



ANGLES ON THE ENGLISH-SPEAKING WORLD

ANGLES
Volume 4 2004



MTP
Museum Tusulanum Press
University of Copenhagen



ISBN 87-7289-932-8

SECOND LANGUAGE READING AND INCIDENTAL VOCABULARY LEARNING

ROB WARING AND PAUL NATION

ABSTRACT

This article reviews the current state of knowledge regarding the relationship between second language reading and incidental vocabulary acquisition. The review shows that the picture we have built up over the years of incidental vocabulary acquisition is less clear than we once thought. Recent research shows that our previous data does not fully show how well vocabulary is retained after reading, nor how the type of test used to gather learning data can be dramatically affected by the type of test used. The paper concludes with some implications for pedagogy and future research.

Introduction

The notion that we could learn a lot, or most, of our vocabulary through reading, or more particularly comprehensible written input, is now entrenched within second and foreign language teaching. This paper will review what we know about the relationship between reading in a foreign language and vocabulary acquisition. We shall then look at the implications for teaching and research.

What do we know about the relationship between vocabulary and reading in second languages?

In recent years we have learned a lot about the relationship between vocabulary learning and reading. For example, we have learned something about how many words we need to know in order to read effectively in a foreign language; the rate of vocabulary uptake and decay from reading; the number of meetings it takes to learn a word; and the retention of recently learned words. We will review each of these in turn.

The most striking examples of the positive effects of extensive reading come from the 'Book Flood' studies (Elley, 1991). These involved spending a large proportion of the English programme on extensive reading where learners chose from a wide range of interesting texts. The Fiji book flood study (Elley and Mangubhai, 1981) lasted eight months and brought about dramatic improvements in a wide range of language skills including reading comprehension, knowledge of grammatical structures, word recognition, oral repetition, and writing. Unfortunately, this study did not include a

measure of vocabulary growth, but it is clear that the improvement on the various measures used could not have occurred without substantial vocabulary growth. Elley (1991: 378-379) saw the success of the book flood being due to five factors.

- 1 Extensive input of meaningful print.
- 2 Incidental learning.
- 3 The integration of oral and written activity.
- 4 Focus on meaning rather than form.
- 5 High intrinsic motivation.

It is likely that these same factors will be important in an extensive reading programme with vocabulary learning goals.

What coverage rate is needed to be able to read pleasurablely?

Lauter (1989) and Liu and Nation (1985) have shown that unless there is at least 95% or higher coverage rate (the percentage of the vocabulary that is known by the reader) of the running words in a text, the probability of successful guessing of unknown words will be severely reduced. Hu and Nation (2001) suggest it should be at least 98%. This was determined by using several texts with different unknown word rates and by measuring adequate comprehension. No subject reported adequate comprehension of text with only 80% coverage rate, but at 90% and 95% coverage a few did, and only at the 98% level did most subjects gain adequate comprehension. Carver (1994) suggests a similar figure of 98-99% for native speakers for reading to be pleasurable. Coverage rate and vocabulary size are closely related and so we will now look at how large a vocabulary is needed to reach these high coverage rates.

How many words do we need to know in order to read effectively in a foreign language?

Most studies in this area have looked at the learning of English but some have looked at other languages (e.g. Oslyn and Godin 1985 looked at Dutch). Laufer (1992) has suggested that a vocabulary of 3000 word families of general English is enough for a good understanding of a general English text such as a novel. Other estimates have been as high as 5000 word families (Hirsh and Nation 1992) as an adequate level for pleasure reading.

The number of words needed for the reading of technical texts such as science texts, or newspapers is larger than for less formal texts. There are several reasons for this. Firstly, there are higher proportions of academic and technical words in formal informative writing. Chung and Nation (2003)

found that 38% of the running words in an anatomy text and 17% of the words in an applied linguistics text were technical words. Some of these words were drawn from the high frequency and academic vocabulary, but more were from what would in other texts be considered low frequency words. Secondly, because of the heavy cognitive demands of formal texts, a higher text coverage is likely to be needed. Where the text content is important we are less tolerant of unknown words. Thirdly, if formal reading is for academic purposes, then several subject areas and topics are likely to be covered. The more diverse the range of subjects and topics, the much larger the vocabulary required (Sutarsyah, Nation and Kennedy 1994).

