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The lexical Profile of the Moroccan National High-stakes Baccalaureate Reading Test Materials: A Corpus-based Approach

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Abstract

Lexical profiling studies are concerned with the lexical breadth required to achieve 95% and 98% coverage of various kinds of verbal or textual materials (Webb, 2021). While prior research has concentrated on the lexical load of EFL textbooks (Nguyen, 2020; Sun & Dang, 2020), scarce research has examined the lexical demands of local proficiency tests. This study investigated the lexical profile of Moroccan national reading exams in relation to coverage in Nation's (2012) BNC/COCA frequency wordlists. To achieve these objectives, a corpus of 10,536 tokens, covering all the reading materials from 2008 to 2022, was compiled. Moreover, the Vocabulary Size Test (Nation & Belgar, 2007) was administered to 72 baccalaureate students to measure their vocabulary size. The findings of an examination utilising the Antwordprofiler and 11 BNC/COCA lists revealed that vocabulary sizes of 3,000-word families and 4,000 word families, including proper nouns, are needed to achieve 97% and 98% coverage rates in the corpus. Additionally, findings of the descriptive statistics showed that the receptive vocabulary size of the respondents (n=72) was 2,015 words. These results showed that Moroccan baccalaureate students' lexical breadth is insufficient to attain 95% coverage. Implications for vocabulary instruction in Moroccan EFL classrooms are discussed.

1. INTRODUCTION

Vocabulary knowledge, in its breadth and depth dimensions (Daller et al., 2007), plays an instrumental role in learners' proficiency in the four skills (Janebi Enayat & Derakhshan, 2021; Miralpeix & Muñoz, 2018). Several researchers have shown that vocabulary knowledge, especially size, is closely associated with successful reading comprehension (Staehr, 2008; Zhang & Zhang, 2020). In fact, evidence suggests that a large receptive vocabulary breadth, defined as the quantity of words that one recognises irrespective of their level of mastery (Daller et al., 2007), contributes to adequate reading comprehension (Laufer, 1992; Nation, 2006). To elaborate, a close and positive relationship has been found between vocabulary coverage, the quantity of words recognized within a given text (Waring & Nation, 1997), and successful reading ability (Hu & Nation, 2000; Laufer & Ravenhorst-Kalovski, 2010). Thus, recognising a sizeable number of words as part of one's sight vocabulary seems to increase one's ability to comprehend texts.

Unlike lexical coverage studies, a substantial body of research has been conducted on lexical profiling, defined as the quantity of vocabulary required to attain 95%- and 98%-word coverage (Webb, 2021), and mastery of the most frequent words in English (Nation, 2006; Nation & Macalister, 2013). Such studies have covered the lexical load of a myriad of discourse genres. For instance, there are studies that have dealt with the vocabulary demands of EFL textbooks (El Morabit, 2020; Sun & Dang, 2020), the lexical load of Television programmes and movies (Webb & Rodgers, 2009a,b), the vocabulary profile of academic spoken English (Dang & Webb, 2014), and even the vocabulary profile of popular songs in English Language Teaching (ELT) (Tegge, 2017). These studies demystify the quantity of words required to comprehend various kinds of discourse and inform EFL teachers about the kind of vocabulary to teach as far as frequency bands are concerned.

Another related strand of vocabulary profiling has been concerned with reading comprehension texts of official proficiency tests. Several researchers have suggested different figures to achieve 95% and 98% coverage rates in different reading proficiency tests. For instance, Kaneko (2014) has proposed that in order to comprehend 95% and 98% of the vocabulary in the TOEFL internet Based-Test (iBT), testees must possess a vocabulary breadth of 6,000 and 10,000 families, including proper nouns. Moreover, to achieve 95% and 98% coverage figures in the CanTest (Canadian proficiency test), mastery of 6,000 and 14,000 word families plus proper nouns are necessary (Webb & Paribakht, 2015). In much the same way, Vu (2019) has suggested that achieving 95% and 98% coverage in Vietnamese high-stakes EFL reading exams requires mastering the most frequent 5,000 and 14,000 word families. However, these studies have employed the RANGE freeware (Heatley et al., 2002) along with

Nation's (2006) British National Corpus (BNC) wordlists, which are presently obsolete. It is worth noting that the AntWordProfiler (Anthony, 2022) and Nation's (2012) wordlists could provide precise estimates of the vocabulary load of different discourse genres.

