Vocabulary size and type goals in advanced EFL and ESL classrooms

A review of research on lexical threshold, lexical coverage, reading and listening comprehension

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Abstract

This paper examines how research on lexical threshold and lexical coverage relates to L2 proficiency in reading and listening comprehension, and how this in turn will impact what types of vocabulary should be taught in advanced ESL and EFL classrooms.

The research reviewed contains estimations of how much English vocabulary L2 users need in order to do certain things in English, such as reading a novel, watching a movie or understanding everyday conversations. The results indicate that to reach lexical coverage of 98 percent, which is necessary to gain an adequate reading comprehension, a vocabulary size of 8,000-9,000 word families is needed, whereas around 5,000 word families may suffice if the expected level of comprehension is lowered to 95 percent lexical coverage. However, the lexical threshold is ultimately dependent on the expected level of comprehension. The vocabulary size needed to understand spoken English is considerably lower than that needed to understand written English.

In order to attain the needed amount of vocabulary, it seems that the traditional vocabulary type teaching, focusing on high-frequency words and the Academic Word List, is no longer sufficient. Rather, more pedagogical focus should be placed on mid-frequency vocabulary, which has previously been overlooked.

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1 Introduction

Researchers agree that vocabulary size and type are very important as a measurement of second language (L2) proficiency (Nation 2006; Nation 2011; Hyland & Tse 2007; Stæhr 2008; Schmitt 2008; Schmitt & Schmitt 2012). The correlation is generally measured through reading or listening comprehension, though some research also measures participation in communication and writing ability. A clear positive correlation between vocabulary size and language proficiency has been established (e.g. Nation 2006; Stæhr 2008; Laufer & Ravenhorst-Kalovski). When readers can focus on the meaning of a text instead of the meaning of specific words it reduces the cognitive load. This allows them to engage in higher level reading processes, which in turn yields better reading comprehension (Laufer & Ravenhorst-Kalovski 2010). Also, L2 fluency increases alongside an enlarged and deepened vocabulary acquisition (Laufer & Nation 2001). However, there is conflicting evidence with regard to the size and type of vocabulary needed in order to reach adequate comprehension.

Nation (2006) claims that in order to reach this goal, a L2 user needs to understand 98 percent of a written or spoken text, whereas Laufer and Ravenhorst-Kalovski (2010) claim that understanding 95 percent is sufficient. Further, there is a debate in the research community concerning the pedagogical value of using vocabulary type lists, such as the Academic Word List (Coxhead 2000). Nation (2011) thinks it is a highly relevant teaching aid and a fine pedagogical tool, while Hyland and Tse (2007) question the very notion of an 'academic vocabulary". Knowledge of what vocabulary size and type can be processed by learners is essential for all those involved in planning, executing and participating in L2 instruction. Knowing how much vocabulary to learn in order to understand and participate in English speaking environments, be it for recreational purposes or academic studies, is also vital for L2 users of English. However, Nation (2011) cautions that there are often gaps between research findings and actual L2 teaching application.

A review of recent literature is thus needed in order to show the extent of the conflicts mentioned above and give direction to those involved in L2 instruction, as well as to point out areas of interest for further research. The studies accounted for in this paper examines how much and what type of vocabulary is needed in order to do a variety of things English, e.g. partake in general communication, watch movies, read books or attend academic courses. The focus of this review is on receptive vocabulary size and what types of vocabulary that will best serve the vocabulary size goals needed in order to reach adequate reading and listening comprehension.

2 Vocabulary: preliminaries

2.1 How much vocabulary do English L2 users need to know?

The English language is known for its vast vocabulary, and one of the most prompting questions for ESL and EFL learners are how much vocabulary they need to learn. Nation and Waring (1997) pose three questions in order to answer that question: How many words are there in English, how many words do native speakers know, and how many words are needed to do the things a language user needs to do. The first two questions have no absolute answers, but calculations have shown that the English language consists of about 88,000-114,000 word families (Nation 2006, p.59). However, very few native speakers know even half of these, and even fewer use them in daily life. Instead, the vocabulary of native English speakers is estimated to grow with approximately 1000 word families per year in childhood, and a university graduate is estimated to have a vocabulary size of about 20,000 word families (Nation 2006, p. 60; Milton 2010, p. 220). However, reaching the same proficiency as a native speaker hardly seems a reasonable goal for those who study English as a foreign language (EFL), but perhaps not as unreasonable for those who learn English as a second language (ESL). The role model of the native speaker in both ESL and EFL classrooms is slowly diminishing, possibly because there are more people who use English on a daily basis who are L2 speakers than native speakers. A more reasonable goal for those who learn English as a foreign language is the pragmatic third question: how many words are needed to do the things a language user needs to do? So, what do L2 users need to do?

In many nations English is used in various domains (McKay 2002), even though it may not be recognized as an official language in most of them. Much of the global popular culture is produced in English speaking nations and the increase in global travelling and tourism depend on English as a common language to some extent. In addition, many international businesses have English as their corporate language and much of the higher education around the globe is entirely or partially conducted in English (McKay 2002, p. 45). This clearly indicates that reading and listening comprehension in English is important for many ESL and EFL learners, both for recreational, educational and work related purposes. To specify, it seems important that ESL and EFL learners can use English to partake in communication, in everyday situations as well as in corporate and academic discourse. In order to achieve this, ESL and EFL learners need a wide range of vocabulary.

It can further be debated whether English should be taught as a second language (ESL), as a foreign language (EFL) or as an international language (EIL). Instead of using these descriptions, it may be more helpful consider Cook's distinction between L2 learners and L2 users. As he sees it, an L2 learner is anyone who is learning a language other than their mother tongue, usually mainly in a classroom situation, whereas the term L2 user describes anyone who is learning a language "for real life purposes outside the classroom" (Cook 2008, p. 12). Due to the spread of the English language, and that the number of people who use English as an L2 now exceeds the number of people who use it as their first language (L1), this paper will apply the term L2 USER when speaking of people who are learning English.