In an extensive reading programme for elementary and intermediate foreign or second language learners, graded readers need to play an important role (Day and Bamford 1998, Hill 1997). This is because the various levels of graded readers provide ideal vocabulary coverage conditions for a range of levels of achievement within the elementary and intermediate levels. These readers cover the 300 to 3000 word vocabulary range. Because graded readers are controlled or simplified material, some teachers and researchers feel that they are not adequate models for language learners. This is a mistaken view because readers can only process text fluently at or near their own ability level. If a text contains too many unknown words, the reader must process the text intensively and slowly which changes the reading into a study activity rather than a fluency building one. Thus, without graded readers, elementary and intermediate learners would not be able to do extensive reading at the proper vocabulary levels (Nation and Deweerd 2001) and a very important means of reading skill development, language consolidation and vocabulary learning would not be available to them. Corpus research on the conditions for vocabulary learning provided by graded readers (Nation and Wang 1999) provides useful guidelines on how to use such readers and suggests that the levels of some of the many graded reading schemes could be usefully redesigned. In spite of these minor shortcomings, graded readers provide an enormously helpful resource for the development of reading skills, vocabulary growth and other associated benefits for language learners.

At what rate can learners learn new words from their reading?

The most basic question is whether learners can learn from reading at all. Clearly they can, as the millions of learners who have learned English from text books and natural reading can attest. The common-sense notion that we can learn new words from reading has led some to suggest that conducting research to determine if learners can learn from their reading is

rather futile. Meara (1997) suggests this is like putting seeds in a pot only to confirm that they will grow into flowers.

While he is undoubtedly right that it will only confirm the obvious, this kind of research is important because it impacts on the pedagogical aspects of language learning and teaching. This type of research will help us understand the rate of uptake of new vocabulary, and how this affects the amount of reading that needs to be done. Moreover, it can provide us with data to determine the likelihood of a word being learnt and thus help us determine the appropriate balance of known versus unknown words in texts so that we can maximize the likelihood of uptake. Secondly, it provides us with data that can assist us in comparisons with data from other vocabulary

Table 1. A representative sample of often cited studies of vocabulary growth from reading in a foreign language (adapted from Waring and Takaki 2003)

Study	Population	Exposure	Materials read	Type of test used	Vocabulary gains
Pitts, White and Krashen (1989) Experiment 1	35 ESL learners	6700 words	2 chapters of Clockwork Orange with 123 madat words	Multiple-choice test	6.4%
Pitts, White and Krashen (1989) Experiment 2	16 ESL learners	6700 words	2 chapters of Clockwork Orange plus 2 scenes of the video	Multiple-choice	8.1%
Day, Omura and Hiramatsu (1991)	92 High school EFL learners and 200 university EFL learners	1032 words	Short story	Multiple-choice	5.8%
Dupuy and Krashen (1993)	42 ESL learners	15 page of text	French text plus watched a video	Multiple-choice	25% of the words the controls did not know
Hulstijn (1992)	65 EFL learners	907 words	Advertisement in Dutch	State the meaning of 12 words	17.6%
Horst, Cobb and Meara (1998)	34 EFL learners	21,232 words	Simplified version of novel, The Mayor of Castleridge	Multiple-choice and a word association test	20.0% of the MC test items and 16% of the word associations
Zahar, Cobb and Spada (1999)	144 ESL	2383 words	Short novel The Golden Fleece		7.8%

learning methods to find ways of combining effective methods of teaching and learning for a given goal. For example, from a vocabulary learning perspective we can see where reading can best benefit the learner and where it does not. We can determine whether it is better to just read a text to pick up the vocabulary, or learn the vocabulary from text first before reading. Thirdly, these data can also help us predict what the learners will be able to learn in a given time and with a given effort, which has implications for curriculum, syllabus and lesson design.