Taken together, the above-mentioned studies (Kaneko, 2014; Vu, 2019; Webb & Paribakht, 2015) provide some insights on when reading tests are expected to be understood by learners. However, apart from Vu's (2019) study, fewer studies have explored the lexical load of local senior high school (high-stakes) proficiency reading texts. Thus, the present paper seeks to employ the AntWordProfiler, which is a recent tool, and Nation's (2012) BNC/COCA wordlists to examine the lexical profile of past reading materials of the Moroccan national high-stakes exams from 2008 to 2022. To the best of our knowledge, no previous study of this kind has ever been conducted in the Moroccan context. Based on the findings of such endeavour, a vocabulary learning target will be set for senior high school Moroccan EFL learners. This goal is in line with Webb and Nation's (2012) acknowledgement of the usefulness of conducting lexical profiling research to determine vocabulary goals for learning. education. The third objective is to suggest practical solutions for teachers to overcome the current challenges.

2. LITERATURE REVIEW

2.1 VOCABULARY BREADTH RESEARCH

At the international level, a plethora of vocabulary breadth studies have been published with special focus on university students, but far less research has dealt with the vocabulary breadth of EFL high school students (Sun & Dang, 2020). The current literature on vocabulary breadth of high schoolers shows that the overall receptive lexical size revolves around 1,000-2,000 word families (Henriksen & Danelund, 2015; Nguyen, 2020; Staehr, 2008). For instance, in the Danish context, the findings revealed that high school students had not achieved proficiency in the most frequent 2,000 words (Henriksen & Danelund, 2015; Staehr, 2008). Conversely, in the Vietnamese context, Nguyen (2020) showed that his EFL participants mastered the 2,000 most frequent word families. Whereas Henriksen and Danelund (2015) and Staehr's (2008) studies employed the Vocabulary Levels Test (VLT) (Nation, 1990; Schmitt et al., 2001), Nguyen's study used the Updated Vocabulary Levels Test (UVLT) (Webb et al., 2017). The earlier version of the VLT was developed by reference to West's (1953) General Service List (GSL), but it is presently outdated in comparison to Nation's (2012) wordlists, which informed the updated VLT. Webb et al. (2017) contended that studies using the UVLT provide a better assessment of high frequency words. Thus, Nguyen's (2020) findings are possibly more informative and credible since they are predicated on more recent accounts of

word frequency. Yet, this claim warrants more studies to be justified. Together, the findings of vocabulary breadth show that a receptive vocabulary size of 2,000 word families is small and does not meet thresholds of language proficiency (Staehr, 2008). Consequently, high school students will face many problems with reading, writing, and listening abilities.

In the Moroccan context, vocabulary breadth research has been flourishing. There has been a proclivity to investigate the receptive vocabulary size of different participants in relation to different variables such as the language of instruction, gender, vocabulary depth, and reading comprehension, to name a few (Agrram, 2020; El Morabit, 2020; Harraqi, 2017; Nouri & Zerhouni, 2018). For a start, Agrram (2020) measured the receptive vocabulary size of 325 EFL master students, employing Meara's (2010) checklist test of vocabulary breadth. His findings disclosed that the participants showed good command of 1,400 word families. Moreover, Harraqi (2017) used the X Lex test (Meara & Milton, 2003) to gauge the receptive lexical breadth of 130 English-major undergraduate students. Harraqi's results revealed that the receptive lexical size of the respondents was around 4,000 lemmas. It is worth mentioning that the X Lex is a lemmatized vocabulary size test that measures recognition mastery of vocabulary up to the first five frequency bands in English (Milton, 2013). In the same spirit, Nouri and Zerhouni (2018) used the VLT to investigate the overall receptive vocabulary size of 32 freshmen telecommunication students. Their findings showed that their participants' receptive breadth was around 2,500 word families. More specifically related to the theme of the present paper, El Morabit (2020) investigated the receptive breadth of 106 Moroccan EFL senior high school students, using the UVLT. To this end, the results of this study reported that the overall lexical size of the subjects was 1,317 word families. El Morabit's findings of Moroccan high school students are in line with the literature at the international level (Henriksen & & Danelund, 2015; Staehr, 2008). However, they run counter Nguyen's (2020) findings, which were superior.

In sum, the emerging number of studies in the Moroccan context seems to shadow the same strand of research at the international level. That is, except for El Morabit (2020), the majority of papers have focused on higher education participants as Sun and Dung (2020) concluded. Hence, it follows that more studies on Moroccan EFL high school students are warranted.

2.2 LEXICAL COVERAGE AND LEXICAL PROFILING SCHOLARSHIP

Many scholars have investigated the relationship among lexical coverage, reading ability, receptive vocabulary breadth, and lexical profiling (Laufer, 1989, 1992; Nation, 2006). In

1989, Laufer undertook the first academic endeavour to examine the relation between reading ability and vocabulary coverage. She calculated coverage, using a self-report method of unknown words, in two reading comprehension tests. Laufer's findings revealed that adequate comprehension took place at a threshold of 55%, which was the minimum required score at the time of the study. The findings also denoted that 95% coverage was the cut-off rate to achieve 55% on the comprehension tests. In the same vein, Laufer (1992) showed that mastering 3,000 word families is adequate to achieve 95% coverage.

