

The Role of Consulting a Dictionary in Reading and Vocabulary Learning

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This article reviews recent research on consulting a dictionary in L2 reading and vocabulary learning. From the perspective of cognitive learning theory, the author re-evaluates the limited role that has often been accorded to dictionary consulting. It is noted that, among the three available lexical processing strategies (inferencing, consulting and ignoring), learners tend to use consulting infrequently and selectively and also to differ among each other in their strategy use. Consulting in combination with inferencing is shown to have the greatest positive effect on performance in L2 reading and vocabulary learning, although consulting is found to slow down task completion. Excerpts from think-aloud protocols illustrate the potential contribution of strategic dictionary use to the cognitive processes required for vocabulary acquisition: attention to form-meaning connections, rehearsal of words for storage in long-term memory and elaboration of associations with other knowledge. Among the pedagogical implications of these findings is the need for training in lexical processing strategies in order to help learners use the dictionary effectively and accurately in L2 reading comprehension and vocabulary learning.

Cet article passe en revue les recherches récentes portant sur la consultation du dictionnaire dans la lecture en langue seconde et dans l'apprentissage du vocabulaire. L'auteure se propose de réévaluer, dans la perspective de la théorie cognitive de l'apprentissage, le rôle limité qu'on a souvent accordé à la consultation du dictionnaire. On constate que, parmi les trois stratégies de traitement lexical disponibles (deviner le sens du mot; consulter le dictionnaire; renoncer à comprendre le mot), les apprenants consultent le dictionnaire peu souvent et de façon sélective. Par ailleurs, on constate des différences entre les individus quant à leur utilisation de cette stratégie. Les études démontrent que la consultation du dictionnaire après que l'apprenant a essayé de deviner le sens du mot exerce le plus grand effet positif sur la performance dans la lecture en L2 et dans l'acquisition du vocabulaire. Des extraits d'entrevues menées avec des apprenants illustrent comment l'usage stratégique du dictionnaire peut contribuer aux processus cognitifs nécessaires à l'acquisition du vocabulaire: j'attention aux liens entre forme et sens, la répétition des mots pour favoriser la rétention en mémoire et l'élaboration d'associations avec d'autres connaissances. Parmi les implications pédagogiques de ces résultats de recherche, on peut mentionner le besoin d'une formation en stratégies de traitement lexical, afin d'aider les apprenants à se servir du dictionnaire avec efficacité et précision en lecture et dans l'acquisition du vocabulaire.

In an article examining LI college students' ability to learn the meaning of unknown words through dictionary definitions, Nist and Olejnik ask: "Where has the idea come from that looking words up in a dictionary is the worst way for students to learn vocabulary" (1995, p. 172). Yes, indeed! In the 70's and 80's, within the framework of information processing models of the reading process (e.g., psycholinguistic model- Goodman, 1970; automatic information processing - Laberge and Samuels, 1974; interactive model- Rumelhart, 1977), the prevalent view among educators was that when reading, L2 learners should consult a dictionary sparingly and only as a last resort (Carrrell, Devine and Eskey. 1988; Dubin, Eskey and Grabe, 1986). Consulting was seen to disrupt the construction of meaning by taking the reader out of the text, and to be ineffective because often learners would either not find the requisite meaning in a dictionary (text context may alter word meaning) or misinterpret the dictionary entry. Inferencing or guessing the meaning of the unfamiliar words on the basis of the text context was seen to be a more efficient and effective lexical processing strategy for dealing with unfamiliar vocabulary. In recent years, the role of consulting a dictionary in the course of reading has become of increasing interest to researchers in the area of second language (L2) learning, particularly vocabulary learning. Results from recent studies (Fraser, 1997; Hulstijn, Hollander and Greidanus, 1996; Knight, 1994; Luppescu and Day, 1993; Watanabe, 1997) suggest a need to re-evaluate the limited role consulting a dictionary is often accorded in the L2 reading class. On the basis of a review of empirical studies that have examined the use of meaning consultation by L2 learners on reading tasks, this article will present an overview of results pertaining to the extent, context, and impact of consulting on reading and vocabulary learning. I will interpret these findings within a framework of cognitive learning theory and discuss their pedagogical implications.

The Extent and Context of Consulting by L2 Readers

One issue is to what extent L2 readers actually consult a dictionary when encountering an unfamiliar word while reading. In case studies of the word-solving strategies of L2 readers, both Hosenfeld (1977) and Adamson (1990) observed that while all participants used dictionaries, less successful L2 readers or learners used them more frequently (i.e. too often) than more successful ones. More recently, Paribakht and Wesche (1993) in an introspective study of the strategies L2 learners used while reading, reported that overall the university students in their study consulted a dictionary infrequently and that consulting was a strategy used by some students more than others. Hulstijn (1993) also reported substantial individual differences in the frequency of consulting (range 1-103 words; $m = 41$; $SD = 24$) and that consulting was done selectively

in the sense that words that were relevant or important to text comprehension were looked up much more frequently than irrelevant words. In another experimental study that compared the provision of a marginal gloss to a bilingual dictionary to no aid, Hulstijn, Hollander and Greidanus (1996) again reported that participants in the dictionary group seldom looked up words (only 12% of the target words).