There have been quite a number of studies which have looked at how much vocabulary is learned from reading in a foreign language. Representative examples include, Day, Omura and Hiramatsu (1991); Dupuy and Krashen (1993); Grabe and Stoller (1997); Horst, Cobb and Meara (1998); Mason and Krashen (1997) and Pitts, White and Krashen, (1989) among a long list of others. Table 1 has a sample of some of the more commonly cited research that has looked at the amount of vocabulary learned from reading in a foreign language.

The general picture from these studies shows that learners do learn vocabulary from their reading, which is of course both encouraging and to be expected. On average, the returns are somewhat low. It seems that of the items tested about one tenth of the target words will be learned. These data, of course, do not cover any other words that were met in the texts that were not tested.

One of the most striking things about Table 1 is that the results differ quite widely. We have rates as high as 25% and as low as 5.8%. What are the reasons for this? Part of the answer lies in the words that were tested. If a word was met only once, there is a much less likelihood that it would be learned compared to one that had been met often. Obviously not all the words in the studies were met the same number of times and each study could have had a different ratio of frequently met items compared to the number of items met only once.

Moreover, some of the words would have been concrete and thus easier to learn whereas others were more abstract and probably harder to learn. Whether a word has been learned or not depends a lot on what one considers learning to be, and defining the 'learning' of a word is no easy task. For example, we can broadly assume that there are two levels, or stages, of word learning. The form-meaning relationship is the first of these which involves matching the spelling of a word with its meaning. The second one refers to the additional knowledge of a word that a learner will need in order to have full command of it. This 'deeper' knowledge may include its inflections and derivations, the shades of meanings of the word, its collocations or

colligations, and the knowledge of its restrictions of use, whether it is formal or informal, pejorative or not, its frequency of use, whether it is more common in speech or written text and so on.

Another part of the answer related to this is the type of test used. Not all the tests used in these studies were of the same type. Research trying to ascertain the rate new vocabulary is learned from reading must be answered in specific terms. It is clearly very difficult to ascertain the level of knowledge of all aspects of word knowledge and so typically vocabulary gains from reading are assessed by form-meaning type tests such as multiple-choice or translation tests that assess only the first level of word knowledge. While this is certainly of value, it understates the importance of other types of word knowledge and possibly overstates the importance of the form-meaning relationship type of word learning when conducting incidental reading research.

Data from Waring and Takaki (2003) suggest that the type of test used can greatly affect the results one will obtain. A variety of measures are needed including what are called sensitive tests (Nation, 2001: 358-361). Waring and Takaki used three types of test to see if there were any major differences. The first test was a simple sight recognition test ('Have you seen this word in the text, yes or no') where meaning was not needed to answer the question. The second test was a standard multiple-choice test of the words with the three distractors from different semantic fields. The third test was a translation test whereby the target word was required to be translated into the L1 (receptive recall of the meaning).

Their results show clearly that the type of test can greatly affect the amount of words considered to be learned. The sight recognition test produced the higher scores (15.3 of the 25 target words (61%) were recognized), the multiple choice test the next highest (10.6/25 or 42.4%) and then the translation test the lowest (4.6/25 or 18.4%) on the immediate post test. Using several tests presents a fuller picture of learning and in future work of this kind it will be important to collect data from more than one type of test so that we can better understand what is going on when learners read.

A third reason for the variations between learning uptake rates would be differences in the rate at which learners are able to take on board new information from the texts used in the experiments. If a text had been inordinately difficult (for example where the coverage rate was too low), it would have made the working out of the meaning of unknown words, and the comprehension of the text, that much harder.

Waring and Takaki's (2003) figures show that incidental vocabulary learning from reading is occurring at several levels. Their translation test is

the most demanding test requiring unassisted recall of a word meaning. This is clearly a desirable state of knowledge, but the incidental learning of vocabulary is best considered as a cumulative process where learners build up knowledge of a word through repeated encounters over a reasonable period of time. Thus being able to choose an appropriate meaning from a list of plausible choices as in the multiple-choice test shows that at least some knowledge of form and meaning has been retained even though in many cases it may not be enough for unassisted recall. Further meetings will strengthen this knowledge. Similarly, the ability to recognize which words occurred in the text and which did not indicates that some familiarity with the form of a word has been achieved. This is an important step in vocabulary learning and there is some evidence that learning to accurately recognise the form of a word is quite a substantial undertaking. Once a form is familiar, working out what it means is the next obvious step.