Another research frontier involved examining the *lexical load* of texts and lexical breadth thresholds. As a case in point, Hirsh and Nation (1992) analysed the lexical input in three novels and compared them to the most commonly occurring 2,000 word families in English. They found that 90% of the words in the novels was accounted for by the list of 2,000 words. Consequently, Hirsh and Nation suggested that the threshold necessary to achieve an optimal rate of comprehension (98%) is 5K word families. Hu and Nation (2000) corroborated this finding by proposing that the ability to comprehend a text without assistance requires familiarity with 98% of the tokens in a script. On the other hand, Nation (2006) analysed 14 lists extracted from the BNC and used them to establish a lexical threshold for achieving 98% of text coverage in authentic novels. His findings reported that if readers aim to reach the optimal reading comprehension level, they must have good mastery of 8,000-9,000 word families.

Taken together, these classic studies produced inconclusive results regarding lexical coverage and vocabulary thresholds. While some experts suggest that recognising 95% of the tokens in a text is satisfactory, others set coverage of 98% as a sufficient goal for comprehension. To resolve this contention, Laufer & Ravenhorst-Kalovski (2010) classified "adequate" comprehension into two levels: minimum and optimum. The optimum threshold, which was operationalised as unassisted reading, required recognizing 98% of the tokens in a text and a breadth of eight-thousand-word families; the minimum threshold, operationalized as reading with guidance, required coverage of 95% and a vocabulary size of five-thousand-word families. Of special interest to us in this study, however, is to determine the lexical threshold that the participants' need to reach optimum and minimum levels of coverage in high-stakes reading examinations.

2.3 LEXICAL PROFILING AND READING PROFICIENCY TESTS

Thanks to the blossoming of Nation's (2012) BNC/COCA wordlists and lexical profiling tools such as the AntWordProfiler, it has become attainable to do research on lexical profiling

and lexical breadth in relation to reading comprehension (Webb, 2021). The use of lexical profiling has also made it practical to identify the requisite quantity of word families necessary to achieve a high percentage of lexical coverage, which leads to comprehension across a myriad of discourse types. However, with respect to proficiency reading tests, Webb (2021) claimed that there is a niche in the extant literature and that more research is direly needed.

Contrary to studies exploring lexical coverage in relation to various genres of discourse (Dang & Webb, 2014; Webb & Macalister 2013; Webb & Rodgers, 2009a,b), studies using vocabulary profiling freewares to examine the lexical load of proficiency tests (reading tests) suggest higher vocabulary breadth figures to attain the minimal and optimal coverage of tokens. To take an example, Kaneko (2014) examined the lexical load of the TOEFL iBT reading sections with regard to Japanese senior high school students' receptive lexical size. To that end, Kaneko created a corpus of 10,000 tokens, extracted from past official TOEFL iBT passages, and analysed it against Nation's (2006) BNC wordlists using the RANGE software. The results revealed that to reach 95% coverage, one should master vocabulary that falls within the sixth band of vocabulary frequency in English. Concerning the optimal rate, the findings revealed that a vocabulary size of 12,000-13,000 word families are required. Interestingly though, Kaneko argued that the Japanese educational panel of secondary education set 3,000 word families as a goal for senior students. Thus, it is plausible to claim that such a goal would not make learners perform well in their examination if Laufer and Ravenhorst-Kalovski's (2010) minimum coverage of 95% is taken into account. In the same fashion and in a more recent study, Kaneko (2020) examined the lexical load of different proficiency tests (IELTS, Cambridge, EIKEN, GTEC, TEAP, TOEIC, and TOEFL iBT) to set a vocabulary target for Japanese university entrance exams. To achieve this objective, Kaneko used the RANGE software and Nation's (2012) BNC/ COCA wordlists to explore the lexical load of the above-mentioned tests. The findings revealed that in order to achieve minimal coverage of the reading texts in the different tests, one should possess a receptive lexical size of 2,000-5,000 word families. As regards the optimal coverage, lexical breadths of 3,000-8,000 word families are necessary. Hence, Kaneko's findings show that a vocabulary size of 3,000 families would allow test-takers to pass the majority of the Japanese university entrance exams, but he reported a number of exceptions where the testees would need more than mastery of 3,000 word families. This simply entails that knowledge 3K word families is not sufficient. Also, Collins (2017) analysed TOEFL practice reading materials and found that good command of 6,000 words in Nation's (2006) BNC wordlists is necessary to achieve 95% coverage. This finding is in accord with Kaneko's (2014) results. Surprisingly, Kaneko's (2014) comprised texts from real past

exams. Thus, Collin's findings showed that practice tests' reading materials mirror real TOEFL exams.

