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A Vocabulary Profile Analysis of English Reading Tests in a Thai University Context

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Article information	
Abstract	In compliance with the Commission on Higher Education Standards' 2024 English proficiency policy, institutions have undertaken initiatives to support students in meeting required standards and achieving academic success. Given the crucial role of vocabulary knowledge, this study analyzed the vocabulary profiles and lexical coverage of university-level reading tests at a Thai university according to Common European Framework of Reference for Languages (CEFR) levels and two high-frequency word lists: the New General Service List (NGSL) and the New Academic Word List (NAWL). The results revealed cumulative vocabulary distribution across CEFR levels, with 67.07% at the basic level (A1-A2), 21.76% at the independent level (B1-B2), and 3.64% at the proficient level (C1-C2). The NGSL accounted for 88.13% of vocabulary items, while the NAWL provided 1.65% coverage. These findings suggest that knowledge of vocabulary breadth, particularly high-frequency vocabulary, serves as a key predictor of reading comprehension and overall test performance. The results offer insights into both the alignment of the reading tests with target proficiency expectations and inform considerations for test design and development.
Keywords	vocabulary profile, reading comprehension, Common European Framework of Reference for Languages (CEFR), New General Service List (NGSL), New Academic Word List (NAWL)

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1. Introduction

Vocabulary knowledge is regarded as a building block of learning and communicating in any language, and the English language is not an exception. Milton (2010, 2013) and Schmitt (2010) pointed to the positive correlation between vocabulary knowledge and performance of English language learners on all basic skills. Furthermore, many studies (e.g., Hu & Nation, 2000; Laufer & Ravenhorst-Kalovski, 2010; Qian 2002; Schmitt et al., 2011; Webb & Paribakht, 2015) confirmed a more specific correlation between vocabulary knowledge and reading comprehension, proving that the greater the former, the more successful the latter. Vocabulary knowledge and reading comprehension are highly essential for learners to succeed not only in their study of another language but also in their academic study (Schmitt et al., 2011). Without adequate vocabulary knowledge, learners would be at a substantial disadvantage in their education (Nagy, 1988). Masrai and Milton (2021) discovered that having a larger resource of general and academic vocabulary contributes to learners achieving higher GPAs and thus, it can be expected that learners' vocabulary knowledge, including both general and academic, is one of the predictors of their academic success.

At the beginning of 2024, the Commission on Higher Education Standards (CHES) under the Ministry of Higher Education, Science, Research, and Innovation of Thailand launched its latest policy aiming to tackle the issue of English language learning and proficiency among Thai learners of English as a foreign language (EFL) and to raise English language standards in higher education. Its ultimate goal is for higher education institutions all over the country to equip students not only with academic and professional skills but also with English language skills at certain adequate proficiency levels (CHES, 2024). To achieve this goal in a concrete manner, one of the requirements is for higher education institutions to assess their soon-to-be graduates' level of English proficiency, aligning with the Common European Framework of Reference for Languages (CEFR) (CHES, 2024). The expected achievement outcomes are the B1 level and above, the B2 level and above, and the C1 level and above for graduates of diploma, undergraduate, and

graduate programs, respectively (Commission on Higher Education Standards, 2024).

At a university in Thailand, there are two English courses for first-year undergraduate students, regardless of their fields of study, to take as prerequisites before proceeding to enroll in other more advanced academic English courses required by their programs. These courses are offered as part of the general education courses and focus on developing students' proficiency in all four basic language skills: listening, speaking, reading, and writing skills for everyday communication. One way that student performance, particularly reading, is evaluated is through formal assessment via achievement tests. The reason why these two courses should be taken into consideration is that they serve as a crucial foundation in English language skills, contributing significantly to students' future success in their academic program. However, both courses had been designed and offered long before the CHES announced its recent policy. Before considering any modifications in response to it, this casts doubt as to what extent the courses have been preparing students to achieve the expected outcomes. Guided by the policy's proficiency requirement of the CEFR B2 level and above (CHES, 2024), the courses, fundamental in nature, are intended to adopt the minimum framework of the B2 level. Additionally, it would be interesting to learn how much knowledge of general and academic vocabulary that these foundational courses can equip students with.

Previous studies on vocabulary knowledge and reading comprehension (e.g., Hu & Nation, 2000; Iwamoto & Kramer, 2020; Jin et al., 2017; Jin et al., 2023; Laufer, 1989; Laufer & Ravenhorst-Kalovski, 2010; MacDonald, 2019; Schmitt et al., 2011; Webb & Paribakht, 2015) involve the analysis of vocabulary in terms of its profile, which is the distribution of words in a text across frequency or proficiency levels (Webb, 2021), and its coverage, which is the proportion of known words within a text (Nation, 2006). These analyses show how much vocabulary knowledge is required for adequate comprehension (Webb, 2021). In the context of reading assessment, it can also reveal the level of the reading test's vocabulary demand and difficulty (Khalifa & Schmitt, 2010). Therefore, this study relies on the conceptual framework that a reading test, which includes an appropriate distribution and coverage of vocabulary items aligned with certain specifications (i.e., the CEFR B2 level and the fundamental general and academic vocabulary

knowledge), would facilitate language learners' progress toward the targeted proficiency level and academic achievement.

