

## **Automaticity in Second Language Vocabulary Learning**

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Fluent language use is generally driven by a kind of linguistic knowledge that is implicit (unconscious, procedural, automatic) in nature. Learners of a second language (L2) in formal instruction settings often gain explicit (conscious, declarative, controlled) knowledge of the language, but this knowledge may not be readily available during fluent language use. This suggests that language programmes should also aim to facilitate the development of implicit, automatic knowledge of the language. In the context of L2 vocabulary learning, this amounts to fostering the development of lexical automaticity, i.e. automaticity in accessing vocabulary knowledge. Unlike other aspects of vocabulary knowledge, lexical automaticity does not often feature on the agendas of either teachers or learners. The object of this paper is to argue for the need to promote the development of lexical automaticity in the L2 classroom and to provide some suggestions as to how this may be achieved. It is suggested that repetition and consistent practice are important principles for automaticity training and that such procedures as reading graded readers and engaging in retelling activities may provide an avenue to foster the development of lexical automaticity.

### **1. Introduction**

Being able to function in an L2 (second language) calls for a large vocabulary size, depth of knowledge of the known words, and automaticity in accessing them (Schmitt, 2010: 15-18). Teachers and learners alike tend to emphasise the need to increase size and depth of vocabulary knowledge over the need to access the known words with automaticity in fluent communication (e.g. Zhang & Lu 2014: 300-301); however, it does not follow that because a word is known in some depth it will be readily available during fluent language use. For this reason, learners may have a large vocabulary size and yet be unable to access the words they know with ease and speed (Daller, Milton & Treffers-Daller, 2007: 9). Arguably, then, language programmes ought to endeavour to develop not only size and depth of vocabulary knowledge but also automaticity in accessing the known vocabulary, that is, lexical automaticity.

The focus of this paper is on automaticity in vocabulary learning and it will unfold as follows. First, the explicit-implicit knowledge distinction will be considered with particular reference to the area of vocabulary. This will be followed by a discussion of the role of implicit knowledge in the wider context of L2 learning. Thereafter, the nature and role of automaticity in language use will be considered, and a final section will outline some principles for fostering the development of lexical automaticity in the L2 classroom.

### **2. Explicit and Implicit Knowledge of Vocabulary in an L2**

Knowledge of an L2 generally comprises both explicit and implicit knowledge (henceforth EK and IK). In the broadest sense, EK and IK can be respectively characterised by the presence or absence of awareness of the knowledge. While the processes involved in fluent language use tend to be driven by a kind of knowledge that is implicit in nature, explicit

linguistic knowledge can also play a role in language use, for example, where grammatical rules are learnt and applied with a degree of awareness. Although this distinction has been primarily made in relation to grammar, it is also pertinent in the area of vocabulary (e.g. Sonbul & Schmitt, 2013). Some aspects of L2 vocabulary knowledge are often explicit in nature. Most notably, this is true for word meaning, which has been said to likely be ‘the largest single area in a learner’s explicit knowledge’ (R. Ellis 2004: 242). Other aspects of L2 vocabulary knowledge tend to be implicit, an example being collocations, whose knowledge is generally intuitive. As R. Ellis (2004: 242) has put it, ‘we know “by feel” [...] which word goes with which’.

Three key defining features typically ascribed to the two types of knowledge are as follows:

- i. Unlike IK, which is intuitive and unconscious, EK encompasses those aspects of the language which the learner has some awareness of (DeKeyser 2009; Hulstijn, 2007).
- ii. IK constitutes a system which underlies fluent language use (Hulstijn 2007). Hence, this type of knowledge is procedural (i.e. it is the kind of knowledge which drives language use) and is sustained in procedural memory. In contrast, EK consists of discrete facts about the L2, and so it is declarative and stored in declarative memory (Paradis 2009).
- iii. As EK is declarative, it is accessible through controlled processing, while IK access involves automatic processing because it is procedural (Hulstijn 2005, Paradis 2009).