Thus in research on incidental learning from reading, the use of several tests is necessary to gain a more accurate and balanced picture of learning. There is no one best way to test learning. Each test reveals another facet of information about the kinds of learning that can take place.

The number of times we need to meet a word to learn it from reading
 Guessing a word from context and remembering it are two different things. In studies of incidental vocabulary learning, it is thus important to see what conditions help learning. The subjects in the Saragi, Nation and Meister (1978) study learned 93% of the words that had been presented to them six times or more but words presented to learners fewer than six times were learned only by half their subjects. Jenkins, Stein and Wysocki (1984) discovered that only about 25% of their learners had learned a word after 10 meetings. Nagy, Herman and Anderson (1985) showed that the likelihood that a word would be learned after one meeting was 0.15. Swanson and Glopper (1999) in a meta-analysis of 20 incidental learning experiments in L1 generalized that the chances of an unknown word being learned were also about 15%. In other words, only one in seven of the target words were likely to be learned in one meeting. In a replication experiment, however, Herman, Anderson, Pearson and Nagy (1987) only found a rate of .05 (1 in 20) for authentic texts. Rott (1999) also concluded that six encounters was an adequate number. Other studies (Waring and Takaki 2003) have shown the value of higher repetition rates. Zahar, Cobb and Spada (2001) found that weaker learners needed more encounters to learn a word than more proficient learners. This seems to fit the maxim that the more you know, the easier it is to learn. The exact rate of this would need to be identified empirically as well.

How well is the learning retained?

One aspect of this incidental learning which is not often examined is how well the words are retained over time. Such data can provide us with insights into how fragile the learning is and thus reflect real life situations more accurately. Nation and Wang (1999) in a corpus study of graded readers calculated that in order for learners to gain enough repetitions to ensure secure learning, they would have to read at least one graded reader every week.

The Waring and Takaki (2003) experiment used 15 subjects to examine how many words of varying frequencies of occurrence rates were learned and retained from the reading of one graded reader – *A Little Princess*. Through an analysis of the target text they identified 25 target items of varying frequency levels (from those occurring 15 to 18 times to those appearing only once). The spelling of each word was changed to resemble an imaginary nonce word to ensure that each test item was unknown. Three test types were administered over three testing periods – immediate post test, one month later and three months later.

An analysis of the rate of learning depending on the frequency of occurrence showed that words that had been met more frequently were more likely to be learned and were more resistant to decay. The average scores after three months dropped from 61% to 33.6% on the form recognition test, from 42.4% to 24.4% on the multiple choice test and from 18.4% to 3.6% on the translation test. The data suggest that, on average, the meaning of only one of the 25 items on the translation test will be remembered after three months (or about a 4% uptake). A deeper analysis of the scores shows that the meaning of none of the items that were met fewer than eight times will be remembered three months later as measured by the translation test. The biggest drop was on the translation test that assessed unprompted recall. This suggests that the word meaning knowledge decays faster than that of simple word form recognition.

This research thus questions the data already presented above on the rate of uptake as no retention data are given to illuminate the decay rates. These findings have direct implications also for the number of times it takes to learn a word. Above we stated that it was about between 6 to 10 meetings, but none of this research had decay data. An extrapolation from the findings in Waring and Takaki suggests that these should be considerably raised to account for knowledge decay. This figure might need to be raised to 20 meetings or more if we take retention beyond the immediate post test as our criterion for learning. Clearly, from a pedagogical point of view, this implies that an effective reading programme which has included vocabulary learning

as one of its goals, must provide for repeated encounters with the same words over reasonably short time periods.

Implications

The findings on coverage, repetition, and decay have direct implications for language teaching and learning. These implications will be broken into two groups – those affecting pedagogy and those affecting research issues.

Implications for pedagogy

One implication from the above is that readers must be exposed to text that is accessible if they wish to read and learn with ease. There is clearly a threshold at which learners are able to take advantage of being exposed to text. This was hinted at in several pieces of research (e.g. Laufer-Dvorkin, 1991; Lai, 1993). If the text is too difficult then little learning can take place – especially if the known coverage rate is lower than 98%. Moreover, the 'guessing from context' research also suggests that unless the reading is done at a high level of vocabulary coverage, little learning will take place.