2.2 Measuring vocabulary knowledge

When measuring vocabulary, there are four main aspects to consider: *size*, *depth*, *fluency* and *control*. First, when measuring *size*, one must begin by deciding what will count as a word. In current vocabulary research there are two common ways to count words. Either, words are counted as LEMMAS or as WORD FAMILIES. Lemmas consist of a head word and some of its most common inflections, and possible reduced forms. Examples of inflections are the plural, third person singular present tense, past tense, past participle, present partiticiple, comparative, superlative and possessive forms. Word families are larger units also categorized under a head word. They include all the forms of a lemma, as well as other closely related forms, e.g. affixes *-ly, -ness* and *un-* (Nation 2001, p. 8). Using lemmas or word families assumes that learners are familiar with how words are inflected and constructed in the language; when they see the word 'undoubtedly', they will see the prefix *un-*, the root word *doubt*, the inflection *-ed* and the suffix *-ly*, and be able to decipher the meaning from this information. The difference between word families and lemmas is that the lemmas are more transparent, and represent smaller units. Word families can sometimes become quite large, and research has not proved that knowing a head word necessarily means knowing all of its derived forms (Schmitt 2008, p. 332). Even though it is problematic in some aspects, researchers agree that using word families or lemmas is a better way to measure vocabulary than counting each word as a separate unit.

The second aspect of measuring vocabulary is *depth*; a standard is needed to determine what it means to know a word. Vocabulary size and depth can be difficult to separate, since testing one aspect will inevitably test the other and vocabulary depth can be

said to be a function of its size (as discussed in Milton 2010). However, in vocabulary research, a distinction is typically made between the two, and also between receptive (passive) and productive (active) vocabulary. Learners overall have larger receptive vocabularies than productive ones (Schmitt 2008, p. 345). Examples of receptive knowledge of a word is that you can distinguish a certain word in speech or text, that you know typical collocations and that you are able to understand a word in a variety of contexts. For it to be part of your productive vocabulary you would be able to pronounce it intelligibly, spell it correctly and put it into various syntactically correct sentences, where the difference nuances of the word are displayed (Nation 2001, pp. 28-29).

This brings us to the remaining aspects of vocabulary measurement, namely *fluency* and vocabulary *control*. How well does the learner know the vocabulary in question, can they access it 'quickly' and do they know in which contexts it fits and where it does not? All these aspects are of course interrelated. Laufer and Nation (2001) have shown that fluency and speed in a given frequency level only increased when the learners' vocabulary knowledge was far more advanced than the given frequency level (as cited in Laufer & Ravenhorst-Kalovski, 2010). There are many other facets of vocabulary measurement that needs to be taken into account, but the four aspects mentioned are foundational.

Vocabulary size is the easiest aspect to test. There are a few different vocabulary size tests available, e.g. the X-Lex developed by Milton and Meara, the Vocabulary Size Test developed by Nation and the Vocabulary Levels Test (VLT). In the research examined in this paper, the only test used by researchers to determine their participants' vocabulary size is the VLT. This test was originally designed by Nation in 1983, and later revised by Schmitt, Schmitt and Clapham in 2001. The VLT provides a vocabulary learning profile by assessing knowledge at five levels: the 2,000, 3,000, 5,000 and 10,000 frequency levels, as well as a section on academic vocabulary, based on the Academic Word List (Schmitt *et al* 2001). The vocabulary knowledge is tested by a selection of representative words (nouns, verbs and adjectives) from each of the five levels, where the test-takers are asked to match words to the correct descriptions.

3 Reading and listening comprehension, lexical threshold and vocabulary size

3.1 Introduction and terminology

The term LEXICAL THRESHOLD is defined by Laufer and Ravenhorst-Kalovski as "the minimal vocabulary that is necessary for 'adequate' reading comprehension" (2010, p. 15). Nation puts it more simply: "How much unknown vocabulary can be tolerated in a text before it interferes with comprehension?" (2006, p. 61). Researchers have long been trying to find the threshold level, both for written and spoken text. According to Laufer and Ravenhorst-Kalovski most of the recent research is rather convergent (2010, p. 18). The term ADEQUATE COMPREHENSION is ambiguous, since what is adequate depends on situation, expectations and level of proficiency. Adequate comprehension is sometimes used interchangeably with "reasonable" comprehension, but it is difficult to set a fixed definition on what is adequate or reasonable, since it will inevitably depend on the circumstances. In Nation's study (2006), adequate comprehension is defined as "full comprehension" or "unassisted comprehension", i.e. the lexis of a text does not take away focus from the message of a text, and the learner does not need access to dictionaries or other sources in order to understand that message. Laufer and Ravenhorst-Kalovski (2010) use two different definitions of adequate comprehension, which has lead them to propose two lexical thresholds, depending on which definition fits best for the intended learners.

In order to account for lexical thresholds researchers often use FREQUENCY LEVELS, which are based on corpus studies of how frequently words occur in the English language. These are comprised of 1,000 band levels of word families, with the first 1,000 band being the most frequent, and then progressing. The first two 1,000 bands are generally referred to as high-frequency vocabulary. High-frequency vocabulary provides a LEXICAL COVERAGE of around 80% of written and spoken text (Nation 2006, p. 79), i.e. if that amount of vocabulary is known to the reader, then that will cover around 80% of the vocabulary in any given text. This has traditionally made high frequency vocabulary the main learning goal for L2 users of English. In the coming sections, a few of the most recent studies in these areas will be expounded.

