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Determinants of L2 English Reading Proficiency among Thai Learners of English in Tertiary Education: A Multicomponent Perspective

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ABSTRACT

Multicomponent perspectives on second language reading proficiency offer a contemporary understanding of reading and its development (e.g., Yamashita, 2022). In this web-based experiment, we investigated the relationship among L2 reading proficiency measures—reading comprehension, listening comprehension, reading fluency—and component reading skills in English, assessed through tests of vocabulary, grammar, and orthographic knowledge. A sample of 101 L2 learners from a Thai university participated, providing demographic and language background information and completing a survey regarding their motivation to perform well. As expected, reading and listening comprehension were strongly correlated. Moreover, a three-factor model emerged, with word-decoding skills, linguistic comprehension, and word-processing speed as latent constructs explaining just over half of the overall variance in L2 reading proficiency. Notably, component skills in English contributed more significantly to individual variability in reading and listening comprehension than to reading fluency. These findings suggest that while both comprehension and fluency are important facets of reading proficiency, a different set of skills may underlie reading fluency

in a second language. The findings are discussed in relation to current theories of reading proficiency, with implications for L2 reading instruction considered.

Keywords: L2 reading proficiency, component reading skills, reading and listening comprehension, reading fluency

Introduction

English has become the dominant language for international communication, particularly in international trade, scientific research, diplomacy, and technology and innovation. This global dominance has influenced the usage of English in Thailand, where it plays a significant role in national development despite lacking official language status. English is mandatory for Thai students from Grade 1 (Ministry of Education, 2008), and recent language policies emphasise improving proficiency in English across all educational levels in Thailand, including higher education (Baker & Jarunthawatchai, 2017). Such policies aim to equip students with the English skills necessary for academic success and global communication, thereby enhancing their competitiveness in the job market. This focus on English proficiency raises important questions about how linguistic, cognitive, demographic, and environmental factors contribute to success or pose challenges for second language (L2) development (Kuperman et al., 2023).

Many university programmes in Thailand operate in a parallel-language environment (e.g., Busby & Dahl, 2021; Shaw & McMillion, 2011), where lectures and discussions are conducted in Thai, but English-language materials, including textbooks and lecture slides, are often utilised in instruction. Good L2 literacy skills are essential in this type of setting because reading is one of the primary means of developing the subject knowledge required for academic success. Students are required to demonstrate their readiness for higher education by taking standardised tests (e.g., ONET, GAT), which typically assess their reading comprehension abilities and general English language knowledge (e.g., vocabulary, grammar). Consequently, Thai students are often assumed to possess the reading skills required to understand academic materials in English, such as textbooks and research articles, which are typically written with L1 speakers in mind. However, these assumptions may not be well grounded because the tests used for university entrance might not adequately reflect the complexity of the academic texts that students are likely to encounter in their courses. Furthermore, university students often face significant challenges with L2 reading because academic texts are generally longer, contain sophisticated

vocabulary, and use more complex grammatical structures compared to regular texts (Snow, 2010). Even students with relatively good English proficiency may experience slower reading speeds, insufficient vocabulary knowledge, or employ fewer reading strategies when reading more specialised texts in English (e.g., Busby, 2018; Cheng, 1996; Laufer, 1992; Rungswang & Kosashunhanan, 2021; Shaw & McMillion, 2008).

Second language reading research in Thailand is predominantly pedagogical. One reason for this may be the general perception that Thai students have relatively poor English proficiency and therefore seem to struggle with reading as well as other skills in English (Baker & Jarunthawatchai, 2017; Sawangsamutchai & Rattanavich, 2016). Understandably, domestic reading research often investigates areas such as student motivation, the effects of teaching interventions like extensive reading, or the types of reading strategies that students employ or do not employ when reading for comprehension (e.g., Akkakoson, 2013; Oranpattanahai 2023; Pratontep & Chinwonno, 2008; Rawengwan & Yawiloeng, 2020; Sawangsamutchai & Rattanavich, 2016; Sek et al., 2021; Thongwichit, 2018). This line of research tends to focus on finding ways to help students improve their reading comprehension abilities or enhance instructional methods for general EFL courses. However, L2 reading is a complex, multifaceted endeavour involving several component processes or subskills (Koda, 2007). To address the complexity of L2 reading, this study investigates some of the cognitive and linguistic factors that influence reading abilities among university-level Thai learners of English. By utilising the component skills framework (Carr & Levy, 1990), the study aims to examine the processes and mechanisms underlying L2 reading proficiency, focusing on university students who have studied English as a foreign language (EFL) for at least 12 years and met the English proficiency requirements for university entrance. The sample is expected to fall within the intermediate to upper intermediate range of proficiency.