The objective of this present study is to examine the degree of alignment of the reading tests of the two courses to the B2 level of the CEFR, and to the fundamental knowledge of general and academic vocabulary based on the high-frequency word lists. Accordingly, the study aims to respond to the following research questions:

1. What are the vocabulary profiles and coverage of the reading tests according to the CEFR levels?
2. What are the vocabulary profiles and coverage of the reading tests according to the New General Service List (NGSL) and the New Academic Word List (NAWL)?

2. Literature Review

In this section, the review that follows is structured into four subsections to contextualize the present study.

2.1 Vocabulary Profiles and Reading Tests

Investigating vocabulary profiles of a text or the proportion of lexical items in a text classified by different frequency or proficiency levels has been of interest to researchers as it provides quantitative insights into the importance of vocabulary knowledge to both pedagogical and assessment approaches of reading comprehension (Nurmukhamedov & Webb, 2019; Webb, 2021). In one way, these studies show language learners and teachers how much vocabulary is required to comprehend different texts (Nation, 2006). In another way, they are used to measure how demanding the texts are when reading tests are developed (Khalifa & Schmitt, 2010).

Reading tests are used for formal assessment of reading comprehension which involves certain language skills, including vocabulary knowledge (Grabe & Jiang, 2013; Khalifa & Schmitt, 2010). Concerning the assessment approach, the correlation between vocabulary and the measurement of comprehension skills (Grabe, 2009), therefore, reflects the significance of the study of vocabulary profiles to the reading test construct. Khalifa and Schmitt (2010) examined the vocabulary profiles of the Main Suite Reading test papers at different levels, using

different wordlists available on the Vocabulary Profile, Bare Naked Lexis, and British National Corpus (BNC)-20K programs, and discovered a progression of lexical variety, frequency, and complexity from the lower to the higher levels of the test. In the study by Jin et al. (2017), the lexical profiling of the reading texts in the MNET or a high-stakes English test in China indicated the coverage across the BNC-14K wordlists and allowed them to establish benchmarks for the test's vocabulary profiles. Studies of vocabulary profiles can also reveal the distribution of general and academic vocabulary. In the context of Thailand's higher education, for instance, Cherngchawano and Jaturapitakkul (2014) reported an 85.05% coverage of general vocabulary based on West's (1953) General Service List and a 4.58% coverage of academic vocabulary based on Coxhead's (2000) Academic Word List in university admission tests. Such quantitative data not only suggest the vocabulary targets for language teachers and learners to prepare for tests but also allow test developers to design tests, catering to different purposes and levels of proficiency (Webb, 2021).

2.2 Lexical Coverage and Reading Comprehension

Vocabulary knowledge is undeniably crucial for reading comprehension. Nagy (1988) stated that it is the key factor that best predicts a reader's comprehension of a text, as it would be impossible for a reader to understand a text if most words remain unfamiliar to them. This raises the issue of how much vocabulary is considered adequate for comprehension. Research has been conducted to describe the relationship between lexical coverage, which refers to the percentage of vocabulary in a text that a reader knows, and the degree of reading comprehension (Nation, 2006; Webb, 2021). Laufer (1989) proposed a target of 95% coverage that allows readers to understand at least 55% of academic texts. Two decades later, Laufer and Ravenhorst-Kalovski (2010) suggested two coverage thresholds. First, the minimal threshold of 95% with proper nouns is adequate for comprehension with some assistance, as it enables readers to understand at least 77% of authentic academic texts. Second, the optimal threshold of 98% with proper nouns enables readers to read independently with at least 89% comprehension. Similarly, the results from the study by Schmitt et al. (2011) agreed that 98% coverage is more appropriate for academic reading, leading to 70% comprehension. In Hu and Nation's (2000) study, an optimum coverage level of 98% with proper nouns was also suggested although it was intended for at least 78% comprehension in reading fiction independently for pleasure. These

earlier notable findings of 95% and 98% coverages have been regarded as reference adequate comprehension thresholds in many later studies (e.g., Iwamoto & Kramer, 2020; Jin et al., 2023; MacDonald, 2019; Masrai & Milton, 2021; Webb & Paribakht, 2015). They indicate that, in order to sufficiently comprehend a text, readers should know at least 95% of its vocabulary–preferably, 98% or more. To elaborate, if a reader knows 95 out of 100 words in a text, they may encounter one unknown word in every 20 words, and if they know 98 out of 100 words, they may only encounter one unknown word in every 50 words (Hu & Nation, 2000). Therefore, the more words known by a reader, the better they tend to understand a text; in turn, higher levels of comprehension typically lead to stronger performance on reading assessments.