Although informative, the studies reviewed above of international high-stakes proficiency tests have certain limitations. First, Kaneko's (2014) methodology did not involve making any modifications to the compiled corpus. To illustrate, Kaneko did not delete proper nouns and abbreviations although Nation and Webb (2011) warned that the RANGE software cannot distinguish between homographs and proper nouns. To expound, the name *Raven* might result in inflation of coverage because it will be dealt with as a low- frequency word (i.e., a type of bird) which belongs to the 7,000 word-frequency level. Therefore, one has to be wary of the slightest modifications in a corpus as they might affect the interpretations to be made (Webb, 2021). A further complication pertains to the methodology of Kaneko's (2020) study. That is, Kaneko analysed a mixture of past proficiency texts and input from practice books in one large corpus. Hence, it appears logical to be sceptical with regard to the validity of such a hybridity.

Moving to national high-stakes proficiency tests, Webb and Paribakht (2015) examined 38 reading passages from the CanTEST in Canada. The object of their study was to set a lexical threshold beyond which the minimal and optimal coverage rates would be difficult to attain. The analysis of the corpus involved the RANGE software and Nation's (2006) BNC wordlists. The results suggested that proficiency in 6,000 word families is required to reach minimal vocabulary coverage, and good command of 14,000 word families is a prerequisite to achieve 98% coverage in the CanTEST. In the same spirit, Vu (2019) investigated the vocabulary load of high-stakes English exams in the Vietnamese context. The overarching aim of Vu's paper was to set a vocabulary learning goal at the high school level. To achieve that objective, Vu created a corpus of 20 test papers and employed the RANGE and Nation's (2006) BNC wordlists. The results showed that if 95% lexical coverage is the desired goal for students, a lexical breadth of around 5,000 word families is required. On the other hand, if the objective is to achieve optimal vocabulary coverage, the vocabulary threshold is 14,000 word families. Interestingly, the Vietnamese educational ministry set a vocabulary size target that does not exceed 3,000 word families for students (Vu, 2019). This entails that Vietnamese learners will face many problems when dealing with high-stakes reading exams.

Overall, the studies on lexical profiling and reading proficiency tests unravel the lexical breadth goals required to achieve minimal and optimal lexical coverage of the running words in reading examinations. The figures for coverage of 95% range between 5,000 word families and 6,000 word families (Collins, 2017; Kaneko, 2014; Vu, 2019; Webb & Paribakht, 2015). On the other end of the continuum, if an optimal coverage of 98% of coverage is the desired

target, then vocabulary sizes that range between 12,000-14,000 word families are necessary (Collins, 2017; Vu, 2019; Webb & Paribakht, 2015). These lexical thresholds are more demanding than those suggested when dealing with other types of texts at the 95% and the 98% rates (Laufer, 1992; Hirsh & Nation, 1992; Nation, 2006). It is important to note that, with the exception of Kaneko's (2020) latest paper, the reviewed studies employed Nation's (2006) BNC wordlists to represent the most frequent vocabulary items in English. Yet, these BNC frequency wordlists do not accurately represent the most frequent words (Sun & Dang, 2020). It is argued that Nation's (2012) BNC/COCA wordlists are more precise and provide the latest accounts of high-frequency words. Therefore, research implementing Nation's (2012) wordlists may provide clear and accurate estimates of the number of words required to attain the 95% and 98% rates.

3. THE CURRENT STUDY

Although successful reading comprehension is contingent upon the interplay among different factors including the cognitive processing required by the task, experience with the response method, and content knowledge (Khalifa & Schmitt, 2010) to name a few, the present article focuses on lexical resources as the main construct of the study. As highlighted above, lexical profiling studies unravel the requisite breadth of lexis to achieve 95% and 98% coverage of the tokens in a text. Thus, the object of this study is to explore the lexical load of Moroccan high-stakes reading sections from 2008 to 2022 and analyse it against the overall receptive vocabulary breadth of senior high school students. Additionally, as argued above, lexical profiling studies provide insights on learning goals and material creation as Webb and Nation (2012) highlighted "this kind of research is valuable in its own right as it guides the setting of learning goals and the development of instructional material" (p.8). Hence, another salient objective of this paper is to set a vocabulary learning goal for second-year baccalaureate students, based on the lexical thresholds needed to achieve 95% and 98% vocabulary coverage. Since no previous Moroccan study has ever been conducted in this regard, the findings will serve as a starting point to set a national learning threshold for vocabulary learning and will enable comparisons between Moroccan EFL learners and other learners worldwide.