More recently, in the context of a classroom-based instructional strategy training study, I (Fraser, 1997) examined the use of consulting as one of three lexical processing strategies (LPSs) L2 readers utilize when encountering unfamiliar words while reading.² The other two LPSs are ignore the word and continue reading, and infer, that is, determine unknown word meaning on the basis of situational and linguistic cues in the text. Using a time-series with repeated-measures design, I gathered introspective data individually from eight participants, all Francophone university students who were enrolled in an intermediate level English for Academic Purposes course. Data was collected over a period of five months. After reading each of eight texts, participants answered comprehension questions in writing, skimmed the article to identify unfamiliar words, and then participated in a structured interview that focused on eliciting a retrospective think-aloud protocol of the LPSs they had utilized to deal with unfamiliar vocabulary while reading.³ Finally, 7-10 days later they completed a cued recall task (*Vocabulary Knowledge Scale*, Wesche and Paribakht, 1996) to assess vocabulary learning.⁴ The texts were selected to be challenging; all came from the Science & Technology section of *The Economist* and were 1000-1200 words long with a readability range of 9.4-12.3.⁵ Both a bilingual and an English dictionary were available for consultation.

A total of 878 participant-selected unfamiliar words were coded and analysed from the think-aloud protocol data (a maximum of 15 per participant per text). Unfamiliar words items were coded not only for frequency of use of the various LPS options but also for the context of that use, such as the decision process associated with strategy selection and the monitoring of the outcomes of LPS use.⁶ Table 1 presents the frequency of use of the three lexical processing strategies. Participants not only used the three LPS

options alone but also in combination with each other (e.g., infer → consult). This accounts for the 1127 responses elicited on 878 word encounters. As well, in 37 cases (3%), participants reported that they had not noticed the unknown word while reading. Of the 841 cases of actual strategy use, 71 % represent single LPS use and 29% represent multiple LPS use. Overall, Table 1 indicates that these adult Francophone learners were able to and did make use of all three LPS options, alone and in combination with each other. Further examination of the frequency distributions associated with LPS use revealed that while inferencing was the preferred and primary LPS option utilized (58% of unfamiliar word encounters where an LPS was actually used), ignoring (31 %) and consulting (40%)

functioned as important backup strategies. Nonetheless, the rate of consulting was also revealed to be an area of great individual difference; over all texts, mean participant rates ranged from 6% to 75% with a standard deviation of 26. Three participants rarely consulted (6%, 15%, 17%), two regularly (33%, 44%) and three often (60%, 69%, 75%).

Table 1: Frequency Distribution of Use of Lexical Processing Strategies

LPS Option	Frequency	Percent
Consult	330	29
Ignore	269	24
Infer	491	44
No attention ^a	37	3
Total^b	1127	100

a In the think-aloud protocols, participants occasionally indicated they did not notice the unfamiliar word item while reading.

b Based on 878 unfamiliar word encounters.

In terms of the context of this use of consulting, there were two dominant patterns: consulting alone (55%) and inferring followed by consulting (45%). As well, these learners appeared to exert deliberate control over their use of consulting in that when they indicated they consulted, most of the time (87%) they included a decision statement focusing on selection of this strategy. When consulting alone, statements indicated that the decision process focused on the need for comprehension (48%), lack of knowledge of word meaning (40%), and occasionally previous familiarity (18%):

T: What did you do and think about when you first saw "flickering"?

S: I had no idea of what it can be, but I thought that it was an important word to understand the rest of the paragraph, so I searched in the dictionary, and now I think I can't remember the meaning now, but it was a good thing to search. (Henri: Text 3)

In complex LPS use (i.e., inference followed by a consult), the decision statements mainly focused on the need for word meaning verification (75%) followed by the need for reading comprehension (25%):

T: What did you do and think about when you first saw "reckons"?

S: I thought it was like something ... I tried to create a meaning and for me it was something like "thinking", or something with the thought ... but I wasn't sure, so after reading the whole paragraph, I looked for it in the dictionary and I found "*considérer*". (Laura: Text 8)

In addition, the protocols revealed considerable monitoring of the use of the consult strategy by these students. When consulting alone, about a quarter of the consults had some indication of monitoring of the outcomes. Typically, this monitoring evaluated whether the dictionary meaning fit the context, as illustrated in the following:

T: What did you do and think about when you first saw "inherit"?

S: I stopped reading, I looked, and I tried to find if it's a verb or something, I tried to find if it was key word or something, and I tried to put another word there to just keep going, but I couldn't, so I looked in the dictionary, and I found that it was receive a property, so I just re-read the sentence, and it was matching there so I just continued. (Lucien: Text 4)

More rarely, this monitoring took the form of adapting the dictionary definition to the given text context:

T: What did you do and think about when you first saw "eerie"?