2.3 Common European Framework of Reference for Languages (CEFR) and English Language Education in Thailand

The CEFR is an inclusive international scheme for describing the proficiency of language users launched by the Council of Europe (CoE) in 2001, aiming to promote quality, transparency, and coherence in language learning and teaching, as well as in language assessment, at all levels (CoE, 2020). The CEFR prioritizes language learning and teaching for the sake of communicative needs, which allows language users to succeed in their social, educational, and professional contexts (CoE, 2020). Led by the action-oriented approach, the six Common Reference Levels of language proficiency were proposed with illustrative “can-do” descriptors based on real-life communicative tasks for each level, and these levels can be categorized more broadly into three groups of language users, including Basic (A1-A2), Independent (B1-B2), and Proficient (C1-C2) users. According to the Council of Europe (2020), the CEFR has increasingly been utilized as a reference for curriculum, pedagogy, and assessment reforms not only by its member states and the European Union but also by those outside of Europe. In fact, Thailand has also adopted the CEFR as a reference despite being later to do so than many other Asian countries (Foley, 2019).

Adopting the CEFR in Thailand’s English language education today is not novel. The CEFR has been introduced since 2014 through the Ministry of Education’s English language teaching reform policy to improve the unsatisfactory English language ability among Thai users and enhance the economic advantage in the ASEAN Economic Community where English is used as a medium for

communication (Foley, 2019; Wudthayagorn, 2018, 2025). The policy suggested that the CEFR be embraced together with the communicative language teaching approach as major frameworks for developing all aspects, including learning, teaching, and testing (Foley, 2019). Then in 2016, the Office of the Higher Education (OHEC) announced a policy on enhancing English language standards in higher education institutions. Many initiatives were taken following the launch of these policies, for instance, in-house English proficiency tests developed by many universities (Foley, 2019; Wudthayagorn, 2018, 2025). Almost a decade later, the CHES established a policy similar to that of 2016. In this 2024 policy, the English language achievement targets based on the CEFR were proposed specifically for graduates to meet at different levels of higher education (CHES, 2024). A recent study by Tangsakul and Poonpon (2024) was conducted on the alignment of the reading test construct of an academic English proficiency test, designed in-house by a university in Thailand, with the CEFR levels. It was found that aiming for the B level of the CEFR, the vocabulary distribution in the tests challenged their construct validity and should be enhanced to better align with the target level and meet the test objectives for graduate-level admission.

2.4 Two Major Word Lists Used in The Study: New General Service List (NGSL) and New Academic Word List (NAWL)

Learning a large amount of vocabulary sufficient for effective use of another language can be complex and burdensome for learners (Nation, 2022; Schmitt, 2010). Lessard-Clouston (2013) noted that word lists, which consist of the most important high-frequency words for different purposes, have progressively been utilized to assist in vocabulary teaching and learning in the English as a second language (ESL) and the EFL contexts to increase the feasibility of vocabulary acquisition among learners. Schmitt (2010) considered high-frequency words as foundational vocabulary of a language as they are usually acquired earlier, processed better, and used more frequently and extensively. Word lists, namely West's (1953) General Service List (GSL) and Coxhead's (2000) Academic Word List (AWL) have long been recognized as notable references for high-frequency general and academic vocabulary, respectively among English language learners and teachers (Lessard-Clouston, 2013; Nation, 2022; Schmitt, 2010). Milton (2010) and Masrai and Milton's (2021) studies mentioned that knowledge of the GSL could be considered equivalent to a 2,000-word target necessary for learners to progress to more advanced levels, particularly the B and C levels of the CEFR, and

together with the knowledge of the AWL, it would facilitate learners to communicate more effectively, both in everyday and in formal or academic contexts.

Subsequently, Browne, Culligan, and Phillips (2013b) proposed the NGSL, an update of West's (1953) GSL in hopes of offering a word list of general vocabulary with highest possible coverage that demands fewest possible words and overcoming some criticisms of the GSL, including its dated corpus and arbitrary definition of a 'word' (Browne, 2014). Similar to the GSL, the NGSL focuses on the words which are typically used for general purposes and frequently and widely appear across different English texts (Lessard-Clouston, 2013; Nation, 2022). However, the NGSL was created based on the substantially larger and more up-to-date Cambridge English Corpus's (CEC) 273-million-word sub-sections of British and American English written and spoken texts, balanced across different genres (Browne, 2014, 2021). To define what constitutes a 'word', the NGSL employed a modified lexeme approach, which Browne (2014) described as follows:

> … we count the headword in all its various parts of speech and include all inflected forms. For example, LIST would include LISTS, LISTED, LISTING, and LISTINGS. It does not include any of the derived forms using non-inflection suffixes. Variations such as the difference between US and UK spelling are also grouped within the same lexeme (p. 6)

Browne (2014) claimed that on the basis of modified lemmas, the NGSL provides 90.34% coverage of the CEC with 2,818 lemmas, while the GSL provides only 84.24% coverage with more lemmas at 3,623. Browne (2014) also compared the NGSL coverage with that of the other New General Service List developed by Brezina and Gablasova in 2013 and found that the NGSL provides better coverage for a dated corpus of classic English literature and for the more current corpora of The Economist and the Scientific American magazines. Furthermore, Stoeckel's (2019) study demonstrated better NGSL than GSL coverage of the Corpus of Contemporary American English's sub-section of 114 million words.