4. RESEARCH QUESTIONS

This study addressed the following research questions:

1. What is the receptive vocabulary breadth of senior high-school Moroccan EFL students?

2. What is the lexical profile of reading comprehension passages in the Moroccan EFL high-stakes baccalaureate tests?
3. How many word families do Moroccan EFL students need to reach 95% and 98% coverage of the reading test materials?

This study is significant because an analysis of the lexical load of high-stakes reading test sections can allow Moroccan textbook publishers to base their materials on word frequency lists, allow teachers to focus on specific frequency bands in their instruction, and provide research-based insights for Moroccan EFL evaluation experts.

5. MATERIALS AND METHODS

5.1 PARTICIPANTS

For the purpose of this study, 72 Moroccan EFL baccalaureate students (26 males and 46 females) were selected using convenience sampling from three public high schools in Casablanca, Morocco. During the research, the participants were near the end of their final semester, and had not yet finished their school year. According to their respective teachers, who had administered a diagnostic test at the outset of the school year, their proficiency level was pre-intermediate.

5.2. MEASURING THE RECEPTIVE VOCABULARY BREADTH

Nation and Belgar's (2007) Vocabulary Size Test was administered to 72 baccalaureate students in May 2022. To ascertain a clear understanding of how to complete the pen-and-paper task, instructions were to the respondents in their L1. The VST measures receptive recognition of written word form and the form-meaning connection of 14,000 word families (Nation, 2012). It employs a multiple-choice technique to measure knowledge of 10 items from every 1K frequency band. Nevertheless, the present academic endeavour only used the first 4 levels due to the respondents' level. As is discussed in the review, Moroccan EFL learners' receptive vocabulary size does not exceed the 4,000 word family level at best (Agrram, 2020, El Morabit, 2020; Harraqi, 2017). Thus, it seemed unfeasible to test knowledge of 14,000 word families. The present paper employed the VST because it has been recognized as a true vocabulary size test (Schmitt, 2010).

5.3. CORPUS

For the objective of this research, a corpus of 10,500 tokens was compiled from a total of 30 reading comprehension passages derived from 30 past official Moroccan high-stakes examinations. These reading passages covered the period from 2008 to 2022, including normal exam sessions and make-up sessions. The individual texts' length revolved around 300 and 390 running words. Taken together, they comprised a large corpus that was analysed using AntWordProfiler (Anthony, 2022). Table 1 summarizes the descriptive statistics of the corpus.

Table 1: ***Descriptive statistics of the corpus***

Years	Number of tests	Number of texts	Tokens
2008	*2 (normal session)*	1	320
	(make-up session)	1	334
2009	*2 (normal session)*	1	338
	(make-up session)	1	346
2010	*2 (normal session)*	1	393
	(make-up session)	1	354
2011	*2 (normal session)*	1	382
	(make-up session)	1	357
2012	*2 (normal session)*	1	372
	(make-up session)	1	352
2013	*2 (normal session)*	1	385
	(make-up session)	1	349
2014	*2 (normal session)*	1	386
	(make-up session)	1	348
2015	*2 (normal session)*	1	305
	(make-up session)	1	342
2016	*2 (normal session)*	1	353
	(make-up session)	1	352
2017	*2 (normal session)*	1	364
	(make-up session)	1	360
2018	*2 (normal session)*	1	361
	(make-up session)	1	377
2019	*2 (normal session)*	1	364
	(make-up session)	1	312
2020	*2 (normal session)*	1	354
	(make-up session)	1	334
2021	*2 (normal session)*	1	294

	(make-up session)	1	348
2022	*2 (normal session)*	1	377
	(make-up session)	1	323
Overall: 15	**30**	**30**	**10,536**

5.4. WORDLISTS AND SOFTWARE

Frequency wordlists such as the New GSL (Brezina & Gablasova, 2013) and other wordlists are based on lemmas, a headword (*e.g., study*) and its most frequent inflections (*studies, studied, and studying*). In contrast, word family has been used in the development of other popular frequency wordlists like Nation's (2012) BNC/COCA and receptive vocabulary breadth tests such as the VST. Thus, a family comprises a headword, inflections, and derivations (*e.g., teach, teaches, taught, teacher, unteachable, etc.)* (Milton, 2009). Discussions of differences between word families and lemmas are beyond the scope of the present paper (see Kremmel, 2016). Of interest to us, however, is the construct of a word family. Bauer and Nation (1993) highlighted that the notion of a word in the sense of a family is important in vocabulary breadth and vocabulary load studies. Thus, the present paper adopts word family as the basic counting unit for several reasons. For a start, the VST and frequency wordlists employed, in this study, are based on word family. Additionally, using word family allows for feasible comparisons with previous corpus-informed studies of lexical demands with respect to proficiency tests. In fact, all the above-mentioned papers, which focused on lexical profiling in relation to high-stakes exams (Collins, 2017; Kaneko, 2014, 2020, Vu, 2019; Webb & Paribakht, 2015), employed word family as the unit of measurement. For all these reasons, the researchers adopted "word family" in this study.