S: I really didn't know so I checked in the dictionary, and it said something "*inquiétant*" or worrying but I said well it's not worrying about recognising faces so I re-read the sentence, it's probably ... they mean it was more complex about the faces, it was more *inquiétant*. (Heidi: Text 2)

As well, when inferring and then consulting, there was indication of monitoring of outcomes 59% of the time. This is a relatively high incidence since for all LPS use, there are indications of the monitoring of outcomes only 26% of the time. The typical pattern was that the participant indicated a lack of certainty about an inference and decided to look in the dictionary for verification:

T: What did you do and think about when you first saw "bias"?

S: I know in French they say *biaisé*, when something is wrong, so in the sentence, it was not the same thing, I couldn't translate it like that so I went to the dictionary and I think it means *tendance*. (Heidi: Text 7)

If they consulted, participants were asked when they had gone to the dictionary: immediately at the word, after reading the sentence, or after reading the paragraph. They reported that for about half the instances they consulted (48%), they did so after reading the sentence. Typically, they reported they stopped at the end of the sentence, reread the sentence, and then consulted. A third of the time, they indicated finishing the paragraph before consulting and in 19% of cases, they reported they consulted immediately upon encountering the unfamiliar word.

Finally, participants were also asked how certain they were about the meaning they had determined through LPS use. AS-point Likert scale was used (not certain, slightly, fairly, certain, very). When they consulted either alone or after inferencing, these learners expressed a high level of certainty about the meaning determined. When consulting alone, 88% of the time they were

certain or very certain, and when inferring and then consulting, 90% of the time they were certain or very certain. In comparison, when inferencing alone, they perceived themselves to be certain or very certain of the meaning only 50% of the time.

To sum up, the description of consulting behaviour revealed in the introspective data in my research generally corroborates previous research findings. First, L2 learners vary considerably in the frequency with which they consult to determine unfamiliar word meaning while reading; some L2 learners consult rarely while others consult often. Secondly, L2 readers consult strategically in a selective way according to how important or relevant the unfamiliar word is perceived to be for reading comprehension or task completion purposes. However, results from my study also indicated that over the course of the study (and the reading of eight texts), these adult L2 university students consulted regularly, not rarely as some previous research had indicated. One explanation is that important differences in task (i.e., type of text, type of reading goal) increased the rate of consulting. The texts used in this study were long, challenging, and carefully selected to present new content to the participants to simulate the "learning from reading" task often required in an academic setting. Moreover, the task was designed to encourage a close and detailed reading of the articles. Participants studied the comprehension questions prior to reading to establish specific reading goals, and as well, at the end of each paragraph, participants provided a taped oral summary of their understanding. Accordingly, task demands may have encouraged these learners to search out the meaning of unfamiliar words more frequently than less demanding reading situations (e.g., shorter texts, narrative structure, less defined and less comprehensive reading goals). Nevertheless, even though rates of consulting may vary substantially according to individual learner and task differences, it is evident that consulting a dictionary to determine the meaning of unfamiliar words while reading is a strategy that adult L2 readers can and do utilize.

Impact of Consulting on Reading and Vocabulary Learning

In the last fifteen years, various researchers have investigated the value of providing L2 learners with the meaning of unknown words for reading either in the form of access to a dictionary or marginal gloss. Bensoussan, Sim, and Weiss (1984) examined the benefit of dictionary use for performance on reading comprehension tests. In one study, 91 advanced EFL learners completed a battery of three tests representing three conditions: no dictionary, monolingual dictionary, and bilingual dictionary. For each test, students read one text (500-700 words each) and underlined the unfamiliar words they intended to look up. Then, still with the text available and if appropriate, access to a dictionary, participants answered 10 multiple choice reading comprehension questions,

and indicated which words they actually looked up or in the no-dictionary condition, words they would like to look up. Results indicated that access to a dictionary did not affect test scores. As well, many fewer words were actually looked up (about 1 % in the monolingual and 3% in the bilingual dictionary condition) than intended (11% in the monolingual and 17% in the bilingual dictionary condition). Need for answering a test question appeared to motivate the use of a dictionary rather than general reading comprehension needs.

Lupescu and Day (1993) examined whether the use of a bilingual dictionary enhanced vocabulary learning on a reading task. A group of Japanese university students (N = 293) read a story that included 17 unknown words whose meaning could be inferred; half the group had access to a bilingual dictionary while half had no dictionary. After reading, all were given a multiple choice vocabulary test. The group that had access to the dictionary had a mean score on the vocabulary test that was 50% higher than the no dictionary group. This suggests that the use of a bilingual dictionary can enhance vocabulary learning (through reading). However, the dictionary group also read at a considerably slower rate (i.e., 50% slower on average) than the no dictionary group, and on some words the use of the dictionary seemed to mislead, possibly due to the large number of dictionary entries.

