (third grade) in learning French words using strategies (e.g., making connections between target words and their English translations). Yamada et al. (1980) involved Japanese children aged seven to 11 years old and found that younger children learned vocabulary faster than older children when learning English–Japanese word pairs. Puimège and Peters (2019) compared vocabulary learning through TV viewing and gaming for learners in different age groups. They found that older (12 years old) learners learned more words (measured by the picture vocabulary size test; Anthony & Nation, 2017) through viewing and gaming than younger (10 and 11 years old) learners. Meta-analyses (Uchihara et al., 2019; Webb et al., 2020; Yanagisawa et al., 2020) have also examined the extent to which age moderates L2 vocabulary learning and found inconsistent results. In these meta-analyses, age was defined as institutional level: primary, secondary, and university. Uchihara et al. (2019) found larger effects for adult learners than young learners. University students ($r = 0.38$) benefited more from repetition in incidental vocabulary learning than primary- ($r = 0.20$) and secondary-level ($r = 0.23$) students. In contrast, Webb et al. (2020) found that secondary school students learned more words through intentional study than university students, while Yanagisawa et al. (2020) found no age effect on L2 vocabulary learning through reading with glosses. Taken together, research indicates that although there is generally a relationship between age and vocabulary learning, the age effect might differ depending on learning conditions: younger learners tend to learn more words than older learners in more explicit instruction, while older learners benefit more from incidental instruction than younger learners.

Perceptual style is predictive of vocabulary-learning outcomes. Pouwels (1992) found that visual learners were able to learn more words than auditory learners in a condition using visual aids (e.g., pictures). Tight (2010) found that when instructional conditions (viewing drawings/listening/walking in the classroom to perform an activity) matched learners’ perceptual styles (visual/auditory/kinesthetic), it led to a significantly greater retention of vocabulary (measured by multiple-choice and cued-recall tests). However, Lee (1992) found no interaction between learning style preference (visual/verbal) and instructional conditions (L1 meanings, pictures, or combination of the two). The contrasting results may be explained by the learning style measures used (e.g., learning preferences questionnaire in Lee, 1992; learning style survey in Tight, 2010). The findings may also suggest that the way words are learned is as important as learning style preference. Boers and Littlemore (2000) compared learners’ types of cognitive styles (holistic/analytic/verbalizer/imager) when they learned figurative concepts (i.e., metaphors such as “economic competition is racing”) of the expressions used in economics (e.g., lagging behind, catch up). Boers and Littlemore found that the way learners see information (i.e., interpreting the concepts of target expressions verbally or in images) matched their cognitive styles (e.g., verbalizer or imager). The findings of the foregoing studies seem to indicate potential benefits of matching perceptual learning style preference and type of instruction. Learners’ dependence on instruction through their preferred style as a learning and memory aid grows and leads to the development of lexical knowledge (Tight, 2010).

Many L2 studies have investigated the relationship between strategy use and vocabulary learning. Gu and Johnson (1996) found that dictionary use or guessing were associated with high vocabulary achievement (measured by vocabulary size tests and vocabulary levels test; VLT). Schmitt (1997) and Zahedi and Abdi (2012) found that imagery strategies (e.g., using images) facilitated vocabulary learning. Zhang and Lu (2015) examined the relationship between learners’ strategy use and their vocabulary size (i.e., the number of words they know) and depth of vocabulary knowledge (i.e., how well they know the words). They found that the use of association strategies (e.g., studying the word’s synonyms) led to higher scores on a depth of vocabulary knowledge test (word
association test; Read, 2000). However, Fan (2003) found a negative relationship between the use of association strategies and vocabulary learning (measured by VLT). The disparity between these findings might be due to tests used to measure learners’ vocabulary knowledge. While Zhang and Lu (2015) measured learners’ association aspect of word knowledge, Fan (2003) measured learners’ form–meaning aspect. Although each strategy type has differential effects on different aspects of vocabulary knowledge (i.e., size and depth), the findings emerging from these studies show a positive relationship between vocabulary-learning strategy use and learners’ vocabulary knowledge.