As to the frequency wordlists and software, this paper used Nation's (2012) 25 wordlists with the AntWordProfiler. Relying on this specific vocabulary profiler has been informed by Nation's (2016) call to use his BNC/COCA wordlists with Anthony's latest freeware (i.e., AntWordProfiler) due to the obsoleteness of the RANGE tool. However, since

the corpus comprises high school level materials, the researchers used the first 11 frequency lists. This decision is justified by the findings of different researchers who demonstrated that 14,000 word families are usually sufficient to account for optimal coverage (Kaneko, 2020; Webb & Paribakht, 2015). Moreover, a preliminary pilot analysis of the corpus corroborated this decision since it revealed that frequency bands higher than the 11K wordlists accounted for 0% of the items in the corpus. It is worthy to note that the AntWordProfiler shows the percentage of words that fall within every 1,000 frequency bands (Webb, 2021).

5.5. ANALYSIS OF THE PROFICIENCY TEST CORPUS

To establish the breadth of lexis needed for achieving 95% and 98% rates of coverage in the corpus, the researchers ran the corpus through the AntWordProfiler with Nation's (2012) BNC/COCA 11 lists. In this respect, several adjustments were made to the corpus and wordlists. To start with, the authors changed all the abbreviations to their original forms since they might be misanalysed by the freeware and skew the results. By way of an example, UN was changed to United Nations, and KM was converted to Kilometres to name but a few. In the same fashion, contractions accounted for 0.34% of the tokens in the corpus. Thus, following Webb and Rodger's (2009b) methodology, the researchers modified contractions to conform to Nation's wordlists. For instance*, I'd, don't, I've, I'm* were changed to *I would, I do not, I have,* respectively. Furthermore, hyphenated words such as *eleven-year-old, five-star, and hitch-hiked* were separated because they would be classified as low-frequency words. Finally, proper nouns that had been categorized as "*Not in the list"* were subjected to a manual identification process and subsequently reassigned to the category of proper nouns as in "*List 12*". To illustrate, the passages contained many Moroccan proper nouns such as Rachida, Ghita, El Yazami, etc. It should be borne in mind that certain items such as *selfie, laptop, headache,* which were unidentified by the software, were likely to be recognised by students whose vocabulary exceeds 2,000 word families. Hence, interpretations of coverage figures may be relatively conservative.

6. RESULTS

6.1 THE VOCABULARY BREADTH OF LEARNERS

The first question dealt with the receptive vocabulary size of the high school respondents. Table 2 presents a summary of the descriptive statistics of the students' receptive vocabulary breadth scores on the VST. The results show that the mean figures systematically decrease in the testees' scores as they moved from the 1st to the 2nd, 3rd, and the 4th most frequent 1,000 word families. This finding suggests that word frequency impacts vocabulary knowledge since

the participants knew relatively fewer words as they progressed from a level to the following. The table also shows that the overall receptive vocabulary breadth of the respondents was moderate (M=2015.27, SD= 771.98). Differently put, the receptive size of the EFL participants is 2,015 word families, and the standard deviation figure shows that the participants' overall scores deviated from the mean to some extent. This entails that there was a considerable amount of variability in the VST scores, especially in the second, third, and fourth bands.

Table 2:Descriptive statistics for receptive vocabulary size

Frequency	N	Minimum	Maximum	Mean	Std. Deviation
band one	72	4.00	10.00	7.5833	1.55419
band two	72	.00	10.00	4.7500	2.63107
band three	72	.00	8.00	3.9306	2.59646
band four	72	.00	9.00	3.8889	2.94817
Vocabulary Size	72	400.00	3300.00	2015.2778	771.98477

6.2 THE LEXICAL PROFILE OF MOROCCAN HIGH-STAKES READING TESTS

Research question number two was concerned with the vocabulary profile of reading texts as combined in a large corpus. Table 3 displays the cumulative coverage figures of words in the corpus (including proper nouns). The findings reveal that the 1st word list accounted for 77.68% of the running words in the corpus, while the second 1,000 wordlist covered 9.35% of the tokens. In much the same way, only 5.31% was accounted for by the third 1,000 wordlist. As the third column of table 3 shows, the percentages systematically diminished after the fourth and subsequent frequency lists, namely in the 11th wordlist. Interestingly though, the results also show that proper nouns occupied a substantial part of the tokens in the corpus. In other words, proper nouns covered 4.69% of the items in the whole corpus. This means that the maximum coverage that could be reached without proper nouns is almost 95%. It is worthy to point that the present study did not exclude the contribution of proper nouns from the cumulative coverages because they have little learning burden (Dang & Webb, 2014; Sun & Dang, 2020). Thus, the coverage of every frequency band plus proper nouns were added up until the 95% and 98% coverages were reached. In sum, the BNC/COCA 5,000 word families yielded an average text coverage of 94.17% without proper nouns.