Knight (1994) investigated the effects of bilingual dictionary use on vocabulary learning and reading comprehension in L2 learners with different L1 verbal abilities. Participants (N = 112) were university students studying Spanish at an intermediate level; they were randomly put into a dictionary or no dictionary group. All participants read two Spanish magazine articles, wrote an immediate recall protocol as a reading comprehension measure, and then completed two unexpected vocabulary tests of 24 targeted unknown words (cued recall- supply a definition; multiple choice-select a definition). Two weeks later, as a delayed measure of vocabulary learning, they redid the two vocabulary tests. Results indicated that there were significant differences favouring the dictionary group on both vocabulary learning (supply and select contexts, immediate and delayed tests) and reading comprehension measures. While the no-dictionary group demonstrated 6% learning on the immediate-supply definition test and 8.5% on the delayed test, the dictionary group demonstrated 20% learning on the immediate and 13.5% on the delayed test. Moreover, the dictionary condition seemed in particular to benefit the low L1 verbal ability group in that it allowed them to more closely approach the scores of the high verbal ability group in the immediate-select-definition vocabulary test and significantly enhanced their reading comprehension scores. Again using a dictionary negatively affected reading rate; the dictionary group spent about 42% more time reading than the no-dictionary group.

More recently, several studies have investigated the impact of different methods of providing L2 readers with unfamiliar word meaning. Hulstijn,

Hollander and Greidanus (1996) compared the amount of vocabulary learning that occurred in three reading conditions: marginal gloss, opportunity to use a bilingual dictionary, and a control or no aid condition. Participants were Dutch university students (N = 78) who were advanced learners of French. After reading a short story in French, students were tested on their recall (recognition and cued recall of 16 target words). Results indicated that the retention of the marginal gloss group was higher than the dictionary or control groups. However, this was largely a result of the fact that the dictionary group seldom looked up words (i.e., only 12% of the target words). When the dictionary group actually looked up a word their retention rate was higher than the overall retention rate of the marginal gloss group (i.e., 25% compared to 18% on words that appeared once, 63% compared to 35% on words that appeared three times).

Watanabe (1997) also examined whether differences in how word meaning is provided affect reading comprehension and vocabulary learning. He investigated the impact of three cue conditions (in-text appositive inference cue, single marginal gloss, multiple marginal gloss) and one task condition (provide an LI translation during reading). Japanese university students (N = 231) were randomly assigned to various cue conditions and read an expository article (500 words). After reading, they answered five open-ended questions to measure reading comprehension and completed immediate and delayed (1 week later) cued recall tests to measure vocabulary learning on 16 target words. Results on the reading comprehension measure indicated that the single gloss group scored significantly higher than the control group who had no cue to meaning given. Furthermore, for the task condition, half of each cue condition provided a translation of the target words as they read. When these translations were scored for demonstrated word comprehension, results indicated that the students in both marginal gloss groups scored significantly higher than the control (no cue) and inference cue groups. Finally, results indicated that vocabulary recall scores were higher for both marginal gloss conditions than the inference cue or control conditions.

Findings from my research comparing the use and effectiveness of the three lexical processing strategies (consult, ignore, infer) address this issue of the impact of consulting in several ways. First, each instance of LPS use in the think-aloud protocol data was rated in terms of how successful it was in determining a meaning for the word that was appropriate for text comprehension. A 3-point scale was used: no comprehension (i.e., no or an inappropriate meaning was determined); partial comprehension (i.e., the meaning determined worked generally for the text context although there was some distortion or loss of the text representation [e.g., corpses → "bodies" instead of dead bodies]); and comprehension (i.e., the meaning determined was appropriate for the text context with little or no meaning distortion). Analysis of the frequency distributions revealed that in terms of word comprehension or the ability to determine

accurate meaning for the text context, consulting either alone or in combination with inferencing was the most effective strategy. As Table 2 indicates, in instances where participants consulted alone, they demonstrated full comprehension 76% of the time and partial comprehension 5%. In instances where they inferred and then consulted, they demonstrated full comprehension 83% of the time and partial comprehension 7%. In comparison, when inferencing, full comprehension was demonstrated 54% of the time and partial comprehension 24% of the time.

Table 2: Frequency Distribution in Percentages of LPS Success by LPS Use

	Lexical Processing Strategy					Overall
	Consult	Ignore	Infer	>Consult ^a	>Ignore ^b	
LPS Success						
No Comp	19	100	22	10	72	39
Partial	5	0	24	7	23	13
Comp	76	0	54	83	5	48
Total	100%	100%	100%	100%	100%	100%
	(181) ^c	(152)	(271)	(135)	(102)	(841)

Note: The values represent % of success in determining an appropriate meaning for text comprehension. No comp= no or inappropriate meaning determined; Partial= meaning determined worked generally for the text context with some loss or distortion; Comp= meaning determined was appropriate for the text context with little or no distortion.

a> Consult= multiple LPS use ending in consulting

b> Ignore= multiple LPS use ending in ignoring

c> Counts are in parentheses.