3.2 Adolphs & Schmitt 2003: Lexical coverage of spoken discourse

In a study by Schonell *et. al*. from 1956, according to Adolphs and Schmitt, it was generally assumed that the high-frequency vocabulary of 2,000 word families covered 99% of the general spoken English discourse. This made high-frequency vocabulary a suitable vocabulary goal for English L2 users. However, the study is over half a century old and was based on a very limited corpus. In 2003, Adolphs and Schmitt made a more modern corpus study of the lexical coverage of spoken discourse using the CANCODE and the British National Corpus (BNC) conversational corpora. Both these corpora are relatively modern, and cover a wide variety of conversations, between people varying by age, sex, geographical location and social class. They cover a variety of discourse content and speech genres (Adolphs & Schmitt 2003, p. 429-430). However, they are both based on English used mainly in the UK and Ireland, which limits how generally applicable they are, considering that the role of the native speaker is diminishing. In the study, the researchers chose to work with large word families, rather including than excluding items under each head word. This may lead to modest conclusions about the vocabulary size needed for the intended coverage, which needs to be taken into account when relating their findings. The results from the study are presented in the table below.

Table 1 Vocabulary size and lexical coverage of spoken discourse

Vocabulary size (word families)	BNC conversational coverage	CANCODE coverage
2,000	93.3%	92.26%
3,000	95.13%	94.16%
5,000	96.93%	96.11%

(Table adapted from Adolphs and Schmitt 2003, p. 431)

Adolphs and Schmitt discuss whether 92%-93% coverage is enough vocabulary to actually engage in everyday conversation, and conclude that more research on the relationship between lexical coverage of spoken discourse and listening comprehension is needed to find a satisfying answer. They do however point out that the previous estimation of 99% coverage was reasonable, as it in reality means that 1 word in every 100 is unknown. However, according to their study, a 2,000 word vocabulary will give a lexical coverage of less than

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95%, which in reality means that one word in every 20 words will be unknown (Adolphs & Schmitt 2003, p. 432). The difference is noticeable, and even though the authors are careful not to draw too far reaching conclusions, they doubt that this amount of vocabulary will make it possible for L2 users to actually participate in conversation in English, since too many words will be unknown. Adolph and Schmitt's study has established as a fact that more vocabulary is needed in order to engage in everyday discourse than was previously thought (2003, p. 436). The study seriously questions whether a vocabulary of 2,000 word families is sufficient to actively participate in English conversation, and thus questions the traditional high-frequency levels as a satisfactory vocabulary goal.

3.3 Nation 2006: How large a vocabulary is needed for reading and listening?

Most research on lexical threshold has been done in relation to reading comprehension, and it is agreed that there is a strong positive correlation between the two. In this study, Nation set out to answer how much vocabulary an L2 learner needs to know in order to do certain things in that language, e.g. read a newspaper, read a novel, watch a movie and participate in a conversation. He uses frequency based lemma lists from the BNC to estimate the "number of word families needed to read and listen to English intended for native speakers" (Nation 2006, p.60). The text coverage needed according to Nations study in 2006 relies on an earlier study by Hu and Nation (2000). They tested the correlation between lexical coverage and reading comprehension. They tested reading comprehension in two ways, with a multiple-choice reading comprehension test and a written cued recall of the text, and concluded that some people attain adequate comprehension with 95 % coverage, but they are a small minority. At 100% lexical coverage, most of the participants attained adequate comprehension. 100% lexical coverage of a text is unusual for L2 users to attain, and Hu and Nation consequently calculated that at 98% coverage, adequate comprehension could still be attained (Nation 2006, p. 61). In his study, Nation (2006), like Adolphs & Schmitt (2003), chose to use large word families in his frequency lists, which again will lead to the actual vocabulary needed for adequate comprehension may being vaster than the numbers of the 2006 study will show (p. 67).

Nation (2006) has demonstrated that in order to read a novel or a newspaper, the reader needs a receptive vocabulary of around 8,000-9,000 word families. However, 4,000 words and proper nouns will provide the reader with approximately 95% coverage (pp. 70-

72). Again, the need to define "adequate comprehension" is essential. The novels used in his study were: *Lady Chatterley's Lover* by D. H. Lawrence, *Lord Jim* by Joseph Conrad, *The Turn of the Screw* by Henry James, *The Great Gatsby* by F. Scott Fitzgerald and *Tono-Bungay* by H. G. Wells. The newspaper corpora he used consisted of samples for newspaper articles from the LOB, FLOB, Brown and Kolaphur corpora.

Further, Nation (2006) has concluded that, in order to watch children's movies, a vocabulary of 7,000 word families is needed to gain 98% coverage, and around 4,000 word families and knowledge of proper nouns till lead to a lexical coverage of approximately 95 % (p. 75). Nation used *Shrek* and *Toy Story* to create this corpus and points out that a vocabulary size of 7,000 word families is not needed in order to watch and enjoy these movies, but it is needed in order to watch and fully comprehend what is said. In order to "cope with unscripted spoken English" and attain 95 % coverage, learners need 3,000 word families plus proper nouns, whereas 6,000-7,000 word families are needed to attain 98% coverage (Nation 2006, p. 77). The unscripted spoken English corpus contained extracts from the Wellington Corpus of Spoken English.

Nation himself points out that the using the BNC corpus to create the frequency band lists is problematic as the BNC is "largely written, British, formal and adult English, and this affects the distribution of the words in the lists" (2006, p. 63). This needs to be taken into account when analyzing and implementing the results of his study for pedagogical goals and purposes.