Table 3:*Cumulative coverage including proper nouns for Moroccan EFL proficiency tests*

word list	Tokens		Token cumulative coverage	Cumulative coverage plus proper
	Raw	percentage		
1,000	8,159	77.68	77.68	82.37
2,000	982	9.35	87.02	91.71
3,000	558	5.31	92.34	**97.03**[a]
4,000	134	1.28	93.61	**98.03**[b]
5,000	59	0.56	94.17	98.86
6,000	15	0.14	94.32	99.01
7,000	8	0.08	94.39	99.08
8,000	9	0.09	94.48	99.17
9,000	8	0.08	94.55	99.24
10,000	5	0.05	94.6	99.29
11,000	10	0.1	94.7	99.39
Proper nouns	493	**4.69**	99.39	99.39
Not in the lists	64	0.61	100.0	100

[a] Reaching 95% coverage

[b] Reaching 98% coverage

6.3 THE VOCABULARY BREADTH NEEDED TO REACH 95% AND 98% COVERAGE OF MOROCCAN EFL reading tests

Research question three pertained to the number of words necessary to reach minimal and optimal coverage of Moroccan EFL proficiency reading tests. Together with proper nouns (i.e., plus 4.69) in the fifth column of table 3, a vocabulary breadth of 3,000 words provided 97.03% coverage of the corpus. With respect to the optimal coverage, along with proper nouns again, a comprehensive mastery of the most commonly occurring 4,000 word families is essential to attain 98.3% coverage. The fifth column of table 3 also shows that knowledge of 11,000 word families should account for up to 99.39% of the running words in the corpus, but its contribution to lexical coverage is insignificant. Interestingly, the findings disclosed that the contribution of wordlists above the 4,000-word level seem almost negligible.

7. DISCUSSION

The present paper mainly examined the lexical breadth of Moroccan EFL high school students in relation to the lexical demands of Moroccan high-stakes reading sections. It also

aimed to investigate the lexical breadth needed to achieve 95% and 98% coverage in reading ability. Another indirect objective of this article was to set a vocabulary goal for high school students preparing to sit for future national examinations.

In answer to research question number one, the findings revealed that the participants' receptive breadth is 2,015 word families. This vocabulary size would allow learners to cover up to 87.02% without proper nouns. Assuming that the participants know proper nouns, their vocabulary breadth might account for up to 91.71% of the tokens in the exam. The participants' receptive vocabulary size results are in accord with Nguyen's (2020), who also found that his high school respondents' breadth was 2,000 word families. Alternatively, they are not in line with El Morabit (2020) and Henriksen and Danelund (2015), who reported a smaller vocabulary size that did not exceed 2K word families. By way of conclusion, the participants' receptive vocabulary size does not meet the threshold necessary to reach the minimum coverage of the tokens in the reading materials.

Drawing on the output of the corpus analysis, the results of the second and third research questions revealed that the requisite receptive lexical breadth to achieve 95% and 98% cumulative coverage rates in the corpus were 3,000 and 4,000 word families plus proper nouns. These cumulative coverage figures, in the present article, are relatively comparable to Kaneko (2020), who found roughly equivalent figures for the minimum and optimal coverage rates. Nevertheless, the findings of this study are not in accord with several studies on lexical profiling of proficiency tests. To take a case in point, Kaneko (2014) found that vocabulary sizes of 6,000-12,000 word families in addition to knowledge of proper nouns are mandatory to attain 95% and 98% coverage rates of the reading passages of TOEFL (iBT), intended for senior high schoolers. These thresholds seem unattainable for secondary EFL students. In the same spirit, Webb and Paribakht (2015) showed that students need bigger lexical sizes to achieve acceptable and optimum coverage in the CanTEST. In principle, the coverage results obtained in this research show that the Moroccan high-stakes reading sections are not very demanding if compared to the findings reported in the literature (Collins, 2017; Kaneko, 2014; Vu, 2019; Webb & Paribakht, 2015). Yet, the findings of the Moroccan EFL high school students' vocabulary breadth fall quite short of the thresholds needed to achieve minimum and optimal rates. In other words, to reach the minimum coverage, which is adequate comprehension, the participants would need 1,000 word families extra. This number of words is much more than EFL students usually learn per year (400 word families) as suggested by Sun and Dang (2020). This indicates that the lexical load of the proficiency tests may be too

demanding for Moroccan high school EFL students although it is not too challenging compared to other findings reported in the literature.