Consulting a dictionary was also associated with substantial vocabulary learning. To monitor vocabulary learning, participants completed a cued recall task one week after the reading of each article. It consisted of 10 words selected from those each participant had indicated were unknown and which had been focused upon in the structured think-aloud interview. A 2-point scale was used; meaning recalled versus not recalled.⁷ The vocabulary learning score for each measurement period represents the percentage of demonstrated retention of word meaning over two texts (i.e., 20 words). A total of 622 cued recall items were analysed. Meaning retention scores over all measurement periods had a range of 5%-50% and an overall mean of 28% (*SD* = 12). These findings indicate that these learners did acquire vocabulary while reading for meaning, but that the amount of vocabulary learning was an area of great individual difference.

More importantly, an analysis of the frequency distributions examining patterns of word retention associated with LPS use indicated that when these learners consulted or inferred alone, they recalled the word meaning they had determined about 30% of the time. Moreover, when consulting was used in combination with inferencing, their recall rate increased to 50%. Schouten-van Parreren (1989) similarly found in a case study of adult L2 readers that inferring word meaning and then consulting a dictionary to verify was a strategy that enhanced vocabulary learning through reading. And Hulstijn (1993) reported in a study of dictionary use by adult L2 readers that consulting a dictionary to verify a self-generated inference was a strategic routine utilized by L2 readers with good inferencing skills.

To summarize, in this review of empirical research, I found no evidence that interrupting the on-going reading process to search out the meaning of an unfamiliar word has a negative impact on L2 readers' comprehension, either word comprehension or global text comprehension. On the contrary, there is growing evidence that when students have access to the meaning of unfamiliar words either through a dictionary or marginal gloss, both local word comprehension, that is, the accuracy of the meaning determined (Fraser, 1997; Watanabe, 1997), and global text comprehension (Knight, 1994; Watanabe, 1997) are enhanced. Nonetheless, there does appear to be a trade-off with reading rate because dictionary use does slow down reading rate substantially (Luppescu and Day, 1993; Knight, 1994). As well, an important issue is that some L2 learners (Adamson, 1990; Fraser, 1997; Hosenfeld, 1977; Hulstijn, 1993; Paribakht and Wesche, 1993) and many L2 learners in some reading contexts (Bensoussan, Sim, and Weiss, 1984; Hulstijn, Hollander and Greidanus, 1996; Paribakht and Wesche, 1993) appear to consult a dictionary infrequently when reading. This highlights the need for a more detailed specification of the role of individual differences such as age and proficiency (both language and reading) on consulting behaviour. All the studies reviewed here (except Hosenfeld, 1977) focused on adult university students and most have not distinguished L2 language proficiency from L2 reading proficiency. Just as L2 reading proficiency affects inferencing behaviour (Block, 1992; Fraser, 1997), it is likely that L2 reading proficiency and skill in using a dictionary affects consulting behaviour. For example, Knight (1994) found that students with higher L1 verbal abilities (i.e., scored higher on the reading and vocabulary sections of the American College Test) looked up more words on an L2 reading task than lower ability ones. However, the lower L1 verbal ability students benefited from this consultation in terms of enhanced reading comprehension and vocabulary recognition more than the higher L1 verbal ability ones.

In addition, consulting to determine the meaning of unfamiliar words is beneficial for vocabulary learning. When L2 readers have access to the meaning of unfamiliar words either through a marginal gloss or a dictionary, they recall a

substantial number of those words. Interestingly, actually looking a word up in a dictionary seems to favour retention over the use of a marginal cue (Hulstijn, Hollander and Greidanus, 1996). Furthermore, consulting (i.e., access to a dictionary or marginal gloss) appears to enhance word recall more than access to an inference cue embedded in the text (Luppescu and Day, 1993; Watanabe, 1997). This may be because consulting fosters more and closer attention to the form-to-meaning connections than inferencing does. Finally, verifying the accuracy of a self-generated inference by consulting a dictionary is a strategy that facilitates later recall of words more than consulting or inferencing alone (Fraser, 1997; Schouten-van Parreren, 1989).

Discussion and Instructional Implications

From the above review, it is clear that consulting a dictionary has the potential to be a productive strategy both for enhancing reading comprehension and for learning new words. It is important for educators to consider what characteristics of consulting make it a productive strategy for L2 vocabulary learning. In current cognitive models of learning, three processes have been posited to be important for initial vocabulary acquisition through reading: attention, rehearsal, and elaboration. For an L2 reader to learn a new word, he/she must first notice the word. However, it seems this attention need not only focus on the meaning of the word but on the association of meaning to the word form (Ellis, 1994). This potentially requires specific and significant analysis of the form meaning connections of new to-be-learned words (Ellis, 1994; Schouten-van Parreren, 1989). For example, a lack of attending to meaning-form associations is hypothesized to be the reason why L2 readers have low vocabulary retention rates on words which are easy to infer because of a rich text context (Haastrup, 1989; Mondria and Wit-de Boer, 1991). Lack of sufficient attention to form meaning connections may similarly account for Watanabe's finding (1997) that L2 readers recalled more words when they had access to the meaning through a marginal gloss than through an embedded in-text appositive inference cue. He suggests that "vocabulary explanation by appositive cue lacked clarity of connection between the explanations and words to be explained" (p. 300).