Motivation has been found to be relevant to vocabulary learning, but empirical studies showed inconsistent results. For example, Fernández Fontecha (2010) found a significant positive correlation between Spanish learners’ (eighth grade) motivation (measured by Gardner’s attitude/motivation test) and productive knowledge of English words. Fernández Fontecha and Gallego (2012) also found a significant positive relationship between Spanish learners’ (ninth grade) motivation (measured in Gardner’s attitude/motivation test) and receptive knowledge of English words. Motivation has been found to be relevant to vocabulary learning, but empirical studies showed inconsistent results. For example, Fernández Fontecha (2010) found a significant positive correlation between Spanish learners’ (eighth grade) motivation (measured by Gardner’s attitude/motivation test) and productive knowledge of English words. Fernández Fontecha and Gallego (2012) also found a significant positive relationship between Spanish learners’ (ninth grade) motivation (measured in Gardner’s attitude/motivation test) and receptive knowledge of English words (measured by VLT). However, they found no relationship between motivation and receptive vocabulary knowledge with learners in the eighth grade. Similarly, Alonso and Fernández Fontecha (2014) found no relationship between adult learners’ motivation (measured by Gardner’s attitude/motivation test) and their receptive vocabulary knowledge (measured by VLT). The disparity between the findings of the foregoing studies might be due to the tests used to measure learners’ vocabulary knowledge. Nation (2013) points out that learners need to be highly motivated when they produce words because a productive task is more demanding than a task to recognize words. However, it should be noted that Fernández Fontecha and Gallego (2012) also found a significant relationship between motivation and receptive vocabulary knowledge in the sample of learners in the ninth grade. Another explanation might be due to the type of motivation (e.g., integrative/instrumental; Gardner, 1985) because there was no variation in the mean motivation of eighth and ninth graders. Gardner (2007) states that integrative motivation (e.g., participating freely in the activities of other cultural groups) is mostly observed in the first years of secondary education and that instrumental motivation (e.g., benefit for one’s career) is mostly observed in the last year of secondary education.

**Data Elicitation**

For working memory, predictive research examines the relationship between WM and vocabulary size regardless of instruction, whereas interactional research investigates whether the effect of instructional treatment on vocabulary learning is moderated by learners’ WM capacity. Working memory has been measured by using simple and complex tasks. Simple tasks tap the storage component, and the measured construct can be called phonological short-term memory (PSTM). Complex tasks measure both the storage and processing components, and the underlying construct can be called complex working memory or executive working memory (Wen & Li, 2019). Example simple tasks include non-word repetition or recognition, digit span, and word span (Degani & Goldberg, 2019; Gathercole et al., 2001). Example complex tasks include reading span (Yang et al., 2017), listening span (see Martin & Ellis, 2012), or operation span (Elgort et al., 2018).

Aptitude research draws more on the interactional paradigm to investigate whether aptitude or aptitude components moderate vocabulary-learning outcomes differently under different vocabulary-learning conditions. Treatment effects are measured using pre-tests and post-tests, and correlation or regression analysis are conducted to determine whether aptitude has differential associations with the effects of different instructional treatments. Alternatively, aptitude scores are also analyzed as a covariate of the instructional treatment to ascertain whether the treatment explains a unique portion of the variance of learners’ vocabulary gains after controlling for the possible effects of vocabulary-learning aptitude (e.g., Nakata & Suzuki, 2019). Aptitude has been measured using the Pimsleur language aptitude battery (PLAB; Pimsleur, 1966), continuous visual memory test (CVMT; Trahan & Larrabee, 1988), modern language aptitude test (MLAT; Carroll...
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& Sapon, 1959), and LLAMA language aptitude test (Meara, 2005) in L2 vocabulary studies. PLAB is a multiple-choice test containing six parts for memory recall, motivation level, auditory ability, language analysis, sound discrimination, and sound–symbol association. CVMT is a nonverbal memory test that requires test takers to recall the visual information (black-and-white drawings) they saw. The MLAT is a standard test for assessing learners’ cognitive abilities (phonetic coding, language analytic ability, and rote memory) to predict their success in language learning, and the LLAMA is a computerized test modeled on the MLAT.