3.4 Stæhr 2008: Vocabulary size and the skills of listening, reading and writing

Stæhr (2008) examined how reading comprehension, listening comprehension and writing skills correlated to vocabulary size. His participants were 88 students in the ninth grade in Denmark, who were tested on national exams as they were graduating from lower secondary school. They came from six different schools and all had at least 570 hours of instructed English at the time. The reading and listening comprehension tests were designed as multiple choice-tests. Beforehand, Stæhr had tested his students' vocabulary size using the revised version of the Vocabulary Levels Test, described previously. He found that there is a strong correlation between vocabulary size and reading comprehension, which aligns well with previous research, and a relatively high correlation between listening comprehension and vocabulary size (p. 148). This "indicates that learners' vocabulary size is more closely

associated with their reading comprehension than with their listening comprehension", according to Stæhr (2008, p.144). Stæhr also tested the correlation between vocabulary size and writing and found a positive correlation. The correlation between vocabulary size and writing performance was stronger than that between vocabulary size and listening comprehension (2008, p. 148).

Stæhr further sought to establish a vocabulary threshold based on whether students performed below or above average on the tests he performed. According to Stæhr, the minimum goal set for Danish students graduating lower secondary school is to know the classic high-frequency vocabulary, i.e. the 2,000 most frequent word families of English. He found that, according to the VLT, 68 out of his 88 participants, i. e. 77%, did not prove to have a good enough knowledge of these words (Stæhr 2008, p. 146). Also, out of those who did not know this basic vocabulary, 38% performed above average on the reading test and 65% of them scored above average on the listening test. However, the mean scores of those who did know the high-frequency vocabulary were consistently higher than that of those who did not know this amount of vocabulary (2008, p.147). Also, the students who did not master the 2,000 level performed below average on the reading and writing tests. Stæhr interprets his study to confirm that the threshold of 2,000 word families still is a "crucial learning goal for low-level EFL learners" (Stæhr 2008, p.149).

The fact that 77% of the participants in Stæhr's study did not know the minimum vocabulary goal set by the Danish school is alarming and leaves room for different interpretations regarding the 2,000 word family vocabulary goal being adequate or not. Either, it seems that the teaching that these students have had is insufficient, or the set vocabulary goal is too high for the students to reach. Another possible aspect of this discrepancy is that the VLT does not indicate a correct vocabulary size, or that it was not used correctly when estimating the students vocabulary size. The fact that many of those who had not attained the high-frequency vocabulary still performed above average on the national tests further indicates inconsistencies between research, curricula and teaching practices.

3.5 Laufer & Ravenhorst-Kalovski 2010: Lexical text coverage, learners' vocabulary size and reading comprehension

The participants in the study were 745 university and college students in Israel. The majority of them was taking an English for Academic Purposes course (EAP), and had studied English for at least eight years. The researchers investigated the relationship between three variables:

reading comprehension, lexical coverage and vocabulary size. Reading comprehension was tested by the Psychometric University Entrance Test, which is used nationwide in Israel to determine whether college students are proficient enough to take university courses in English. Vocabulary size was tested by a revised version of Nations Vocabulary Levels Test (VLT). The authors note that this is not a precise test, which makes their estimations of vocabulary size approximate (Laufer & Ravenhorst-Kalovski 2010, p. 21). The results that the 2010 research comprise were based on the scores of the 2,000, 3,000 and 5,000 level parts of the test. Tests based on the BNC corpus, made available by Tom Cobb and Paul Nation were used to test the lexical coverage (Laufer & Ravenhorst-Kalovski 2010, pp. 20-22).

Laufer and Ravenhorst-Kalovski's study prove a strong correlation between the three tested elements: reading comprehension, vocabulary size and lexical coverage. This was the expected outcome, but their research further indicated that even very small improvements in lexical coverage resulted in good improvements on the reading test score (p. 23-24). The authors discuss two possible reasons for this. Either, the improvement on the reading comprehension score is due to these few low-frequency words being crucial for understanding a text, or it is achieved because of the greater automaticity that follows a larger vocabulary size (2010, p. 24). Either way, it endorses the importance of learning low-frequency words (p.25). Consequently, Laufer and Ravenhorst-Kalovski (2010) suggest that both high- and low-frequency words ought to be taught in English programs at the level they were testing.

At the end of the study, the authors suggest two different lexical thresholds, one optimal, and one minimal (Laufer & Ravenhorst-Kalovski 2010, p.25). The *optimal threshold* is set at 8,000 word families, with coverage of 98% and the *minimal threshold* is set at 4,000-5,000 word families with coverage of 95 % (p.26). The optimal threshold is established by defining the term adequate comprehension as "can read academic material independently" and "functional independence in reading" (p. 25) which is very similar to Nations description "unassisted reading" (see 3.3). If adequate comprehension instead is interpreted as "reading with some guidance and help", then the minimal threshold is sufficient (Laufer & Ravenhorst-Kalovski 2010, p.25). Interesting to note is that out of all the 745 participants in the research, only 10 people reached the optimal threshold. This should be compared to 23% of the students nationwide in Israel who pass the minimal threshold. Laufer and Ravenhorst-Kalovski estimate that learners who pass the minimal threshold on the psychometric entrance test will reach 'independent reading' after 56 academic hours of English instruction.

3.6 Interim summary

Much of the research accounted for above converges on some points, but there are some discrepancies. There are clear correlations between Nations (2006) description of adequate comprehension with what Laufer and Ravenhorst-Kalovski (2010) call the optimal threshold, which is estimated to be around 8,000 word families in both their studies. In addition, the minimal threshold of 4,000-5,000 word families from Laufer and Ravenhorst-Kalovski (2010) can be found in Nations (2006) study which suggests that in order to reach a 95% coverage of a newspaper article, 4,000 words and proper nouns is needed. However, Nation does not seem to imply that 95% coverage of a text will lead to adequate comprehension, which Laufer and Ravenhorst-Kalovski argue for. The area of disagreement is what level of understanding should be counted as 'adequate comprehension'.