Table 1 below presents a summary of the key defining features of explicit and implicit knowledge discussed above:

<b>Explicit knowledge</b>	<b>Implicit knowledge</b>
Conscious	Unconscious
Declarative	Procedural
Controlled	Automatic

Table 1: Key Defining Features of Explicit and Implicit Knowledge

It should be clarified that, despite being mediated by controlled processing, access to EK need not be slow. Learners may become ‘adroit’ in accessing their EK in real-time communication over time (R. Ellis, 2005b: 215), although such access remains a conscious process which consumes attentional resources. Hence, while EK cannot be automatic by definition (cf. DeKeyser, 1997; DeKeyser, 2003; R. Ellis, 2005b), it can be accessed through speeded-up controlled processing (Paradis, 2009: xi).

It may be useful at this stage to return to the examples of explicit and implicit vocabulary knowledge provided earlier (i.e. word meaning and collocations), this time analysing them with respect to the key features of EK and IK in Table 1. Let us consider two hypothetical scenarios for this purpose. In the first, a learner has just learnt the meaning of a word by consulting a bilingual dictionary. Knowledge of word meaning is conscious and declarative in as far as the learned translation is an integral part of such knowledge. Because this knowledge is stored in declarative memory and its use requires the activation of L1-L2 links, it cannot be accessed automatically in normal communication (Jiang, 2000: 51). Instead, access to this knowledge hinges on the conscious recollection of the L1-L2 links (Jiang, 2000: 56). Accordingly, this knowledge could be said to be explicit. In the second scenario, a learner has developed knowledge of the collocations of a given word through use. Such collocational knowledge drives language use but is not accessible to conscious inspection, and its processing involves a high degree of automaticity. Accordingly, this knowledge could be said to be implicit.

The examples above suggest that vocabulary knowledge can be both explicit and implicit. This has not always been the prevalent view; for example, Hulstijn (2003: 361) stated that ‘vocabulary knowledge can easily be conceived of as a type of declarative knowledge’. However, as Sonbul & Schmitt (2013: 125) remark, such a view would seem to treat vocabulary knowledge as a matter of form-meaning pairings and to ignore the fact that vocabulary knowledge comprises a number of aspects beyond form and meaning (see Nation, 2001: Chapter 2). Hence, even if word meaning is explicit, other aspects of vocabulary knowledge may generally be implicit, for example collocations (R. Ellis, 2004: 242), grammatical properties (Paradis, 2009: 12), meaning-based regularities and generalisations (Paciorek & William, 2015: 83), and morphological specifications (Paradis, 2009: 22). Additionally, word selection during performance is also believed to be inherently implicit and automatic – although it can also be a controlled task, particularly in an L2 (Paradis, 2009: 19).

### **3. The Need for Implicit Knowledge in L2 Learning**

Fluent language use calls for a substantial amount of information processing. For instance, speech production normally involves processing about two or three words and some fifteen phonemes per second (Levelt, 1989: 22), and this needs to be synchronised with the processing of information at the higher levels of content, discourse, and pragmatics. Because humans’ capacity for information processing is limited, most of this information needs to be ‘processed automatically, in parallel, without conscious monitoring’ (Hulstijn, 2007: 492). This is true for vocabulary, whose processing should ideally be highly automatised so as to free up attentional resources required for the processing of information at higher levels (Segalowitz & Hulstijn, 2005: 381). It follows that IK, given its automatic processing nature, would seem more compatible than EK with the demands of fluent language use.

L2 learners can also make use of EK during performance, but there is a limit to how much of it can be employed if communication is to proceed fluently. This is because EK is accessible through controlled processing, which, unlike automatic processing, demands conscious attention (Schneider & Shiffrin, 1977). Additionally, because controlled processing is generally serial in nature, there is a limit to how much information can be processed simultaneously (Schneider & Shiffrin, 1977). For these reasons, language use which is driven by use of EK can be expected to be relatively slow and effortful and more likely to result in errors.

One pedagogical implication is as follows: it is IK which allows learners to be functionally competent in an L2, which suggests a need for instruction to foster the development of this type of knowledge. This does not rule out the contributions of EK to the L2 learning enterprise; in fact, many have argued that approaches which favour the development of EK make fast and efficient ways of learning an L2 (for example, see DeKeyser, 2003; N. Ellis, 2011; Hulstijn, 2002; Norris & Ortega, 2000; Spada & Tomita, 2010) and L2 vocabulary (Laufer, 2005). It does suggest, however, that EK cannot be the ultimate object of language programmes seeking to prepare learners for the demands of fluent communication.