In the same year, Browne et al. (2013a) also created the NAWL. This word list contains academic vocabulary, which is defined by Nation (2022) as words with

a formal written nature that are commonly found in English texts for academic purposes, but do not have any special attachment to a specific subject area. It allows English language learners to use this word list for further vocabulary development for university studies, complementing the NGSL on the same modified lexeme basis (Browne, 2021). Although they followed a similar principle as Coxhead (2000) in developing the AWL, the academic words on the NAWL were based on the CEC academic corpus of 288 million words which is larger in size and more recent (Therova, 2020). Browne (2021) claimed that the NGSL and the NAWL together provide a coverage of 92% of the CEC academic corpus. While the former contributes 86%, the latter contributes another 6% to the total coverage (Therova, 2020).

Investigating coverage provided by the NGSL and the NAWL has resulted in many pedagogical implications, as can be seen from the following research. Studies by Iwamoto and Kramer (2020) and MacDonald (2019) agreed that the NGSL can be a useful vocabulary resource for learners and teachers of secondary education to prioritize in order to enhance the English reading comprehension achievement in examinations because of its considerably high coverage (i.e., approximately 95-98%) of senior high school and university entrance examinations in Japan. It was found in the former study that knowledge of only the first 1,000 most frequent words on the NGSL could provide as high as 98.11% coverage of senior high school entrance examinations (Iwamoto & Kramer, 2020). Another study by Jin et al. (2023) also recommended focusing on both the NGSL and the NAWL, plus the list of 100 technical words developed in their study, when preparing for the CEFR-aligned reading texts in the Malaysia University English Tests. It was reported that through investigating the texts from over 30 years of the tests, the NGSL provided an approximately 92% coverage, while the NAWL provided an additional coverage of 2%. Utilizing word lists of the most frequent general and academic vocabulary helps guide language learners as well as teachers to a clearer, achievable path in learning and teaching vocabulary.

3. Research Method

3.1 Data and Data Collection

This study used secondary data sourced from archived English reading tests and employed a quantitative, corpus-based approach. The approval of the research (COA No. 464/67) was granted by the Research Ethics Review Committee for Research Involving Human Subjects: The Second Allied Academic Group in Social Sciences, Humanities and Fine and Applied Arts at the university. Additionally, the researcher received institutional permission to access the archived tests for research purposes.

The data were obtained from the reading section of all versions of the single-use achievement tests administered in the two foundation English courses at a public university in Thailand in the past three academic years, from 2021 to 2023. In total, there were 48 reading tests: 20, 16, and 12 from each academic year, respectively. A decrease in the number of the tests mainly resulted from the test administration conditions caused by the COVID-19 pandemic and its aftermath. With an attempt to adapt the test development and administration in response to the disruption, more versions of the tests were developed in 2021 to promote fairness and prevent exam misconduct, when the tests were completely administered online. Although the exams resumed on campus between 2022 and 2023, the higher number of tests in 2022 stemmed from a greater need for makeup tests for students who missed the original exams due to a valid reason, particularly illness. This was intended to preserve the same test construct while also maintaining exam integrity. Each reading test comprised a reading passage and multiple-choice questions. The reading passages were selections from authentic texts, which might be modified marginally by professional test developers for suitability purposes, and had a Flesch Reading Ease score of between approximately 50 and 60. Their topics aligned with the themes in the coursebooks used in the courses, for example, environment, personal experience and development, and society and culture. The multiple-choice questions were reading comprehension questions of different types, including factual information, inference, main idea, reference, rhetorical purpose, and vocabulary questions. The length of the reading passages and the number of questions in the 2021 tests differed to some extent from those in the subsequent academic years owing to the aforementioned administrative conditions.

The tests were then organized in a compatible file format with the analysis tools and cleaned manually to remove irrelevant items, including test instructions, question numbers, letters in multiple choices, and numerals which are not supported by the analysis tools. The processed data contributed to a corpus of approximately 34,000 running words.

3.2 Data Analysis

In response to the two research questions of this study, the analysis of the data collected was conducted in two different methods.

As for the first method, the data was analyzed initially using the Text Inspector, an online text analyzer which offers the English Vocabulary Profile (EVP) as one of its features (Bax, 2012). The EVP is under the English Profile (EP) project which is mainly funded by Cambridge University Press and Cambridge English Language Assessment. The compilation of the EVP relied on the Cambridge Learner Corpus, a large collection of worldwide language learners' exam scripts, as well as additional sources, such as the Cambridge English Corpus – the same source used in compiling the NGSL and the NAWL, Cambridge English Lexicon, and vocabulary lists from leading coursebooks and proficiency tests (Cambridge University Press & Assessment, n.d.a). The EVP thus provides a reliable resource of vocabulary suitable for language users at different CEFR levels (Cambridge University Press & Assessment, n.d.a). The tool automatically tagged the vocabulary items in the input data, classified them into different CEFR levels, and calculated the percentages of distribution. However, the tool limitations listed on its webpage state that only the British English version of the EVP is available and that vocabulary items which belong to more than one level, depending on their polysemous meaning senses or parts of speech, will be tagged to their lowest level by default (Text Inspector, n.d.). Therefore, a manual analysis on the vocabulary items in question was carried out afterward by checking them against the American English version of the EVP using the EVP Online on the EP website (Cambridge University Press & Assessment, n.d.b) and by adjusting the tagging to the extent of the alternatives offered by the tool. Furthermore, the off-list vocabulary items were manually examined to extract proper nouns from those that do not belong to any of the CEFR levels and create a separate list.