The data here also confirm the need to provide materials at the right instructional levels both for intensive and extensive reading. The rate of uptake data seem to confirm Nation's contention (2001: 150) that there are three levels of instruction regarding the coverage rate of known versus unknown words. Nation suggests that the appropriate text coverage level for intensive reading (i.e. involving the direct learning of new language features) can be less than 95%. However, for extensive reading with the aim of language growth, the rate should be between 95-98%. For extensive reading for fluency improvement it should be 99-100%.

Moreover, if the aim of the reading task is to increase language knowledge, imposing a text on learners of different ability levels for the purpose of pleasure reading is likely to lead to frustration on the part of some learners. This is because some learners will be able to easily handle the text and get something from it, while others will be swamped with new language and learn nothing. If the text is too difficult, the weaker subjects will not be able to guess successfully and the advanced ones will be limited by knowing most of the words anyway and thus will meet fewer unknown words and structures. Thus an extensive reading program of learner self-selected reading where learners read at their own comfortable reading rate with material at an appropriate level is important for incidental vocabulary learning. An effective extensive reading programme needs to engage the learners to get their sustained attention, needs to encourage large quantities of reading to get adequate vocabulary repetition, and needs to provide texts

at the right coverage levels to allow unknown vocabulary to be adequately dealt with.

Even with this adjustment to current knowledge, does this imply that reading is the best way to learn vocabulary? A number of researchers suggest that reading is the key. Stephen Krashen is probably the most famous proponent of the need for reading and especially Sustained Silent Reading, Pleasure Reading and Extensive Reading. Krashen has stated that:

Reading is good for you. The research supports a stronger conclusion, however. Reading is the only way, the only way we become good readers, develop a good writing style, an adequate vocabulary, advanced grammar, and the only way we become good spellers.

(Krashen 1993:23)

There is no doubt that reading a lot can contribute to our reading ability, our writing style and can help build our vocabulary and aid our spelling. No one would suggest that the *only* thing one should do to be good at a foreign language would be to read. However, Krashen comes close to saying this. Krashen's claim suggests that reading is a very effective way of building up a lot of one's language competence. But his claim goes further than that. It suggests that all other methods of vocabulary learning are less effective, or less useful than simply just reading. While few people voice such an extreme view, there are numerous others who support the notion that 'simply reading' is an extremely beneficial way of learning vocabulary.

How true is this? In order to find out, we need to look beyond only reading to master an 'adequate vocabulary' (presumably Krashen is referring to receptive recognition vocabulary only), and look closely at other methods of vocabulary learning to see how effective they are. Hulstijn (1988) investigated the amount of vocabulary learned from reading only versus reading plus additional vocabulary activities. His study concluded that reading should be supplemented by other activities. Zahar, Cobb and Spada (1999) concur suggesting that intentional learning should supplement the reading as it is a more effective way of learning words. All studies comparing incidental with intentional learning show that intentional learning is more efficient and effective. This should not be seen as a competition between incidental and intentional learning. Rather, a well balanced language programme should make good use of both types of learning. One without the other is inadequate.

Most research data we have looked at suggest that learners will learn about 3-6 words per hour of reading. If we assume that a student in school

has 3-4 hours of exposure to English each week for 40 weeks a year, and one third of that is reading, this totals about 50 hours of reading per year, or vocabulary growth of between 150 to 300 words per year, not counting natural forgetting from the reading alone. Of course different programs will have different learning rates and these figures would have to be amended as such. Clearly then a program heavily emphasizing an input heavy approach would have to demonstrate considerable gains to be a valid main strategy. Learners would benefit from some combination of direct intentional study to build a larger vocabulary. This would have to be accompanied by adequate reading at the right level and in the right amounts to consolidate and enrich the vocabulary learned from direct learning.