Secondly, the learner needs to form a representation of the new word in memory. Rehearsal in the form of repetition encourages the creation of a coherent and rich memory trace. The repetition of new words, literally by saying them out loud, promotes later recall of those words (Ellis and Beaton, 1993; Ellis and Sinclair, 1996). Working within a constructivist model, Ellis and Sinclair explain this effect for articulatory repetition as follows:

the more often the FL utterances are repeated in phonological working memory, the more regularities and chunks of spoken FL are abstracted, and the more accurately and readily these can be called 10 working memory,

either for accurate pronunciation as articulatory output or as labels for association with the native-language translations. (p. 245)

In other words, repetition constitutes a rudimentary form of practice which fosters the encoding of information about new vocabulary in memory during initial acquisition.

Thirdly, word learning through reading is enhanced by "deep" processing and an important feature of deep processing is the amount and kind of elaboration (Craik and Lockhart, 1972; Ellis, 1994). It is through elaboration that rich and coherent associations are created between the new word and existing knowledge or cognitive structures (both form and meaning). The more and the richer the elaboration made during acquisition, the more readily the new word will be recalled (Schouten-van Parreren, 1989; Ellis, 1994). Elaborations associated with learning a new word through reading include identifying its part of speech and grammatical features, and drawing associations between that word and existing knowledge by, for instance, commenting on the meaning of that word with others in the same semantic field or drawing an association with known L1 and L2 words (e.g., synonyms, homonyms, antonyms).

Consulting in the course of reading has the potential to be a lexical processing strategy that encourages the kind of attention, rehearsal, and elaboration important in the initial learning of new words. Minimally, learners pay close attention to the orthographic and phonological form and engage in frequent rehearsal, often whispered articulatory repetition, as they maintain a representation in working memory while searching the dictionary. However, as illustrated in student think-aloud protocols (Fraser, 1997), there also can be considerable attention paid to form-meaning connections and significant elaboration. In the following example, H  l  ne reveals that she has paid very close attention to the orthographic form of "thrust" by differentiating its spelling from the word "trust". In doing so, she has elaborated a form association with a known L2 word.

T: What did you do and think about when you first saw "thrust"?

S: I never saw it with the "h" after the "t", soil was a new word, and I wanted to know the difference between "trust", and "thrust", so I searched it in the dictionary.

T: And what did you find?

S: *Pouss  e*, it's for power. (H  l  ne: Text 3)

In the next example, Lucien demonstrates significant elaboration in which he utilizes both the semantic and grammatical context of the sentence to monitor a self-generated inference "to kill" prior to looking up "soothe".

T: What did you do and think about when you first saw "soothe"?

S: I tried to figure out what it could be, and with the rest of the sentence "breast milk contains enough", so I didn't know, I thought it was maybe to kill, but "a

few hours" ... with the rest of the sentence it was impossible, so I went to the dictionary and found that it was something like *endormir, calmer, apaiser*.

T: When did you look it up in the dictionary?

S: After trying to put another word for that and to find if it was a verb or adjective, and I found it was a verb, so I tried to put something else, but I couldn't, so I went to see there. (Lucien: Text 6)

And in the example below, Laura demonstrates substantial repetition of the unfamiliar word "deck" not only alone but also in its grammatical/semantic context as she reread the sentence several times. As well, she reveals rich elaboration through her determination of grammatical function, her narrowing of the semantic context, and her final adaptation of the meaning she found in the dictionary to the text context.

T: What did you do and think about when you first saw "deck"?

S: I ... because ... there is a lot of "decks" in this paragraph, for the first one I underlined it and continued reading ... but in the next sentence there is "deck" too, so I re-read the first sentence, and the second one to find the sense, but it was not very clear so just continued reading until the end of the paragraph, and I came back on it, tried to find the sense, tried to find other sense of other word that I didn't understand, and after that I looked for it in the dictionary to be sure.

T: What did you think it was before you look in the dictionary?

S: Because of "to add", it was to add something at the plane, so I just thought that, I wasn't sure it was something ... it was something, so it can be just a thing which to add to the plane, so it's not a lot of choice, not a feeling or something like that just ... but I wanted to understand the meaning of this word a lot of time because I think it's important for the paragraph....

T: And what did you find?