Literature Review

Traditional L2 reading research has been heavily influenced by L1 top-down frameworks that emphasise the role of conceptual abilities, background knowledge, and processing strategies (e.g., Coady, 1979; Goodman, 1967; Rumelhart, 1980). However, there is a general consensus among reading researchers that success in L2 reading comprehension is determined by several factors, including features of the text itself, the reader's background knowledge, and several component knowledge-based skills that the reader develops or possesses (Shaw & McMillion, 2011). Contemporary views of reading comprehension regard it as an interactive process involving

the intricate interplay of lower-level and higher-level processes. Lower-level skills (bottom-up processing) are important for decoding and understanding the meaning of printed words, encompassing aspects such as fluency, phonological awareness, and vocabulary knowledge. By contrast, higher-level skills (top-down processing) enable readers to comprehend the main ideas in the text by using background knowledge and contextual cues to make predictions and inferences that lead ultimately to a meaning-based interpretation (Li & D'Angelo, 2016). Skilled readers achieve better reading comprehension because their lower-level skills are highly automatised, which frees up attentional resources for the higher-level skills needed for processing textual information.

The Simple View of Reading

The Simple View of Reading (SVR; Gough & Tunmer, 1986; Hoover & Gough, 1990) is one of the most influential interactive models or component approaches to reading comprehension. In this model, reading comprehension is explained by the combination of two latent variables: word decoding and linguistic comprehension. Word decoding is essentially efficient (context-free) word recognition that reflects a reader's ability to quickly convert graphemes (letters) to phonemes (sounds) to derive meaning from print by accessing the appropriate entry in the mental lexicon (Jeon & Yamashita, 2014; Wolf & Katzir-Cohen, 2001). Decoding is usually measured in terms of accuracy and/or speed in reading real or pseudowords, but it has also been operationalised using measures of phonological awareness, reading fluency, and letter knowledge (Yamashita, 2022). Conversely, linguistic comprehension refers to the ability to understand and interpret language using lexical (word), sentence, and discourse information (Gough & Tunmer, 1986; Hoover & Gough, 1990). Investigations utilising the SVR framework tend to operationalise linguistic comprehension via listening comprehension, syntactic knowledge, and vocabulary, considering them under the general umbrella of "oral language" (Yamashita, 2022, p. 11). Linguistic comprehension comprises both lower- and higher-level processes, which are utilised regardless of input modality (aural or visual); that is, a common set of cognitive processes and components is involved in language comprehension, whether one is listening or reading (Jeon & Yamashita, 2022).

The Simple View of Reading in First (L1) and Second Languages (L2)

The SVR has received widespread empirical support in the literature (Catts, 2018; Kirby & Savage, 2008), with most research focusing on younger L1 learners. Several studies with primary school-age children indicate that

approximately 40%-80% of the variance in reading comprehension can be attributed to individual differences in word decoding and linguistic comprehension—in both English readers (e.g., Adlof et al., 2006; Foorman et al., 2018; Hoover & Gough, 1990) and readers of other alphabetic languages with varying orthographic depths, including Portuguese, Greek, Korean, Finnish, and Dutch (e.g., Cadime et al., 2017; Kendeou et al., 2013; Kim, 2011; Torppa et al., 2016; Verhoeven & van Leeuwe, 2012). Similar findings have been observed in studies of younger readers of nonalphabetic writing systems such as Chinese and Hebrew (e.g., Joshi et al., 2012, 2015). Therefore, these investigations show that much of the variance in reading comprehension, regardless of language, is accounted for by individual differences in word decoding and linguistic comprehension, providing robust support for the SVR.

Another line of research focusing on bilingual children's reading development has provided additional empirical support for the SVR. For example, Bonifacci and Tobia (2017) assessed both decoding and comprehension skills in primary school age bilingual language-minority children learning Italian as their L2. They found that listening comprehension was the strongest predictor of reading comprehension, although word-decoding skills did play a smaller but significant role in the younger age groups (first and second grade children). In a longitudinal study, Verhoeven and van Leeuwe (2012) investigated reading proficiency in L2 learners of Dutch over the first six years of primary school (Grades 1–6). The findings revealed that both word decoding and listening comprehension were significant predictors, accounting for over 60% of the overall variance in reading comprehension. However, the authors noted that the significance of word decoding diminished as children advanced through the grades, while the role of listening comprehension increased over time. In a study involving first-grade Spanish speakers learning English as an L2, Gottardo and Mueller (2009) reported that word decoding was a strong predictor of reading comprehension. Oral language proficiency also played a role, suggesting that both components are necessary for efficient English reading comprehension in young second language learners. In Kang's (2021) study, both decoding skills and oral language comprehension significantly contributed to L2 reading comprehension in fifth-grade Korean EFL learners, although language comprehension emerged as a relatively stronger predictor than decoding skills.