Ideally, then, EK of an L2 feature could be seen as a legitimate goal at the initial phases of learning, but IK of such L2 feature would subsequently need to be developed. Anderson’s (2000) model of skill acquisition posits that it is possible for initial declarative (explicit) knowledge to be transformed into procedural, automatic (implicit) knowledge through practice, but whether this applies in L2 learning contexts remains a controversial issue (see, for example, Paradis, 2009: 86; Segalowitz & Hulstijn, 2005; VanPatten, 2016; and cf. DeKeyser 2009: 126). It has also been suggested that what appears to be the conversion of EK into IK may in fact constitute the separate and additional development of IK (Hulstijn, 2002: 210-11). This would seem more in line with neurological research which has shown

EK and IK to reside in different areas of the brain (see, for example, Paradis, 2009: xi). The nature of the route to building IK once EK has been established is thus a contentious one, but further discussion of this issue is outside the scope of this paper. What is important for the present purposes is that a commonality behind these views is the widely accepted belief that EK can contribute to the construction of IK through practice (see, for example, DeKeyser, 2009: 126; N. Ellis, 2005: 332; Hulstijn, 2007: 783; Paradis, 2009: 96-97).

#### **4. Automatisation and Automaticity**

For the present purposes, automatisation will be defined as the process of developing implicit, automatic knowledge through practice. This process is often characterised by an increase in speed, accuracy, and stability (Rodgers, 2011: 299). The end result of the process of automatisation is the accomplishment of automaticity (DeKeyser, 2001), which has generally been characterised as fast, ballistic (unstoppable), effortless and unconscious (Segalowitz & Hulstijn, 2005: 371-72). Not all these features need to co-occur for automaticity to exist, and there is lack of consensus as to which one(s) should be considered essential for automaticity (Segalowitz, 2010: 78-79). Hence, the exact nature of automaticity escapes precise definition, although it would seem reasonable to believe that the underlying issue at play entails increased efficiency in some meaningful way (Segalowitz, 2010: 79).

Importantly, some authors have taken the view that the process of automatisation reflects a quantitative change in which the mechanisms involved in carrying out a given task are merely speeded up (see DeKeyser, 2015: 96). Conversely, a number of researchers have argued that underlying the process of automatisation is a qualitative change which involves restructuring of the mechanisms underpinning the execution of a given task (see, for example, Hulstijn, 2002: 211; Segalowitz & Gatbonton, 1995: 139). The view presented here considers automatisation to be an incidental feature of the development of IK (Hulstijn, 2002: 210) and consequently endorses the latter stance (i.e. automatisation defines a qualitative change). While it would also be possible to accelerate the underlying mechanisms without restructuring, acceleration alone would not entail automatic processing according to this view, but rather speeded-up controlled processing (see Section 2).

An example of automatic processing in the area of L2 word recognition provided by Hulstijn, van Gelderen & Schoonen (2009: 557) is as follows: ‘automatic processing would mean that word recognition proceeds directly from the printed word to meaning activation without passing through stages of phonological recoding or translation into the L1’. This instance illustrates that, rather than having been speeded up, the underlying mechanisms involved in L2 word recognition have been restructured. Jiang’s (2000) model of lexical representation and development in an L2 offers an account of how this might happen. According to this model, L2 word recognition at an initial stage of learning depends on the activation of its L1 translation. At a subsequent stage of learning, a direct link materialises between the L2 word and semantic and syntactic specifications of its L1 translation as a result of use and experience (a process of automatisation).

The fact that automatisation entails a process rather than a sudden switch from controlled to automatic may give the impression that knowledge of an L2 feature can be automatised to different degrees at different stages of the process. While this was the predominant view in the past (see DeKeyser, 2001: 127), more recent accounts of automaticity consider it an either-or issue. Rodgers (2011), for example, based on Segalowitz’s (2003) view that L2 performance involves both controlled and automatised component processes in interaction, suggests that L2 performance becomes more automatised as the emphasis moves from controlled to automatic components (Rodgers, 2011: 299). Along the same lines, Paradis (2009) contends that automatisation involves the gradual replacement of controlled processes with corresponding automatic processes, which in the L2 learning context amounts to the

gradual shift from predominant reliance on EK to predominant reliance on IK of an L2 feature<sup>1</sup>.