Regarding the second method, the AntWordProfiler (Version 2.2.1), a vocabulary profiling freeware tool (Anthony, 2024), was utilized to provide the coverage percentages of the general and academic vocabulary items in the input data based on the NGSL 1.2 of 2,809 headwords (Browne et al., 2013b) and the NAWL 1.2 of 957 headwords (Browne et al., 2013a) as the reference word lists. In addition to these lists, the list of the NGSL Supplementary Words (hereafter, SUPP) (Browne et al., 2013c) was also included. The SUPP is a list of 52 headwords which consist of days of the week, months of the year, and numerical words and are classified under the NGSL (Browne, n.d.). There is reasoning behind this inclusion. Apart from the fact that the SUPP is considered part of the NGSL by Browne (n.d.) himself, Stoeckel (2019) mentioned that the version of West's (1958) GSL, which is used extensively as a reference word list in the lexical profiling tools, namely Lawrence Anthony's AntWordProfiler, Tom Cobb's Lextutor VocabProfiler, and Alex Heatley, Paul Nation, and Averil Coxhead's Range, was revised by Nation in the 1990s to include days of the week, months of the year, and numbers. In other words, these words are also regarded as general vocabulary and should be counted together with their coverage. Similar to the first approach, a manual analysis was then completed to identify proper nouns among the off-list vocabulary items and assemble a list of proper nouns.

The extraction of proper nouns was intended to follow the practice of the previous research (e.g., Hu & Nation, 2000; Laufer & Ravenhorst-Kalovski, 2010; Nation, 2016; Webb & Paribakht, 2015) to include them as part of the lexical coverage. It is based on the assumption that proper nouns are not too burdensome for learners to understand due to their distinctive features, such as being typically capitalized in a written text. Thus, they are deemed unnecessary to be known prior to reading a text, and oftentimes, their meanings can be learned within a text (Hu & Nation, 2000; Webb, 2021). In this study, proper nouns refer to names of specific entities, including prominent categories, such as personal names, geographical names, objects, institutions, languages and nationalities, and adjectives and common nouns that are derived from proper nouns (Biber et al., 1999). However, proper nouns that are days of the week and months of the year as well as those made up of ordinary lexical words (Biber et al., 1999) (e.g., 'Psychology Today') were classified in their respective CEFR levels or word lists (Laufer & Ravenhorst-Kalovski, 2010). To ensure the reliability of the research, the manual analysis

conducted by the researcher was verified by an expert in the field of English language teaching and assessment.

Nevertheless, there is another limitation posed by the tools. The Text Inspector could operate on certain multiple-word items (e.g., 'according to'), hyphenated vocabulary (e.g., 'well-being') included, whereas the AntWordProfiler could only identify single-word items (e.g., 'according', 'to', 'well', and 'being'). This resulted in different numbers of tokens calculated as can be seen in the results reported in the next section.

4. Results and Discussion

The results and discussion are presented concurrently, following the study's two research questions.

4.1 Research Question 1: What are the vocabulary profiles and coverage of the reading tests according to the CEFR levels?

The distribution of the vocabulary items in the reading tests across the six CEFR levels, which are further grouped into basic, independent, and proficient levels, the proper nouns, and the off-list items is shown in Table 1. According to the analysis tool, the number of tokens in the reading tests from each academic year between 2021 and 2023 was 17,578, 9,188, and 6,978 tokens, respectively, and these added up to a total of 33,744 tokens among all the 48 tests collected. Focusing on the CEFR levels, overall, the A1-level vocabulary items accounted for the largest proportion at 54.59%. Combined with the 12.48% at the A2 level, the basic-level items clearly constituted the majority of the vocabulary in the tests at 67.07%. The B1-level proportion of 13.04% was the second largest, followed by an 8.72% of the B2-level items. The distribution of these two levels made the independent-level vocabulary the second in proportion at 21.76%. The proficient-level vocabulary made up the lowest distribution at 3.64%, comprising a 2.46% and a 1.18% proportion of the C1- and C2-level items, respectively.

Table 1

Vocabulary Profiles of the Reading Tests: CEFR Levels, Proper Nouns, and Off-List Items

	2021 Tests		2022 Tests		2023 Tests		Total	
	Tokens	%	Tokens	%	Tokens	%	Tokens	%
Basic								
A1	9,602	54.63	4,984	54.24	3,836	54.97	18,422	54.59
A2	2,221	12.64	1,162	12.65	828	11.87	4,211	12.48
Independent								
B1	2,157	12.27	1,343	14.62	901	12.91	4,401	13.04
B2	1,578	8.98	765	8.33	599	8.58	2,942	8.72
Proficient								
C1	398	2.26	230	2.50	201	2.88	829	2.46
C2	211	1.20	109	1.19	77	1.10	397	1.18
Proper Nouns	724	4.12	281	3.06	209	3.00	1214	3.60
Off-list	687	3.91	314	3.42	327	4.69	1328	3.94
Total	17,578	100	9,188	100	6,978	100	33,744	100