Although research on the applicability of the SVR to L2 reading among adults and older students is relatively limited, several recent studies have begun to explore this area. For instance, in a study involving English-speaking American high school students learning Spanish as a foreign language, Sparks and Patton (2016) reported that word decoding combined

with listening comprehension accounted for 66% of the overall variance in Spanish reading comprehension. In Kang's (2020) study, vocabulary depth and listening comprehension emerged as significant predictors of L2 English reading comprehension among Korean middle school (Grades 7–8) EFL learners. Notably, the participants in Kang's study had highly efficient decoding skills; thus, the findings align with previous research that highlights the greater importance of oral language capabilities in L2 reading comprehension for more proficient readers. Finally, Xu and Zhang (2024) investigated English reading comprehension abilities in Chinese university students and reported that word decoding and spoken language comprehension combined to make a unique contribution to L2 reading comprehension.

Determinants of L2 Reading Comprehension

The strength of the SVR framework lies in its simplicity. However, many researchers acknowledge that word decoding and linguistic comprehension are multifaceted and supported by various subcomponent processes that help to construct meaning (Kim, 2017; Kirby & Savage, 2008; Yamashita, 2022). These subcomponent linguistic skills (language-specific knowledge), including orthographic, phonological, morphological, lexical, and syntactic information, are essential for reading and its development. Research also indicates that general cognitive processes (or language-general knowledge) are important for reading and its development. Language-general knowledge includes cognitive skills such as inferencing, working memory, and inhibitory control, as well as metacognitive skills such as self-regulation, and reading strategies, which include operations such as comprehension monitoring, predicting, and goal setting that occur during reading (Yamashita, 2022; Jeon & Yamashita, 2022).

L2 research has identified various components that contribute to reading, distinguishing between language-specific knowledge and general cognitive processes. In a recent meta-analysis, Jeon and Yamashita (2022; see also, Jeon & Yamashita, 2014) examined the relationship between passage-level L2 reading comprehension and 11 correlates of reading. In decreasing order of strength of association, L2 reading comprehension was strongly and positively related to: L2 vocabulary knowledge (r = .72), L2 grammar knowledge (r = .70), L2 morphological knowledge (r = .64), L2 oral reading fluency (r =.64), L2 phonological awareness (r = .61), L2 orthographic knowledge (r = .59), and L2 decoding (r = .59). Of the two companion linguistic comprehension variables, L2 listening comprehension was the overall strongest predictor of L2 reading comprehension (r = .81), while L1 reading comprehension, thought to reflect general reading abilities, was

moderately correlated with L2 reading comprehension (r = .48). On the other hand, language-general variables such as metacognitive knowledge and working memory were fairly weakly correlated with L2 reading comprehension (both rs = .33) in the meta-analysis. Overall, these findings suggest that L2 language-specific knowledge plays a more significant role in L2 reading proficiency than general cognitive processes. This highlights the importance of linguistic knowledge in second language reading, while L1 reading skills and domain-general cognitive skills, such as metacognition and working memory, appear to play a more minor role.

The current study utilises a test battery that includes several of the component skills discussed above, including vocabulary, grammar, and orthographic knowledge as well as measures of word reading and listening comprehension.

L2 Reading Fluency

Reading fluently is important for effective reading comprehension and it is considered the hallmark of skilled reading ability (National Reading Panel, 2000). Skilled readers not only need to comprehend what they are reading, but also need to read quickly, accurately, and with appropriate prosody—that is, proper phrasing and expression (Grabe & Yamashita, 2022; Rasinski et al., 2011). Theory suggests that reading fluency is a complex construct involving the execution of a number of lower-order subskills or component processes that are orchestrated quickly, accurately, and effortlessly within a short period of time (Fuchs et al., 2001; LaBerge & Samuels, 1974). Automaticity in the basic linguistic processing operations of decoding, word recognition, and syntactic parsing allows readers to allocate residual cognitive resources to higher-order comprehension processes that are required for understanding the meaning of a text (Jeon & Yamashita, 2022).

Reading fluency represents both accuracy and automaticity in reading processes at the letter, word, and connected text levels (Wolf & Katzir-Cohen, 2001). Letter-level fluency is a lower-level perceptual skill involving grapheme-to-phoneme conversion. It is measured by asking participants to name a series of letters of the alphabet as quickly and accurately as possible and appears to be more important in younger readers (e.g., Joshi & Aaron, 2000). Word reading fluency builds upon automaticity in sub-lexical processes, reflecting a reader's ability to decode words in isolation by measuring how quickly and accurately they can read aloud a list of words (e.g., Fuchs et al., 2001; Jenkins et al., 2003). Text or passage reading fluency builds further upon these skills and reflects a reader's ability to integrate discourse-level information within a text.