Nation claims that in order to understand unscripted spoken English, 3,000 words plus proper nouns will give you a 95% coverage, which can be contrasted by Adolph's and Schmitt's estimations of 5,000 words reaching to that percentage of coverage. Meanwhile, Adolphs and Schmitt are careful in interpreting their results, and call for further research, which is answered by Nation's study in 2006. And, the results of the two studies converge by proving that more vocabulary than previously thought is needed to understand and participate in spoken English.

Staehr's conclusion that vocabulary size is more closely associated with reading comprehension than listening comprehension supports Nation's (2006) study which shows that a smaller amount of vocabulary is needed to cover spoken text than written text. However, Staehr's study also showed that it is possible to achieve scores above average on reading and listening comprehension tests without the estimated vocabulary size, which could imply that a lesser vocabulary size is sufficient. Again, this illustrates that adequate comprehension is ambiguous and needs to be defined for specific pedagogical situations.

In addition, there are some aspects of the research above that needs to be considered when interpreting the results. Both Adolphs and Schmitt (2003) and Nation (2006) use corpora that consist of English spoken and written mainly by L1 users. As discussed in chapter two, the native speaker role model for English L2 users is no longer the only ideal, and using this type of corpora could imply that the vocabulary size needed according to these studies may be too high for an L2 learner. However, large word families were used to measure the vocabulary size in both these studies, which point to their estimations being quite low. It is therefore quite possible their vocabulary size estimations are applicable also for L2

speakers, which was the original purpose of the researchers in both cases. Nation points out himself that the BNC corpus is problematic as it is "largely written, British, formal and adult English, and this affects the distribution of the words in the lists" (2006, p. 63). Before applying this research to a pedagogical situation, this needs to be taken into account. However, much of the extramural English that L2 users encounter is informal, which could mean that the English that L2 users need to focus on during classroom hours is formal and academic.

The aim of all second language acquisition research, such as the studies accounted for above, is to inform and form teaching and policymaking, as well as to take research further in the field. The next section will address the current pedagogical tools for teaching vocabulary types and some recent suggestions for improvement.

4 Types of vocabulary: traditional view and recent critique

In his review article from 2008, Schmitt concludes that "learners need large vocabularies to successfully use a second language, and so high vocabulary targets need to be set and pursued" (p. 353). When working with frequency based vocabulary, it is assumed that both native and non-native language learners acquire vocabulary in the order of its range and frequency (Nation 2006, p.63). Based on this assumption, and in order to know what vocabulary targets to set and pursue, vocabulary has traditionally been divided into four categories: high-frequency words, academic words, technical words and low-frequency words. These types of vocabulary will be explained and evaluated in light of the research related in the previous chapter and other recent critique.

4.1 High- and low-frequency vocabulary

As evident in the names, high- and low-frequency vocabularies are frequency based. The standard of *high-frequency vocabulary* has been set at the 2,000 most frequent word families, starting with West's General Service List (GSL) from 1953 and is still strongly supported by Nation (Nation, 2011). The reason for the focus on high-frequency vocabulary is because it covers around 80% of any given English text (Nation 2001 p.16). The learners thus gain a lot of understanding with a relatively small vocabulary, which is desirable for any language learner. *Low-frequency vocabulary* has been identified in many ways, "ranging from anything

beyond 2,000 word families all the way up to all of the word families beyond the 10,000 frequency level" (Schmitt 2008, p. 2). Basically, they are all the words that are not deemed to be high-frequency words (Nation 2001, p. 12).

Nation has suggested that learners and teachers deal very differently with high- and low-frequency words in the learning process. He endorses explicit teaching for the high-frequency vocabulary and that learners be taught vocabulary learning strategies in order to learn the low-frequency vocabulary in a more implicit manner. The idea is that learners start by learning the high-frequency words and then move on to learning the low-frequency words "preferably in a rough order of importance for them" (Nation 2011, p. 531).

Schmitt and Schmitt (2012) point out that the recent research on comprehension and lexical coverage has made this four part categorization obsolete, since a much higher lexical coverage is needed than previously thought, mainly based on Nations study from 2006 related previously in this paper (see 3.3). Based on the estimation that at least 3,000 word families are needed to adequately participate in a conversation held in English (Adolphs & Schmitt 2003; Nation 2006), as well as the fact that the third 1,000 frequency band also provides substantial lexical coverage (Laufer & Ravenhorst-Kalovski 2010) Schmitt and Schmitt argue that high frequency vocabulary should contain the 3,000 most frequent words of English, instead of the traditional 2,000 word families. Also, due to Nation's calculation that 8,000-9,000 word families are needed in order to do mundane things such as reading a book and watching the news, they suggest that this range of vocabulary cannot reasonably be deemed to be infrequent. They suggest instead that words beyond the ninth 1,000 frequency band be labeled low-frequency vocabulary. If this is implemented, the academic and technical vocabulary will not fill the gap between high- and low-frequency vocabulary bands, so Schmitt and Schmitt suggest that the vocabulary ranging from the third to the ninth frequency band be called mid-frequency vocabulary, illustrated below:

High frequency vocabulary	Mid-frequency vocabulary	Low-frequency vocabulary
1,000-3,000	3,000-9,000	9,000-

To my knowledge, Nation has not responded to this critique by Schmitt and Schmitt, but he uses the division of high- mid- and low-frequency vocabulary in his 2012 version of the Vocabulary Size Test (available at http://www.victoria.ac.nz/lals/about/staff/paul-nation). Although, Nation keeps the high-frequency vocabulary limit at 2,000 word families, and puts the starting point for the low-frequency vocabulary at 10,000 word families.