Note: % = Percentage

The decreasing distribution of vocabulary from the A1 to C2 levels was predictable, as the reading tests generally reflected vocabulary accumulation from basic to advanced proficiency. Tangsakul and Poonpon (2024) reported a similar declining proportion of vocabulary from the A to C levels (i.e., 71.4%, 18.19%, and 3.69%, respectively) in their study of B-level reading texts from university standardized tests in Thailand. Despite differences in test design, the vocabulary in both studies' tests was likely similar, given their shared aim of assessing academic reading comprehension at the CEFR independent proficiency level. As indicated by this study's results, the A1-level items represented over half of the distribution, which was by far the highest. It was found that function words (e.g., 'the', 'and', 'of'), which were mostly deemed to be at the A1 level, appeared most frequently in the tests, and constituted around a quarter of the total tokens. This was not uncommon in the literature. According to Biber et al. (1999), function words serve to connect lexical words or larger structural units within a text and typically occur with high frequency, regardless of text type. In the BNC, function words exclusively comprised the top 50 high-frequency words and dominated the top 100. (Schmitt, 2010). In fact, the aforementioned most frequent functions words in this study ranked in the top three in the BNC. Besides the function words, there was no notable pattern of other high-frequency items. The vocabulary varied

across tests and was context-dependent even though the topics corresponded to common coursebook themes. Some basic-level items (e.g., A1: 'country', 'people', 'something'; A2: 'almost', 'become', 'online') and independent-level items (e.g., B1: 'achieve', 'organization', 'technology'; B2: 'cause', 'popularity', 'transform') appeared across multiple tests, but this was less likely to occur with the proficient-level items. Some C1-level items (e.g., 'awareness', 'outcome', 'sector') were found in several tests, whereas many C2-level items (e.g., 'melody', 'offset', and 'prey') occurred only in one test.

Since word sense is crucial to CEFR level classification, it is noteworthy that items with multiple meanings or used as different parts of speech in the tests were classified under different levels. For instance, 'world' denoting the Earth (as in 'around the world') was classified as A1, whereas 'world' denoting a group of activity (as in 'business world') was classified as B1 (Cambridge University Press & Assessment, n.d.b). Likewise, 'impact' was classified as B2 as a noun and C1 as a verb. Consequently, knowledge of vocabulary depth may also come into play, an issue that deserves further investigation.

Regarding the items outside the CEFR classification, the extracted proper nouns (e.g., 'Asia', 'Facebook', 'Michael') accounted for 3.6% of the proportion, and another 3.94% belonged to the off-list items (e.g., 'maligned', 'propensity', 'smartphone'). This 7.54% proportion was comparable to Tangsakul and Poonpon's (2024) reported unlisted vocabulary of 6.72% although their study did not extract proper nouns separately. Nation (2006) indicated that proper nouns typically comprise 2-4% of written texts. The 3.6% proportion found in this study fell within this expected range. Notably, off-list items alone accounted for a proportion equivalent to that of proper nouns and C1- and C2-level items combined.

Table 2

Lexical Coverage of the Reading Tests: CEFR Levels, Proper Nouns, and Off-List Items

	2021 Tests		**2022 Tests**		**2023 Tests**		**Total**	
	Cov. %	Cum. %	Cov. %	Cum. %	Cov. %	Cum. %	Cov. %	Cum. %
A1	54.63	54.63	54.24	54.24	54.97	54.97	54.59	54.59
A2	12.64	67.26	12.65	66.89	11.87	66.84	12.48	67.07
B1	12.27	79.53	14.62	81.51	12.91	79.75	13.04	80.11
B2	8.98	88.51	8.33	89.83	8.58	88.33	8.72	88.83

C1	2.26	90.77	2.50	92.34	2.88	91.22	2.46	91.29
C2	1.20	91.97	1.19	93.52	1.10	92.32	1.18	92.47
Proper Nouns	4.12	96.09	3.06	96.58	3.00	95.31	3.60	96.06
Off-list	3.91	100	3.42	100	4.69	100	3.94	100

Note: Cov. % = Lexical Coverage Percentage, Cum. % = Cumulative Lexical Coverage Percentage

Table 2 illustrates the lexical coverage of the reading tests provided by the vocabulary items across the CEFR levels, the proper nouns, and the off-list items. As can be seen, the cumulative coverage of the A1- to C2- level items in the tests across all three academic years was 92.47%. However, when considering only items up to the B2 level, the policy-designated proficiency benchmark, the cumulative coverage from basic- and independent-level items was 88.83%. With reference to the minimal coverage of 95% for reasonable reading comprehension and the optimal coverage of 98% for ideal comprehension (Hu & Nation, 2000; Laufer, 1989; Laufer & Ravenhorst-Kalovski, 2010; Schmitt et al., 2011), the results showed that the cumulative coverage fell short the minimum requirement. Even when proper nouns, which are generally assumed to be easily comprehend (Nation, 2016; Webb & Paribakht, 2015), were included, the cumulative coverage reached only 92.43%, adding 3.6% to the total. At this rate, test takers are likely to encounter an unknown word in about every 12 words in the tests (Hu & Nation, 2000). This suggested that the tests were lexically demanding for test takers who possess the B2-level vocabulary knowledge complemented by proper nouns to read without assistance.