Once advanced stages of the process of automatization have been reached, performance can be expected to be less susceptible to disruption by interfering tasks as well as more efficient by virtue of being faster, more accurate, and more stable (Segalowitz, 2003: 383). Besides, because automatization minimises the amount of attentional resources required for a task, the more performance is automatized, the more attentional resources are freed up for other purposes (Segalowitz, 2003: 400). This is an important consideration in L2 learning contexts because language use calls for real-time processing of a range of linguistic elements at different levels (e.g. content, vocabulary, and sounds) (Segalowitz & Hulstijn, 2005: 381) and, as said, there is a limit to how much controlled processing can occur if language use is to proceed fluently.

The issue of automaticity is particularly relevant in the area of vocabulary. This is because the ability to link words and meanings is a fundamental aspect of language use, and a low level of automaticity in this ability is bound to compromise overall L2 performance by, for example, hindering fluency (Segalowitz, 2010: 75). This is true for all four modes of language use: automatic word recognition plays a vital role in the achievement of listening and reading comprehension and, correspondingly, automatic word retrieval plays a key role in the communication of messages in spoken and written language production (see Hulstijn, 2007: 789-92; Zhang & Lu, 2014: 284-85).

Given the crucial role of lexical automaticity in language use, it would seem natural to reason that size and depth of vocabulary knowledge cannot suffice as the only goals of a language learning programme; achieving appropriate levels of lexical automaticity is equally indispensable (Hulstijn, 2007: 793). However, language programmes tend to emphasise vocabulary size and depth at the expense of automaticity, which has been described as ‘a neglected component’ in many language curricula (Hulstijn 2001: 281-82). This imbalance could be expected to result in a lack of correspondence between size and depth of vocabulary knowledge and the automaticity with which such knowledge can be accessed in fluent communication, and there is some empirical evidence suggesting that a lack of correspondence may indeed exist (Zhang & Lu, 2014). This raises the question of how to promote the development of lexical automaticity in the L2 classroom, a question which will next be considered in the final section of this paper.

## **5. Developing Lexical Automaticity**

It is generally assumed that automaticity is mainly developed through practice, and this is also true in the context of L2 vocabulary learning (Segalowitz, 2003). This is not to say that any and all kinds of practice can be expected to result in automatization of lexical knowledge. This section will consider some issues that may have to be borne in mind if practice is to foster the automatization of lexical knowledge in formal instruction environments.

Two important insights from the field of cognitive psychology in this respect are that both ‘large numbers of repetitions’ and ‘consistent training’ are key elements in the development of automaticity (Shiffrin & Schneider, 1977: 158). Both repetition and consistency are also believed to be essential for automatization in the context of L2 learning (Segalowitz 2003: 402). In what follows, each of these issues will be discussed in turn.

Repetition is generally viewed as a vital ingredient in the development of automaticity in L2 learning contexts. This view has often led to the conclusion that learners should have multiple opportunities to encounter familiar words during reading and listening practice. To maximise the benefits of such an approach to automaticity training, it would seem best for

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<sup>1</sup> This is not to say that IK replaces EK so that the latter ceases to exist; both kinds of knowledge of a given L2 feature can coexist (N. Ellis, 2008: 4; R. Ellis, 2009: 15).

listening and reading materials to include mostly known vocabulary. Hulstijn (2001) proposes two main paths to this end. The first involves repeated use of the same texts (which would require the provision of appropriate, stimulating tasks; see Hulstijn (2001: 284-85) for some suggestions). Another route to ensuring that listening and reading materials are packed with familiar vocabulary would be to employ texts which control the vocabulary load, a case in point being graded readers, i.e. short books (often including audio) written for language learners which grade language according to level of proficiency. The fact that graded readers restrict the vocabulary load makes them inherently rich in lexical repetition, more so at lower levels of proficiency.