S: *Pont*, like ... it's not the good what I will say ... I don't know if we say this word for the plane ... but, I'm not really sure of the sense, I think it's something that we add, like another floor. (Laura: Text 3)

Thus, consulting a dictionary has the potential to be a productive strategy for L2 learners to use to acquire new vocabulary in the course of reading. Nonetheless, we should remain cautious about sending our students rushing off to buy dictionaries and "getting on with it". Consulting is one of three lexical processing strategies available to our students for efficiently and effectively coping with unfamiliar words encountered during reading. An important feature of efficient and effective strategy use is knowing when not to utilize one strategy and to select a more appropriate one. Accordingly, it is important for our students to learn to use the three lexical processing strategies as an integrated unit of strategic activity. In reading, some unfamiliar words - words unimportant for text comprehension - can and should be ignored, the meaning of many words can be efficiently and effectively inferred, and some words - words important for

text comprehension, for task completion, or for the learners' own acquisition purposes - should be looked up in the dictionary.

Moreover, we need to teach our students how to "consult" to enhance vocabulary learning. We can make them aware that their later recall for a new word will be enhanced if they first try to infer its meaning and then verify by consulting. We can encourage them to repeat the word out loud alone as well as in its sentence context, and to try to draw as many and as rich elaborations as possible during the consulting process. Once they have made the decision to consult, the more effort they put into this initial encounter, the greater the likelihood that they will later on remember and be able to use the word themselves.

Finally, consulting a dictionary is a skill and not all L2 learners, even adult university students, are skilled users. In one study that examined the ability of adult L2 learners to use dictionaries, Nesi and Meara (1994) found that dictionary entries were systematically misinterpreted. Our students need to develop strategies for using a dictionary efficiently and effectively. For example, efficient dictionary use may be enhanced by having students identify the word class of a word prior to consulting and focusing their dictionary search on the entries in that word class only. As well, both the quality of the meaning determined and retention of that meaning may be enhanced by encouraging students after consulting to reread the sentence substituting and fitting in the meaning generated through consulting rather than to just continue to read.

In conclusion, as educators, rather than thinking of consulting a dictionary as a reference skill to be used as a "last resort" during reading, we need to think of it as a lexical processing strategy which if used appropriately and judiciously, has the potential to enhance our L2 students' reading comprehension and vocabulary learning capabilities.

Notes

- 1 I gratefully acknowledge support for this research from Glendon College, York University, Toronto, in the form of Minor Research Grant. An earlier version of this paper was presented at the 29th CAAL Annual Conference. Trends in Second Language Learning and Teaching. Carleton University. May 1998.
- 2 A main focus of this study was to examine the impact of instruction in lexical processing strategies over time. Multivariate repeated-measures ANOVAs over time indicated no significant time effect for the rate of use or success when consulting. Therefore, for the purposes of this article, the patterns and characteristics of the use of consulting over all measurement periods are described.
- 3 A structured interview format (employing the same questions, in the same order, to all participants, for all texts) was used to increase the stability of the data in a repeated-measures design. All problems began with the general question "What did

you do and think about when you first saw 'x' word?" followed by 1-3 non-directive questions depending on the indicated LPS.

- 4 Results from the vocabulary learning component of the study are reported in Fraser (1999).
- 5 The criteria used in reading text selection were that the articles be: authentic and complete (not a translation, adaptation or abridgement); reasonably long and challenging (1000-1500 words) so as to elicit a 10-15 item sample of participants' strategies when encountering unfamiliar words; expository in rhetorical content and containing information that would be new to the participants to simulate reading in the academic context; and all from one source to ensure editorial consistency across the 8 texts.
- 6 After all protocol items were independently transcribed, I coded all word items using a coding scheme designed for this study. The coding categories for the type of decision process used in strategy selection were developed on the basis of the decision statements that occurred during piloting and are not mutually exclusive in that a protocol statement may have included two or more categories among the following: lack of knowledge of word meaning; previous familiarity; desire to verify word meaning; deliberate effort to learn L2 vocabulary; need [or lack of] for reading comprehension purposes, communication strategy of avoidance. As well, whether participants monitored the outcome of their strategy use was coded (Yes/No) along with a description of the type of monitoring, either an evaluation of the outcome of use of a selected LPS or explicit adaptation of meaning determined through LPS use to the text context. To verify reliability in coding, a second independent rater coded 25% of the data. The percentages of complete inter-rater agreement were 89% for LPS Use, 75% for type of decision process in LPS selection, 85% for monitoring of outcomes.
- 7 The reader should note that since the goal of this vocabulary learning measure was to track retention associated with LPS use, the rating of participant's learning of a word was based on the meaning determined by the participant in their initial LPS use, not a standard meaning of the word. For example, through LPS use one participant determined that "sights" meant *taille* (i.e., size), and subsequently, in the cued recall task supplied the translation *taille* to the prompt "sights"; when scored, she was awarded a score of 1 (meaning recalled) even though the meaning determined was incorrect.