Whether or not the third 1,000 level band should be counted as high frequency or not can be discussed. However, the research related here clearly suggests a need to pedagogically address the vocabulary that follows the high-frequency bands. By naming this vocabulary range *mid-frequency*, teachers and linguists are given a meta-language to address the vocabulary, which will facilitate a pedagogical development of the mid-frequency vocabulary span (Schmitt and Schmitt 2012). This is clearly illustrated by the development of the Academic Word List, which has become a very popular teaching tool for teaching academic vocabulary.

4.2 Academic and technical vocabulary

The *academic vocabulary* is mostly represented by Coxhead's Academic Word List (AWL) from 2000. Xue and Nation made a predecessor in 1984 called the University Word List, but Coxhead's version has taken precedence since it is more condensed. The AWL is also frequency based, however, the corpus of reference contains only academic text and the coverage of the corpora is estimated using the AWL and the GSL. The academic corpora contained "representative texts from the academic domain" whereof the majority was written for "an international audience" (Coxhead 2000, p. 219-220). The texts were then divided into four main categories: Arts, Commerce, Law and Science. These, in turn, consisted of 28 more defined subject areas. The AWL comprises 570 word families which cover roughly 10% of the academic corpus that Coxhead used, compared to a fiction corpus where the AWL only covered 1.4% of the text. The coverage was, however, not the same for all four categories in the academic corpus, as demonstrated in the table below.

Table 2   Text coverage of the AWL and GSL in each sub corpora of Coxhead's academic corpora

Subcorpora	AWL coverage	Total coverage, including first 2,000 words from GSL
Arts	9.3%	86.7%
Commerce	12%	88.8%
Law	9.4%	88.5%
Science	9.1%	79.8%

(adapted from Coxhead 2000, p. 224)

Especially the hard science texts did not benefit as much by the AWL as the other categories. In spite of this, the relatively high coverage for a specific register has made the AWL a popular teaching tool, particularly for those studying English for Academic Purposes (EAP).

Technical vocabulary is that which is too specialized to be covered by the general academic vocabulary. It is found in the low-frequency ranges and needs to be learned in each specific field (Nation 2001, p.12). This vocabulary is usually taught explicitly, since the words are so rare and so vital to the understanding of genre texts that learners are not expected to know them beforehand (Schmitt & Schmitt 2012).

Schmitt (2008, p. 2) points put that academic and technical vocabulary "cut across these 1,000 word-bands, and Nations division into four categories does not take this into account. This puts the necessity of teaching academic and technical vocabulary in question, especially considering that they are meant to be taught as a complement to the high-frequency vocabulary, which would most likely not result in sufficient text coverage due to the cross over. In addition, the 64.3% of the AWL is covered by high-frequency vocabulary, if the level is set at 3,000 word families. This suggests that the AWL is too general to be truly useful.

Hyland and Tse (2007) point out that even though the AWL covers around 10% of the academic vocabulary, the 570 word families "often occur and behave in different ways across disciplines in terms of range, frequency, collocation and meaning" (p. 235). The different discourse registers found in the academic world vary a great deal which leads Hyland and Tse to suggest treating them as "subject-specific literacies" instead of generalizing about uniform academic discourse (2007, p. 247). Because of this they do not support the division between academic and technical vocabulary and suggest that for EAP courses, students be taught discourse specific vocabulary that will enable them to succeed in their chosen field rather than general academic 'register' (p.249). Also, the notion of an academic vocabulary "gives a misleading impression of uniform practices and offers an inadequate foundation for understanding disciplinary conventions or developing academic writing skills" (p.250). Nation (2011) recognizes the critique of Hyland and Tse as justified, even though the basis of their critique lies in trying to make the AWL into something it was not meant to be, namely a list that would cover all of the academic discourse.

4.3 Interim Summary

The case for Schmitt and Schmitt's high-frequency boundary of 3,000 word families is supported by Adolphs and Schmitt's study from 2003, if high frequency vocabulary should

cover what is needed for participating in everyday communication in an L2 (Schmitt & Schmitt 2012). Also, Hyland and Tse (2007) argue that SLA research indicates that L2 users learn words out of need, and that many L2 users will need words from the AWL before knowing all of the high frequency words. This points toward a need to teach the first three 1,000 bands as high-frequency vocabulary, rather than focusing on the two first bands and the AWL, since much of the AWL is embedded in these three bands. However, the percentage of coverage drops drastically after the second 1,000 level, which speaks for keeping the traditional 2,000 word families as high-frequency vocabulary. In the end, whether high-frequency vocabulary encompasses the first two or three 1,000 bands on the frequency list, it is vital to learn, as it provides high comprehension for a relatively small amount of vocabulary learning. It is equally important to keep in mind that whatever words you learn in addition to high-frequency vocabulary will also yield much higher understanding of written and spoken text even if the percentage of text coverage is small (Laufer & Ravenhorst-Kalovski). All vocabulary is thus important to continually improve reading and listening comprehension, in order to reach what is adequate comprehension in the situation the L2 user is in.

It is thus clearly problematic to teach academic vocabulary based only on the AWL, especially if the students already know the most common 3,000 word families, since this means that they already know over 60% of the 'academic' words. Cobb (2010) further shows that knowledge of the 5,000 most frequent word families in English covers about 92% of the AWL (as cited in Schmitt 2008, p. 10). If the learners already have a vocabulary around that size, they will be very moderately assisted by teaching on the AWL. However, it is pedagogically challenging to cover all aspects of academic discourse, for all different disciplines, in one EAP course. It is even more challenging if the students have not yet decided which discipline they will study, or are taking an English course that will prepare them for general higher studies. Considering that a vocabulary size of around 5,000 word families is needed in order to reach even the minimal threshold of comprehension when reading and listening in English, it seems as the importance of teaching the Academic Word List is decreasing, and the need to teach a broader type of vocabulary is needed. This need could be met by intentional teaching on the mid-frequency vocabulary. Teaching technical vocabulary, or discourse specific vocabulary, would most likely be more beneficial, since there are great variations in how vocabulary is used in different discourses. However, the AWL does apply to many academic areas, and may be the best general tool available so far. Perhaps teaching the AWL will be a stepping board for teachers and others involved in the planning of language programs to focus more specifically on the mid frequency vocabulary.