Implications for research

We hope that more researchers will adopt a multi-test format in future research to provide a richer picture of the types of word knowledge that learners can gain. For example, it would be instructive to see how well learners can pick up a word's spelling, its collocations, its derivatives and so on. Similar research also needs to be done on the rate of acquisition of multi-word units. Moreover, we hope that these researchers will also obtain decay data to provide a clearer picture of the actual learning that has taken place.

Recent research on incidental vocabulary learning through extensive reading has shown that it can be a major source of learning, providing it is part of a substantial and sustained reading programme. Vocabulary learning is also helped by the direct learning and teaching of vocabulary, by the need to use vocabulary in speaking and writing, and by opportunities to become fluent with vocabulary across the skills of listening, speaking, reading and writing. It is thus important to see incidental vocabulary learning through extensive reading in this wider context. The important question is not 'Which way of learning vocabulary is the best?' but 'How can the various ways of learning vocabulary be used to help each other and provide optimal vocabulary growth?'. Incidental vocabulary learning through reading is an important and effective part of this balance. The very informative recent research and descriptions of good practice have provided useful guidelines for setting up reading programmes to help this learning. The present major challenge is to get teachers to put these guidelines into practice.

References

- Arnaud, P.J.L. and Béjoint, H. (1992) *Vocabulary and Applied Linguistics*, Macmillan: London.
- Carver, R.P. (1994) 'Percentage of Unknown Vocabulary Words in Text as a Function of the Relative Difficulty of the Text: Implications for Instruction', *Journal of Reading Behavior*, 26, 4, 413-437.
- Chung, T. and Nation, I.S.P. (2003) 'Technical Vocabulary in Specialised Texts', *Reading in a Foreign Language*, 15, 2, 103-116. <http://nhfchawaii.edu/fhl>
- Day, R.R. and Bamford, J. (1998) *Extensive Reading in the Second Language Classroom*, Cambridge University Press: Cambridge.
- Day, R. R., Omura, C., and Hiramatsu, M. (1991) 'Incidental EFL Vocabulary Learning and Reading', *Reading in a Foreign Language*, 7, 2, 541-551.
- Dupuy, B. and Krashen, S.D. (1993) 'Incidental Vocabulary Acquisition in French as a Foreign Language', *Applied Language Learning*, 4, 1 and 2, 55-63.
- Elley, W. B. (1991) 'Acquiring Literacy in a Second Language: the Effect of Book-Based Programs', *Language Learning*, 41, 3, 375-411.
- Elley, W. B. and Mangubhai, F. (1981a) *The Impact of a Book Flood in Fiji Primary Schools*, NZCER: Wellington.
- Elley, W. B. and Mangubhai, F. (1981b) 'The Long-term Effects of a Book Flood on Children's Language Growth', *Directions*, 7, 15-24.
- Grabe, W. and Stoller, F. (1997) 'Reading and Vocabulary Development in a Second Language: a Case Study', in Coady and Huckin, *Second Language Vocabulary Acquisition*, 98-122, Cambridge University Press: Cambridge.
- Herman, P.A., Anderson, R.C., Pearson, P.D., Nagy, W.E. (1987) 'Incidental Acquisition of Word Meaning from Expositions with Varied Text Features', *Reading Research Quarterly*, 22, 3, 263-284.
- Hill, D.R. (1997) 'Survey Review: Graded Readers', *ELT Journal*, 51, 1, 57-81.
- Hirsh, D. and Nation, P. (1992) 'What Vocabulary Size is Needed to Read Unimplified Texts for Pleasure?', *Reading in a Foreign Language*, 8, 2, 689-696.
- Horst, M., Cobb, T., and Meara, P. (1998) 'Beyond a Clockwork Orange: Acquiring Second Language Vocabulary through Reading', *Reading in a Foreign Language*, 11, 2, 207-223.