Bibliography

- Adamson, B.D. 1990. "ESL students' use of academic skills in content courses." *English For Special Purposes*, 9, pp. 67-87.
- Bensoussan, M., D. Sim and R. Weiss. 1984. "The effect of dictionary usage on EFL test performance compared with student and teacher attitudes and expectations." *Reading in a Foreign Language*, 2, pp. 262-276.
- Block, E. 1992. "See how they read: Comprehension monitoring of L1 and L2 learners." *TESOL Quarterly*, 26, pp. 319-343.

- Carrell, P., J. Devine and D. Eskey (eds.). 1988. *Interactive Approaches to Second Language Reading*. Cambridge: Cambridge University Press.
- Craik, F.I.M. and R.S. Lockhart. 1972. "Levels of processing: A framework for memory research." *Journal of Verbal Learning and Verbal Behaviour*. 11. pp. 671-684.
- Dubin, F., D. Eskey and W. Grabe (eds.). 1986. *Teaching Second Language Reading for Academic Purposes*. Reading, MA: Addison-Wesley Publishing.
- Ellis, N.C. 1994. "Consciousness in second language learning: Psychological perspectives on the role of conscious processes in vocabulary acquisition." *AILA Review*. 11. pp. 37-56.
- Ellis, N.C. and A. Beaton. 1993. "Factors affecting the learning of foreign language vocabulary: Imagery keyword mediators and phonological short-term memory." *The Quarterly Journal of Experimental Psychology*. 46A. pp. 533-558.
- Ellis, N.C. and S.G. Sinclair, 1996. "Working memory in the acquisition of vocabulary and syntax: Putting language in good order." *The Quarterly Journal of Experimental Psychology*. 49A. pp. 234-250.
- Fraser, C.A. 1997. "The impact of lexical processing strategy instruction on L2 readers' strategy use, reading rate, reading comprehension and vocabulary learning." Unpublished doctoral dissertation. University of Toronto (OISE), Toronto, Ontario.
- Fraser, C.A. 1999. "Lexical processing strategy use and vocabulary learning." *Studies in Second Language Acquisition*, 21. pp. 225-241.
- Goodman, K. 1970. "Behind the eye: What happens in reading." In K.S. Goodman and O.S. Niles (eds.). *Reading: Process and Program*. Urbana, IL: National Council of Teachers of English. pp. 3-38.
- Hastrup, K. 1989. "The learner as word processor." *AILA Review*. 6. pp. 34-46.
- Hosenfeld, C. 1977. "A preliminary investigation of the reading strategies of successful and unsuccessful second language learners." *System*, 5, pp. 110-123.
- Hulstijn, J.H. 1993. "When do foreign-language readers look up the meaning of unfamiliar words? The influence of task and learner variables." *The Modern Language Journal*. 77, pp. 139-147.
- Hulstijn, J.H., M. Hollander and T. Greidanus. 1996. "Incident vocabulary learning by advanced foreign language students: The influence of marginal glosses, dictionary use, and reoccurrence of unknown words." *The Modern Language Journal*, 80. pp. 327-339.
- Knight, S. 1994. "Dictionary use while reading: The effects on comprehension and vocabulary acquisition for students of different verbal abilities." *The Modern Language Journal*, 78, pp. 286-298.
- Laberge, D. and S.J. Samuels. 1974. "Toward a theory of automatic information processing in reading." *Cognitive Psychology*, 6, pp. 293-323.
- Lupescu, S. and R.R. Day. 1993. "Reading dictionaries and vocabulary learning." *Language Learning*, 43, pp. 263-287.
- Mondria, J.-A. and M. Wit-De Boer. 1991. "The effects of contextual richness on the guessability and the retention of words in foreign language." *Applied Linguistics*, 12, pp. 249-267.
- Nesi, H. and P. Meara. 1994. "Patterns of misinterpretation in the productive use of ESL dictionary definitions." *Systems*, 22. pp. 1-15.

Nist, S.L. and S. Olejnik. 1995. "The role of context and dictionary definitions on varying levels of word knowledge." *Reading Research Quarterly*, 30, pp. 172-193.

Paribakht, T.S. and M. Wesche. 1993. "Reading comprehension and second language development in a comprehension-based ESL program." *TESL Canada Journal*, 11, pp. 9-29.

Rumelhart, D. 1977. 'Toward an interactive model of reading:' In S. Dornic (ed.), *Attention and performance VI*. Hillsdale, NJ: Erlbaum, pp. 573-603.

Schouten-van Parreren, C. 1989. "Vocabulary learning through reading: Which conditions should be met when presenting words in texts?" *AILA Review*, 6, pp. 75-85.

Watanabe, Y. 1997. "Input, intake, and retention: Effects of increased processing on incidental learning of foreign language vocabulary." *Studies in Second Language Acquisition*, 19, pp. 287-307.

Wesche, M. and T.S. Paribakht. 1996. "Assessing vocabulary knowledge: Depth versus breadth." *The Canadian Modern Language Review*, 53, pp. 13-40.