In conclusion, the findings of the present paper show that Moroccan high school EFL students should have a vocabulary size of 3,000- 4,000 word families if they target 95% and 98% coverage rates of the running words in their high-stakes exams. Therefore, mastering knowledge of the most 3,000 word families should be a goal for all learners to meet before finishing their high school education.

7.1 PEDAGOGICAL IMPLICATIONS

The results of this paper shed light on the vocabulary profile of second-year baccalaureate reading sections. They also reveal the receptive vocabulary breadth of students before graduating high school. Therefore, these results have several crucial pedagogical implications. Firstly, students and Moroccan EFL teachers could potentially anticipate the expected coverage figures for the national exams. That is, if EFL teachers focus on teaching the most frequent four thousand word families, they are likely to ensure that their students may know up to 95% and 98% of the tokens in the test plus proper nouns. Thus, Moroccan EFL teachers are exhorted to use vocabulary breadth tests such as the VST or the UVLT as diagnostic tests. Also, EFL teachers are encouraged to analyse the lexical load of materials they use in their teaching. It is of paramount importance to note that El Morabit (2020) reported that in order to reach 95% and 98% coverage figures of tokens in Moroccan EFL textbooks, 3,000-5,000 word families are necessary. Another pedagogical implication for EFL teachers is to use vocabulary profiling freewares such as RANGE or AntWordProfiler to analyse the vocabulary demands of their quizzes and mock exams. This would help students get comfortable with texts of the same difficulty. On a different note, EFL teachers are implored to motivate their students to learn new words and expand their vocabulary breadth by reading extensively (e.g., graded readers).

Secondly, Moroccan EFL evaluation experts are urged to analyse the lexical demands of the official textbooks and previous high-stakes tests. Moreover, they are advised to minimise the use of proper nouns in the tests since they occupied 4.69% of the running words in the corpus analysed in the present paper. Finally, the findings of the receptive vocabulary size of the participants should inform future official exams. It would be highly advised for the Moroccan Ministry of education to start a large-scale research project to investigate the lexical breadth of Moroccan EFL high school students.

Lastly, curriculum designers and textbook writers should be mindful when choosing vocabulary items to be included in Moroccan EFL public sector textbooks. They are advised

to make use of learner corpora in the selection phase of vocabulary items. Research shows that the most commonly occurring 3,000 word families should occupy a sizeable proportion of the items in high school EFL textbooks (El Morabit, 2020; Sun & Dang, 2020). Thus, this figure seems as a suitable goal for Moroccan EFL learners in Morocco.

7.2 LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

The present study has many limitations that should be noted. With respect to vocabulary breadth, the number of participants (n=72) is not very representative of the Moroccan population. Hence, to arrive at a clear understanding of the vocabulary size of Moroccan EFL students, similar research should attract a large number of subjects.

As to the limitations of the lexical profiling, although lexical coverage might be the most crucial variable contributing to comprehension (Dang & Webb, 2014; Laufer & Sim, 1985), there are other predictors that might influence reading ability such as topic familiarity, text difficulty, and text length (Song & Reynolds, 2022). In fact, research dealing with the effects of different variables affecting reading comprehension is direly needed in the Moroccan context. For example, Song and Reynolds (2022) showed that topic familiarity, text length, and text difficulty played an instrumental role in reading comprehension compared to lexical coverage. The importance of studies of this nature lies in probing how lexical breadth, vocabulary profiling, and reading ability are related.

It is noteworthy to highlight that the present paper does not compare the lexical load of proficiency tests and the vocabulary size of the participants due to the limited number of respondents and the scanty amount of tokens in the corpus. However, it may be useful if further academic endeavours investigate the relationship between vocabulary size and coverage directly, using Laufer's (1989) methodology.

Finally, using the AntWordProfiler to analyse the corpus, this paper is affected by some shortcomings of the freeware. By way of an example, this programme cannot deal with multiword units such as compound words and idiomatic phrases. Thus, this might have interfered with the results because the AntWordProfiler cannot correctly process them. Subsequently, the programme cannot distinguish between homographs such as kind (adjective) and kind (type).

8. CONCLUSION

The current study examined the lexical demands of the EFL high-stakes proficiency tests in Morocco and the vocabulary breadth of students sitting for such examinations. The findings disclosed that most students lacked adequate vocabulary mastery of the most 3,000 word

families (m=2,015). Given the overall breadth of the participants, the reading test materials appear to be too challenging as far as vocabulary coverage is concerned. This paper also showed that in order to achieve 95% and 98% coverage of the tokens, students must master the most frequent 3K and 4K word families in English. Thus, it has been suggested that a vocabulary learning goal of around 3,000 and 4,000 word families should be set as a goal for Moroccan EFL learners before graduating high school. In sum, these findings, therefore, highlighted the role of lexical size in reading ability.

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