The results demonstrated that the reading tests provided a substantial foundation of the basic-level vocabulary while also incorporating the independent- and proficient-level vocabulary. Nevertheless, given that the policy establishes B2 as the target proficiency level for students, a more balanced distribution and coverage of vocabulary items in the test design and development should be pursued. Even when function words were excluded from the analysis, significant gaps remained between proficiency levels. Although the smallest proportion of C-level items could be expected, the A-level proportion, twice that of the B-level, could be reduced through greater inclusion of B1- and B2-level items. Additionally, the proportion of off-list items, which are potentially unfamiliar, could be minimized. Such adjustments would align the test more closely with the B2-level benchmark and enhance lexical coverage to support adequate comprehension.

4.2 Research Question 2: What are the vocabulary profiles and coverage of the reading tests according to the New General Service List (NGSL) and the New Academic Word List (NAWL)?

In Table 3, the distribution of the vocabulary items in the reading tests across the NGSL, the NAWL, and the SUPP as well as the proper nouns and the off-list items is presented. By using a different analysis tool, there were 18,002 tokens in the 2021 tests, 9,423 tokens in the 2022 tests, and 7,141 tokens in the 2023 tests, constituting a total of 34,566 tokens. The NGSL markedly contributed to the highest distribution at 88.13%, whereas the distribution of the rest was noticeably lower. The NAWL accounted for 1.65%, which was the second to lowest, and the distribution of the SUPP, a supplement to the NGSL, was the lowest at 0.45%. Almost 10% of the items did not belong to any of the reference word lists which consisted of 3.62% of proper nouns and another 6.14% of off-list items. This similar trend of vocabulary distribution was evident in the tests across all three academic years.

Table 3

Vocabulary Profiles of the Reading Tests: NGSL, NAWL, SUPP, Proper Nouns, and Off-List Items

	2021 Tests		2022 Tests		2023 Tests		Total	
	Tokens	%	Tokens	%	Tokens	%	Tokens	%
NGSL	15,843	88.01	8,343	88.54	6,277	87.90	30,463	88.13
NAWL	276	1.53	150	1.59	146	2.04	572	1.65
SUPP	90	0.50	45	0.48	22	0.31	157	0.45
Proper Nouns	750	4.17	294	3.12	209	2.93	1,253	3.62
Off-list	1,043	5.79	591	6.27	487	6.82	2,121	6.14
Total	18,002	100	9,423	100	7,141	100	34,566	100

Note: % = Percentage

The results indicated that the majority of the tests' vocabulary distribution was represented by the NGSL. This could be anticipated as the word list offers coverage of the high-frequency general vocabulary across texts of various genres (Browne, 2014). Despite its largest proportion, the 88.13% distribution of the NGSL in the tests of this study was approximately 3-9% smaller when compared to the previous research. Iwamoto and Kramer (2020) and MacDonald (2019) reported that the NGSL accounted for 95-98% of the distribution in the university entrance examinations, while Jin et al. (2023) reported a 92% NGSL distribution in the university comprehension tests. Even though the tests from the reviewed studies

and the present study differed in design, all tests were intended to assess academic reading comprehension in an entry-level higher education context. Similar to the first research question results, a further investigation into the distribution of the general vocabulary in this study also uncovered a highly frequent occurrence of function words across the tests. Although the vocabulary distribution in Cherngchawano and Jaturapitakkul's (2014) research was incomparable with the results of this study due to the use of different word lists, interestingly, the first 100 high-frequency items in the corpus of Thailand's university admission tests in their research were largely function words. The function words appeared most frequently in this study (i.e., 'the', 'and', 'of') even made the top five on their list. The NAWL, however, constituted a small proportion of academic vocabulary across the tests. This result was unsurprising because this word list was designed to complement the NGSL for academic purposes (Browne, 2021). Therova (2020) found that the NAWL provides 6% additional coverage of the CEC academic corpus beyond the NGSL's 86%. The NAWL-to-NGSL ratio of 1.65% to 88.13% in this study was slightly lower than the 2% to 92% ratio reported by Jin et al. (2023). Apart from the notable proportion of function words among general vocabulary items discussed previously, no clear patterns emerged in the vocabulary distribution due to topic variation across the tests. General vocabulary (e.g., 'do', 'example', 'new') appeared more consistently across tests than academic vocabulary (e.g., 'consent', 'discrimination', 'spectrum'). Items from the SUPP (e.g., 'fourth' 'two', 'September'), which forms part of the general vocabulary list, were rarely found across the tests. However, off-list items (e.g., 'cybersecurity', 'rigorous', and 'scrutiny') comprised a relatively high proportion. Their 6.14% proportion in this study exceeded that in MacDonald's (2019) analysis of nearly 4%.