5 Implications for teaching and policy

Laufer and Ravenhorst-Kalovski (2010) speak of the importance of setting vocabulary goals on the basis of the comprehension level expected of learners. This is vital for a correct implementation of the presented research. Applying Vygotsky's ideas (Vygotsky & Kozulin 1986) of the proximal development zone to vocabulary teaching, the materials used should be slightly more difficult than what the readers can understand independently, but not so difficult that they lose interest. This implies that teachers carefully need to weigh what written and spoken texts to give their students in order for them to maximize their learning. In order for the results of this study to be truly implicational in teaching practice, they will need to be considered in light of different levels of proficiency. The best way of accomplishing this is to tie the results to the standards of proficiency stated in national curricula and international proficiency standards, such as the Common European Framework of Reference for Languages (CEFR).

Milton (2010) and Kusseling and Decoo (2009) have attempted to tie vocabulary size to the different levels of the CEFR, but it has proven to be rater intricate. This is especially so in the case of the CEFR, which aims to be a universal guide to proficiency levels, pertaining to a wide range of languages. Since languages are structured very differently and words are formed in various ways in different languages, what counts as a word in one language may not necessarily be only one word in another (Milton 2010, p. 227). Thus, since it is difficult to generalize about vocabulary size across language barriers, this needs to be done for every specific language. Milton (2010) as well as Kusseling and Decoo (2009) therefore attempted to tie vocabulary size in various languages to the CEFR levels, among them English. In order to understand their estimations, a short overview of the CEFR levels is necessary.

The CEFR is developed by the Council of Europe (2001a) and its levels are divided as follows:

Table 3 CEFR levels

Basic User		Independent User		Proficient User	
A1	A2	B1	B2	C1	C2

(Council of Europe 2001b)

A1 represents very basic knowledge, like introducing oneself, using everyday phrases and familiar words, and at the C2 level, sometimes referred to as "L2 mastery", learners "can understand virtually everything heard or read" (Council of Europe 2001b, p.5). Milton (2010)

has looked into what CEFR levels may pertain to some of the research accounted for earlier. He suggests that Nation's (2006) level of adequate comprehension, with 98 % text coverage, is comparable to the CEFR C2 level. He further argues that, in order to progress from the A-levels into the B-levels of the CEFR scale, learners need a vocabulary of around 3,000 word families. Students at the CEFR B2 level should be able to read "with a large degree of independence" (Council of Europe, 2001b, p. 9). This is comparable with Laufer and Ravenhorst-Kalovski's description of the minimal threshold, which requires a vocabulary of around 5,000 word families. The participants in Laufer and Ravenhorst-Kalovski's study were college students taking an EAP course. As a comparison, Swedish upper secondary school students are also estimated to be on the B2 level, in the last two courses offered (Skolverket 2011). It would seem reasonable that the college students need to be at a higher level of English proficiency than upper secondary students, who are not required to study in the English language. Consequently, it is of great importance not only to tie vocabulary size to specific levels of proficiency in international standards, but also to tie it to national curricula, which is often an interpretation of the international standards.

Part of the complexity is likely due to word families being the most common way to measure vocabulary size, and they require that L2 users know all of the derived forms of a word for the calculations to be correct. Another reason is illustrated in Stæhr's study from 2008. He states that knowing the 2,000 most frequent word families of English was the minimum goal for the students he tested. However, 68 of the 88 students did not know these words. It is alarming then that many of those who did not know the minimal vocabulary goal still achieved above average on the national tests. This calls both the teaching as well as the testing into question, since the students actually did not seem to need the vocabulary size that was set as their goal in order to do well on the tests. So, it seems that there is a discrepancy between the Danish curricula and its national tests. If this is true also in other nations, the importance of properly analyzing and applying the research reviewed in this paper before applying it in teaching and policymaking may be universally applicable.

6 Conclusion

This review has covered research on lexical threshold, lexical coverage and vocabulary size in relation to reading and listening comprehension and vocabulary type teaching practice. The most pressing point of divergence, in order to define a satisfactory lexical threshold, is defining what adequate reading and listening comprehension means. Nation (2006) assumes

that adequate comprehension is equal to unassisted understanding, with no help from outside sources to understand the written or spoken text. He therefore argues that 98 percent text coverage is needed to attain adequate comprehension, which requires a vocabulary size of around 8,000-9,000 word families for written text and 6,000-7,000 word families. Conversely, Laufer and Ravenhorst-Kalovski's (2010) indicate that the definition of adequate comprehension must be broadened, and as a result they suggest two different lexical thresholds for reading. The optimal threshold, at 98 percent text coverage, requiring a vocabulary of 8,000-9,000 word families, and the minimal threshold, at 95 percent text coverage, requiring a vocabulary of around 5,000 word families. Adolphs and Schmitt (2003) propose that approximately 3,000 word families is needed to understand conversational English, and this is supported by Nation (2006) whose results indicate that 3,000 word families and proper nouns will give a lexical coverage of around 95 percent, which could yield sufficient understanding. It is confirmed that reading comprehension requires a larger vocabulary size than listening comprehension (Nation 2006; Stæhr 2008).