Language anxiety has been measured using the foreign language classroom anxiety scales (FLCAS; Horwitz et al., 1986), state anxiety measure (MacIntyre & Gardner, 1991), and foreign language reading anxiety scale (FLRAS; Saito et al., 1999). The FLCAS focuses on general foreign language anxiety, and the anxometer measures learners’ levels of state anxiety (e.g., emotional reaction to the current situation). The FLRAS measures learners’ levels of anxiety for incidental vocabulary learning through reading (see Zhao et al., 2016 for details about how the measurement was used).

Regarding previous vocabulary knowledge, some experimental studies (e.g., Mulder et al., 2019) use pre-test scores for target words as learners’ previous knowledge. General L2 vocabulary knowledge or learners’ vocabulary size has most frequently been measured by means of the vocabulary levels test (VLT; Nation, 1983; Schmitt et al., 2001; Webb et al., 2017) and the productive vocabulary levels test (PVLT; Laufer & Nation, 1999). The VLT measures how many English words L2 learners know at different word frequency levels (1,000, 2,000, 3,000, 4,000, and 5,000 levels in the most recent version; Webb et al., 2017). Researchers often examine differences in prior vocabulary knowledge in relation to the degree to which learners are able to reach mastery on the different levels of these tests. The cut-off score for mastery of each word level has varied. Nation (1983) recommended 66% or higher for mastery of each level, Schmitt et al. (2001) recommended 87% (26/30) or higher, and Webb et al. (2017) recommended 97% (29/30) for the first three 1,000 levels and 80% (24/30) for the 4,000 and 5,000 levels. The rationale for having different cut-off scores for different levels is that, because the highest frequency levels account for the vast majority of English language, there is a need to ensure that learners have a higher degree of knowledge of these levels. A less demanding cutting point may be appropriate for lower levels because there is less variation in lexical coverage across those levels. The PVLT measures learners’ productive ability to use vocabulary at different word levels (2,000, 3,000, university word list, 5,000, and 10,000). The VLT and PVLT indicate which word frequency level learners have learned and which levels they need to focus their vocabulary studies.

Learners’ style preference is assessed by using questionnaires, and the learners’ overall perceptual style (calculated by summing up the number of individuals who indicated each preference type on the questionnaire) is determined to be the modality in which the learner had the highest overall scores (e.g., Tight, 2010). Perceptual styles have been measured using the Swassing–Barbe modality index (Barbe & Swassing, 1979), learning preferences questionnaire (Kirby et al., 1988), and the learning style survey (Cohen et al., 2001). Most measures include learners’ perceptual preferences, and visual and auditory modalities. These measurements rely on learners’ own self-reports on how they perceive, organize, and analyze information in a task. Learners’ cognitive styles (e.g., holistic/analytic processing) have been measured by cognitive styles analysis (CSA; Riding, 1991). The CSA records learners’ reaction times to identify simple and complex shapes. This measurement asks learners to perform a task and then makes inferences from their performance.

Learners’ strategies for vocabulary learning have been measured using the strategy inventory of language learning (SILL; Oxford, 1990), framework for categorizing language strategy use (O’Malley & Chamot, 1987), vocabulary-learning questionnaire (Gu & Johnson, 1996), vocabulary-learning strategy survey (VLS; Schmitt, 1997), and young learners’ language strategy use survey (Cohen & Oxford, 2001). Existing instruments to assess learner strategy use have been refined or combined over time. Most vocabulary studies used VLS (e.g., Zhang & Lu, 2015), but some studies
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(e.g., Fan, 2003) have also used a questionnaire combining several categories of learning strategies based on the findings of previous research (e.g., Gu & Johnson, 1996; O’Malley & Chamot, 1987; Oxford, 1990).