Segalowitz & Hulstijn (2005: 381-82) present a similar argument and recommend that teachers and learners should make a distinction between texts as sources of new linguistic forms and texts as means for automaticity training. Making such a distinction explicit would seem important if automaticity training is to succeed, and so would raising awareness of the rationale behind using each kind of text. This is because although research has shown that reading texts which control the vocabulary load can result in positive attitudes and motivation (see, for example, Day, 2013: 11); this does not preclude the converse possibility, i.e. that such texts might come across as dull and under-challenging (to at least some learners). It would seem plausible that learners who equate vocabulary learning with increasing the number of words they know may see very little reward in investing their time in texts which do not present new vocabulary, and a mismatch between teaching approach and learners' values may have a negative impact on engagement and motivation (Dornyei, 2001: 67).

Besides repetition, some authors have stated that automaticity training needs to provide consistent practice (DeKeyser, 2001; Segalowitz, 2003). This is because of the finding that as consistency of practice decreases, so does the rate of automatization, and that, in fact, highly inconsistent practice may not lead to automatization at all (Shiffrin & Schneider, 1984: 274). On the face of it, this would seem to suggest that for recognition of an L2 word to be automatized in reading, practice would require repeated encounters with the words in reading materials (as opposed to listening materials). It would also seem to suggest that for automaticity of word retrieval to develop, practice would need to involve productive language use (as opposed to receptive language use).

One important consideration for automaticity training proposals, then, is that the practice effect seems to be 'highly skill-specific' (DeKeyser, 2007b: 4; see also DeKeyser, 1997 and de Jong, 2005 for some empirical evidence; cf. VanPatten & Oikennon, 1996). This means that automatization in one skill cannot be expected to transfer to other skills, and so separate training would seem necessary for different skills. Hence, practice through reading and listening materials loaded with familiar vocabulary cannot be the whole answer to the question of how to promote the automatization of lexical knowledge; some procedures need also be put in place to automatize lexical retrieval in the productive modes of language use.

Arguably, practice in speaking and writing would need to create opportunities for both word selection and retrieval in spoken and written production. One further requisite would be that, if practice was to ensure repeated use of words in need of automatization, specific words would have to be predetermined. These two requirements are at odds: the fact that word selection would be up to the learners would make it virtually impossible to target specific words. The challenge here, then, is one of designing activities which would induce learners to self-select targeted words. To this end, successful activities would likely have to prompt learners, in some way or another, to 'communicate certain meanings while the necessary forms are easily available' (DeKeyser, 2001: 146-47).

In the case of speaking, one possible approach to creating favourable conditions for targeted words to be self-selected and retrieved during communicative language use may be through retelling activities (i.e. reading short texts and then retelling them). While this would still be far from ideal, it would nevertheless be a convenient way of increasing the likelihood that at least some automatization of targeted words can take place. This is because retelling

activities give learners the chance to retrieve the specific words encountered in a text and to use them creatively within their own speech (Nation, 2001: 135). A re-telling activity which may be particularly useful for the purpose of fostering the development of lexical automaticity is '4/3/2' (Maurice 1983). In this activity, learners deliver the same talk (or retell the same text) three times to three different listeners one immediately after another, first in four minutes, then in three, and finally in two. As 4/3/2 involves both repetition and increasing time pressure, it could be used to provide opportunities for targeted words to be used repeatedly and retrieved with increasing fluency (Nation, 2001: 136). It is unlikely that retelling activities or similar procedures alone can effectively tackle the problem of developing automaticity of lexical retrieval, but they can nevertheless constitute a necessary first step in the process of automatization and one which 'the classroom can facilitate much better than any other environment' (DeKeyser, 2007a: 292).

## 6. Conclusion

This paper has argued for the need to promote the development of lexical automaticity in L2 learning settings. It has first discussed the distinction between explicit and implicit knowledge to conclude that it is the latter which learners need to develop in order to be functionally competent in the L2. It has subsequently defined automaticity as an inherent feature of implicit knowledge and provided reasons why automatization of lexical knowledge should have a stronger presence in L2 curricula. Lastly, it has proposed some ways in which lexical automaticity may be fostered in formal instruction environments. While it is possible that the proposed activities and procedures may only bring about a modest contribution to the task at hand, they provide viable options for lexical automaticity training to find its way into the L2 classroom.

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