Regarding vocabulary type teaching practice, there is an ongoing debate about whether the traditional division of high- and low-frequency, academic and technical vocabulary is pedagogically viable in light of the research on lexical threshold and adequate comprehension. Much points toward a continued need for L2 users and teachers to focus on high-frequency vocabulary, but also to focus on mid-frequency vocabulary in order to reach the vocabulary size needed to attain adequate comprehension (Schmitt & Schmitt 2012). Using only the Academic Word List does not sufficiently cover the range of vocabulary needed for L2 users to read, listen and converse in English. In order to apply the research above to actual teaching and learning situations there is further a need to attribute vocabulary size to different levels of international standards as well as to national curricula.

Suggestions for further research:

- Replicas of Staehr's (2008) study performed in different national contexts, in order to find if it is common for L2 English users to achieve above average even if they have not achieved the vocabulary size goal for their proficiency level.

- Analysis of texts used in national tests at different levels of proficiency in order to see how the tests reflect the vocabulary size attributed to the level tested.

- Examinations of textbooks and other materials used in English L2 classrooms and compare them to the expected vocabulary size of the target students.

- Tying vocabulary size to national curricula to aid teachers and policymakers when setting vocabulary size goals and choosing/making teaching materials.

- Research on the nature of mid-frequency: could new vocabulary type teaching lists be developed, which facilitate the learning of mid-frequency vocabulary more effectively than the AWL and various technical word lists?

References

Adolphs, S. & N. Schmitt (2003). Lexical coverage of spoken discourse. *Applied Linguistics*, 24(4), 425-438. Retrieved from http://www.norbertschmitt.co.uk/#untitled41

Cook, V. (2008). *Second language learning and language teaching. Fourth edition*. New York: Routledge

Council of Europe (2001a). *Common European framework of reference for languages: learning, teaching, assessment*. Cambridge: Cambridge University Press. Retrieved from http://www.coe.int/t/dg4/linguistic/cadre1_en.asp

Council of Europe (2001b). *Common European framework of references for languages: Learning, teaching, assessment. Structured overview of all CEFR scales*. Retrieved from http://www.coe.int/t/dg4/education/elp/elp-reg/cefr_scale_EN.asp

Coxhead, A. (2000). A new academic word list. *TESOL Quarterly*, 34(2), 213-238. Retrieved from http://search.proquest.com/docview/62327492?accountid=11162

Hyland, K., & Tse, P. (2007). Is there an "academic vocabulary"? *TESOL Quarterly, 41*(2), 235-253. Retrieved from http://search.proquest.com/docview/85656075?accountid=11162

Hirsh, D. & Nation. P. (1992). What vocabulary size is needed to read unsimplified texts for pleasure? *Reading in a Foreign Language*, 8(2), 689-695

Kusseling, F. S. & Decoo, W. (2009). *Europe and language learning: the challenges of comparable assesment.* Paper presented at the European Studies Conference. University of Nebraska at Omaha, Nebraska. Retrieved from http://www.unomaha.edu/esc/2009papers.html

Laufer, B. & Ravenhorst-Kalovski, G. (2010). Lexical threshold revisited: Lexical text coverage, learners vocabulary size and reading comprehension. *Reading in a Foreign Language, 22*(1), 15-30. Retrieved from http://search.proquest.com/docview/744444432?accountid=11162

Laufer, B. & Nation, I. S. P. (2001). Passive vocabulary size and speed of meaning recognition: Are they related? In S. Foster-Cohen & A Nizegorodcew (Eds.), *EUROSLA Yearbook 1*, (pp. 7-28). Amsterdam: Benjamins

Milton, J. (2010). The development of vocabulary breadth across the CEFR levels. EUROSLA Monograph Series *Communicative proficiency and linguistic development: Intersections between SLA and language testing research*, 211-232.

Nation, I. S. P. (2001). *Learning vocabulary in another language*. Cambridge: Cambridge University Press

Nation, I. S. P. (2006). How large a vocabulary is needed for reading and listening? *Canadian Modern Language Review, 63*(1), 59-82. Retrieved from

http://search.proquest.com/docview/62036474?accountid=11162

Nation, I. S. P. (2011). Research into practice: Vocabulary. *Language Teaching*. 44(4), 529-539.

Nation, P. & Waring, R. (1997). Vocabulary size, text coverage and word lists. In Eds. Schmitt, N & M. McCarthy (1997) *Vocabulary: description, acquisition and pedagogy*. 6-19. Cambridge: Cambridge University Press

Schmitt, N. & Schmitt, D. (2012). A reassessment of frequency and vocabulary size in L2 vocabulary teaching. *Language Teaching*, 47(4), 1-20. Retrieved from http://www.norbertschmitt.co.uk/uploads/schmitt-n-and-schmitt-d-(available-in-advanced-view)-a-reassessment-of-frequency-and-vocabulary-size-in-l2-vocabulary-teaching-language-teaching.pdf

Schmitt, N., Schmitt, D. & Clapham, C. (2001). Developing and exploring the behavior of two new versions of the vocabulary levels test. *Language Testing*, 18(1), 55-89.

Schmitt, N. (2008). Review article: Instructed second language vocabulary learning. *Language Teaching Research, 12*(3), 329-363. Retrieved from http://search.proquest.com/docview/85669088?accountid=11162

Skolverket (2011). *Om ämnet Engelska*. Retrieved from http://www.skolverket.se/laroplaner-amnen-och-kurser/gymnasieutbildning/gymnasieskola/eng?tos=gy&subjectCode=eng&lang=sv

Stæhr, L. S. (2008). Vocabulary size and the skills of listening, reading and writing. *Language Learning Journal, 36,* 139–152.

Vygotsky, L. S. & Kozulin, A. (1986). *Thought and language*. Cambridge, Mass: MIT Press