Motivation for learning vocabulary has been measured using a number of questionnaires such as the attitude/motivation test battery (AMTB; Gardner, 1985), language orientation questionnaire (Dörnyei & Clément, 2001), and motivation and strategies questionnaire (Ehrman, 1996). Many studies (e.g., Fernández Fontecha, 2010) used the AMTB to measure learners’ different motivations for learning L2 vocabulary. The L2 motivational self-system (Dörnyei, 2005) is one proposed reconceptualization of L2 learner motivation and offers a more complete model of language learner motivation. Although the L2 motivational self-system has been widely used in L2 research on motivation, there are virtually no studies using the L2 motivational self-system in ID research on L2 vocabulary learning.

Practical Applications

Research has shown that students vary in the degree to which they learn L2 words; while some students make great progress, others make very little progress (Webb & Nation, 2017). If teachers do not take account of students’ individual differences, Matthew effects—cases in which greater learning results from superior initial knowledge—are likely to occur with some students falling further and further behind in their lexical development (Webb & Chang, 2015). The degree to which teachers can work to improve vocabulary learning through the development of ID variables will vary. Learners with larger WM tend to learn more words. Although WM or aptitude may not lend themselves well to classroom-based instruction, teachers may be able to use tests (e.g., Ospan and LLAMA) to determine students’ WM or aptitude profiles and match them to vocabulary instruction. Second, research indicates that learners with a larger vocabulary size tend to learn more words than learners with a smaller vocabulary size. Teachers can use tests (e.g., VLT) to identify which students are struggling with vocabulary learning. They can then provide additional support to help reduce differences in vocabulary knowledge between them and their peers. Third, research indicates that age effects may differ depending on learning conditions. Younger learners tend to learn more words in intentional conditions (e.g., word-focused exercises) than in incidental conditions (e.g., reading). Teachers can explicitly guide and train younger learners to use strategies to learn vocabulary incidentally. Fourth, research indicates that certain vocabulary-learning strategies (e.g., guessing from context and using dictionaries) have a positive impact on lexical development. Teachers should instruct and assess students to ensure that students can effectively use vocabulary-learning strategies (Webb & Nation, 2017). Lastly, research indicates that motivation plays an important role in performing more demanding vocabulary-learning tasks. This suggests that teachers should aim to establish the relevance between what students learn inside the classroom and resources that they are likely to encounter and use the L2 outside the classroom. By providing support to understand and engage with different sources of L2 input inside the classroom, teachers can motivate students to seek out and engage with these types of input in their own time. This in turn is likely to lead to increased incidental vocabulary learning (Webb & Nation, 2017).

Future Directions

Research investigating IDs in learning different aspects of vocabulary knowledge (e.g., word parts and collocations) is needed. Vocabulary is a multifaceted construct with gains in different aspects of knowledge occurring gradually over time. The bulk of research has focused on linking L2 form to meaning. Examining how IDs are related to learning other aspects of knowledge would indicate whether current approaches to lexical development are effective for all learners. It is also not clear to what extent IDs such as motivation or strategy use moderate the effects
of different vocabulary learning conditions such as spaced learning (i.e., the spacing of repeated learning) or retrieved practice (i.e., testing learned information). Because there are many ways to learn words, it is important to examine the extent to which IDs affect the degree to which words are learned in a variety of ways. Finally, there is a need for more research exploring the extent to which out-of-school exposure contributes to vocabulary learning. Out-of-school exposure may be dependent on learner motivation; motivated learners may seek out opportunities to learn L2 words outside of the classroom and, in turn, engage more L2 input than less motivated learners. There are many types of L2 input that learners may engage with such as watching television or YouTube, using mobile applications, reading books, listening to songs, and playing video games. Peters et al. (2019) found that the amount of exposure to L2 input outside the L2 classroom had a greater effect on vocabulary learning than the length of L2 classroom instruction. Webb (2015) and Webb and Nation (2017) advocated teaching and training learners with different types of L2 input to better enable autonomous L2 vocabulary learning. Further research investigating IDs in L2 vocabulary learning outside of the classroom would help teachers, students, parents, and school administrators to better understand the value of extensive learning with different types of L2 input.

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