- Huah-chao, M.H. and Nation, I.S.P. (2001) 'Unknown Vocabulary Density and Reading Comprehension', *Reading in a Foreign Language*, 13, 1, 403-430.
- Hulstijn, J.H. (1992) 'Retention of Inferred and Given Word Meanings: Experiments in Incidental Vocabulary Learning', in P. Arnaud and H. Béjoint, 113-125.
- Hulstijn, J.H. (1998) 'Experiments with Semi-Artificial Input in Second Language Acquisition Research', in B. Hammarberg (ed.), *Language Learning and Learner Language*, 8, 28-40. Papers from a Conference held in Stockholm and Åbo 17-18 October, 1988. Scandinavian Working Papers on Bilingualism (issued from the Centre for Research on Bilingualism: University of Stockholm).
- Jenkins, J.R., Stein, M.L. and Wyszocki, K. (1984) 'Learning Vocabulary through Reading', *American Educational Research Journal*, 21, 4, 767-787.
- Krashen, S. (1993) *The Power of Reading. Insights from the Research*, Englewood, Co.: Libraries Unlimited.
- Lai, F. (1993) 'The Effect of a Summer Reading Course on Reading and Writing Skills', *System*, 21, 1, 87-100.
- Lauter, B. (1992) 'How much Lexis is Necessary for Reading Comprehension?', in P. Arnaud and H. Béjoint, 126-132.
- Lauter, B. (1989) 'What Percentage of Text-Lexis is Essential for Comprehension?', in C. Lauren and M. Nordman (eds.), *Special Language: From Humans Thinking to Thinking Machines*, Multilingual Matters: Clevedon.
- Lauter-Dvorkin, B. (1991) *Similar Lexical Forms in Interlanguage*, Gunter Narr Verlag Tübingen: Tübingen.
- Liu Na and Nation, I.S.P. (1985) 'Factors Affecting Guessing Vocabulary in Context', *REL C Journal*, 16, 1, 33-42.
- Mason, B. and Krashen, S. (1997) 'Extensive Reading in English as a Foreign Language', *System*, 25, 1, 91-102.
- Meara, P. (1997) 'Towards a New Approach to Modelling Vocabulary Acquisition', in Schmitt and McCarthy, 109-121.
- Nagy, W. E., Herman, P., and Anderson, R. C. (1985) 'Learning Words from Context', *Reading Research Quarterly*, 20, 233-253.
- Nation, I.S.P. (2001) *Learning Vocabulary in Another Language*, Cambridge University Press: Cambridge.
- Nation, I.S.P. and Deweerd, J. (2001) 'A Defence of Simplification', *Prospect*, 16, 3, 55-67.
- Nation, P. and Wang, K. (1999) 'Graded Readers and Vocabulary', *Reading in a Foreign Language*, 12, 2, 355-380.
- Osburn, P. and Godin, P. (1985) 'RALEX: an Alternative Approach to Language Teaching', *Modern Language Journal*, 69, 4, 346-355.
- Pitts, M., White, H., and Krashen, S. (1989) 'Acquiring Second Language Vocabulary through Reading: a Replication of the Clockwork Orange Study Using Second Language Acquirers', *Reading in a Foreign Language*, 5, 2, 271-275.
- Rott, S. (1999) 'The Effect of Exposure Frequency on Intermediate Language Learners' Incidental Vocabulary Acquisition through Reading', *Studies in Second Language Acquisition*, 21, 1, 589-619.
- Saragi, T., Nation, I. S. P., and Meister, G. F. (1978) 'Vocabulary Learning and Reading', *System*, 6, 2, 72-78.
- Schmitt, N. and McCarthy, M. (eds) (1997) *Vocabulary: Description, Acquisition and Pedagogy*, Cambridge University Press: Cambridge.
- Sutarsyah, C., Nation, P. and Kennedy, G. (1994) 'How Useful is EAP Vocabulary for ESP? A Corpus Based Study', *REL C Journal*, 25, 2, 34-50.
- Swanborn, M.S.L. and de Glopper, K. (1999) 'Incidental Word Learning while

- Reading: a Meta-Analysis', *Review of Educational Research*, 69, 3, 261-285.
- Waring, R. and Takaki, M. (2003) 'At What Rate Do Learners Learn and Retain New Vocabulary from Reading a Graded Reader?', *Reading in a Foreign Language*, 15, 2, 130-163.
- Zahar, R., Cobb, T. and Spada, N. (2001) 'Acquiring Vocabulary through Reading: Effects of Frequency and Contextual richness', *Canadian Modern Language Review*, 57, 3, 541-572.