Table 4

Lexical Coverage of the Reading Tests: NGSL, NAWL, SUPP, Proper Nouns, and Off-List Items

	2021 Tests		**2022 Tests**		**2023 Tests**		**Total**	
	Cov. %	Cum. %	Cov. %	Cum. %	Cov. %	Cum. %	Cov. %	Cum. %
NGSL	88.01	88.01	88.54	88.54	87.90	87.90	88.13	88.13
NAWL	1.53	89.54	1.59	90.13	2.04	89.95	1.65	89.78
SUPP	0.50	90.04	0.48	90.61	0.31	90.25	0.45	90.24
Proper Nouns	4.17	94.21	3.12	93.73	2.93	93.18	3.62	93.86
Off-list	5.79	100	6.27	100	6.82	100	6.14	100

Note: Cov. % = Lexical Coverage Percentage, Cum. % = Cumulative Lexical Coverage Percentage

Concerning the lexical coverage, Table 4 shows the cumulative coverage of the reading tests provided by the NGSL, the NAWL, and the SUPP as well as the proper nouns and the off-list items. In relation to the established lexical coverage thresholds (Hu & Nation, 2000; Laufer, 1989; Laufer & Ravenhorst-Kalovski, 2010; Schmitt et al., 2011), the 89.78% combined coverage of the NGSL and NAWL was insufficient for adequate comprehension at either the minimal threshold of 95% or the optimal of 98%, with the NGSL coverage alone reaching only 88.13%. When the SUPP items and proper nouns, which are assumed to be readily comprehensible, were included, the cumulative coverage increased to 93.86% but remained below the minimum requirement. This indicates that the tests imposed a greater lexical demand than the knowledge of high-frequency general and academic vocabulary. With this coverage, an unfamiliar word would be encountered in every 16 words in the test, which is still likely challenging for test takers to cope with unassisted reading (Hu & Nation, 2000).

Milton (2010) noted the importance of West's (1958) GSL knowledge in advancing to the CEFR levels B and C and combined with Coxhead's (2000) AWL, this knowledge supports more effective everyday and academic communication. It may be plausible to assume that knowledge of the NGSL and NAWL, which are the more contemporarily developed versions, can also be regarded as a foundation for such progress. As seen from the results, a more limited distribution of the NGSL was found in the tests of this study than in other research, particularly in Jin et al.'s (2023), which was conducted on the CEFR-aligned texts, ranging from the A2 to C1+ levels. The cumulative coverage provided by the NGSL and the NAWL of the tests in this study was also moderately lower than that reported by Jin et al. (2023). Furthermore, the percentage showed that there was a considerable proportion of off-list items that were not likely to be known by readers. Consequently, the design of the tests could be enhanced through a balanced, increased distribution of high-frequency general and academic vocabulary and a reduced proportion of off-list items to facilitate learners in attaining the fundamental vocabulary knowledge and the expected academic achievement.

5. Limitations and Future Research

One key limitation lies in the predominance of single-word vocabulary items in the analysis. According to Milton (2010, 2013), Schmitt (2010), and Qian (2002),

vocabulary knowledge, which is integral to the development of language skills and academic success, involves learners' ability to both recognize words and know the way these words are used in collocations and in different contexts. The results of this study, which primarily reflect the knowledge of vocabulary breadth, may underrepresent the vocabulary knowledge required for adequate reading comprehension. Another limitation stems from the assumption that vocabulary knowledge alone may not fully account for reading comprehension. Hu and Nation (2000) stated that it also entails language learners' knowledge and experience of the world and skills in reading comprehension. Combined with the existing lexical coverage, these two latter variables may allow adequate comprehension of the tests to be met.

To address these limitations, future research could be conducted on the influence of vocabulary knowledge on reading comprehension by taking into account the knowledge of vocabulary depth in addition to the breadth. It would also be interesting to explore how other relevant factors, including learners' background knowledge of a text and their reading competence, contribute to comprehension. Moreover, further research on measurable outcomes, such as corresponding test scores, would offer a deeper understanding of this topic.

6. Conclusion

In conclusion, this study investigated the vocabulary profiles and coverage of the reading tests at a Thai university, guided by the CEFR B2 benchmark established in the CHES' 2024 policy on enhancing English language standards in higher education. The analysis examined vocabulary according to two alignments: the CEFR proficiency levels and the two reference word lists: the NGSL and the NAWL. First, it was revealed that the tests provided a substantial foundation of the basic-level vocabulary (A1: 54.59%; A2: 12.48%) while incorporating the independent-level (B1: 13.04%; B2: 8.72%) and the proficient-level vocabulary (C1: 2.46%; C2: 1.18%) to progressively lesser degrees. The tests also contained extensive 88.13% NGSL coverage with an additional 1.65% from the NAWL. Second, the vocabulary profiles indicated that students with broader vocabulary knowledge, particularly of high-frequency words, are better positioned to comprehend texts and perform successfully on the tests. Accordingly, word lists such as the NGSL and the NAWL serve as effective pedagogical tools for developing both vocabulary breadth and depth. Third, the results suggested

opportunities for improving test design and development. Refinements are needed to strengthen alignment between the tests and the prescribed benchmark. Optimized test development should integrate corpus-based analyses with pedagogical considerations, qualitative methods, and empirical validation, ultimately to support students in achieving the target proficiency level and academic success.

7. About the Author

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