Some investigations into reading fluency have employed measures of oral reading fluency (ORF), which reflect both the speed/rate (words per minute) and accuracy (number of words correctly identified) of reading a passage aloud. ORF is considered a proxy for silent reading and may include an expressive component that assesses how well a reader processes prosodic phrasing and intonation patterns while reading at the connected-text level (Grabe & Yamashita, 2022). ORF has long been considered an important variable in L1 reading research (for reviews, Fuchs et al., 2001; Grabe & Yamashita, 2022; Wolf & Katzir-Cohen, 2001), but it has recently started to generate some interest in L2 reading research. Jeon and Yamashita (2022), for instance, identified only six studies that met their criteria for inclusion in their recent meta-analysis. The majority of these studies assessed passage-level L2 ORF in younger EFL readers (Grades 1-4), with just two of them involving a sample of either adolescent or adult EFL readers (Jeon, 2012; Jiang et al., 2012). As noted earlier, there was a strong and positive relationship between L2 ORF and L2 reading comprehension ($r = .64$), which suggests that more fluent readers are also better at comprehending what they are reading.

Reading fluency has also been assessed under silent reading conditions. In a recent high-powered study, Kuperman et al. (2023) assessed the oculomotor behaviour (eye movement patterns) of 543 university students from various first language backgrounds while they read English texts for comprehension. The findings revealed a clear dissociation between reading comprehension and reading fluency: although L1 and L2 readers had similar reading comprehension accuracy, L2 readers exhibited significantly lower reading fluency as indicated by reading rate and eye-tracking measures. More specifically, L2 readers read more slowly, fixated longer, skipped fewer words, and had a higher likelihood of re-fixating or re-reading compared to L1 readers. Within-group analyses revealed that L1 and L2 eye movement patterns related to fluency were strongly related, yet L2 component reading skills had minimal impact on L2 fluency. By contrast, L2 component skills were more strongly related to reading comprehension in English than to reading comprehension in L1. This suggests that L2 fluency is influenced by a different set of skills and abilities than L2 comprehension. Nonetheless, proficient readers, regardless of language, utilise both fluency and comprehension skills. Given that the current study was conducted online, we used silent reading rate (words read per minute) as our measure of L2 reading fluency.

The Present Study

As discussed earlier, many studies using the SVR framework to investigate L2 reading comprehension have focused on children or adolescent

learners (e.g., Bonifacci & Tobia, 2017; Gottardo & Mueller, 2009; Kang, 2021, 2020; Sparks & Patton, 2016; Verhoeven & van Leeuwe, 2012). Relatively few studies, however, have examined L2 reading comprehension in more advanced L2 learners such as university students (e.g., Xu & Zhang, 2024). In contexts where English is taught as a foreign language, such as Thailand, university students often encounter specific challenges when reading in English. These challenges often stem from factors such as low motivation, slow reading speed, inadequate comprehension strategies, and deficiencies in vocabulary and syntactic knowledge (e.g., Chawwang, 2008; Chinpakdee, 2024; Oranpattanahai, 2023; Rungswang & Kosashunhanan, 2021; Srimongkontip & Wiriyakarun, 2014). Despite these reported difficulties, limited research has focused on how component reading skills affect reading comprehension in adult EFL learners. To address this gap, the present study examines L2 reading behaviour in Thai university students—a relatively advanced learner group in terms of years of formal education—using the component process approach (Carr & Levy, 1990) to explore how component reading skills contribute to L2 reading comprehension in this cohort.

To achieve this goal, we compiled a comprehensive battery of tests to assess the knowledge and skills that are important for reading in English. We used a reading comprehension test to measure both comprehension quality (accuracy in answering questions) and reading fluency, indexed by reading rate across multiple texts. In addition, linguistic comprehension was assessed using a listening comprehension test, while component reading skills were evaluated using measures of vocabulary, grammar, and orthographical knowledge. These measures of linguistic knowledge were selected based on their identification as key determinants of L2 reading comprehension (Jeon & Yamashita, 2022). The objective was to determine whether these component skills could be grouped into latent constructs representing word decoding and linguistic comprehension within this advanced EFL learner group. Participants also completed a language background and history questionnaire as well as a motivation survey to explore extralinguistic influences on their performance. The current work addresses the following two research questions:

1. Can the English reading comprehension of Thai university students be explained within the SVR framework?
2. Which component skills of reading in English predict L2 reading proficiency and its related facets of reading comprehension, reading rate, and listening comprehension among L2 learners from a Thai university?

Method

Design

A component skills design was employed, featuring three outcome measures (dependent variables) and eight predictor (independent) variables. The outcome measures included reading comprehension, reading rate, and listening comprehension. The predictors comprised various component English skills in vocabulary, grammar, and orthographic knowledge, along with a measure of motivation to excel in the study (see Materials for specific details). The experiment was administered entirely online, minimising the need for any specialised testing equipment.

Participants

One hundred and one students from Thammasat University participated in exchange for a small fee (around $3–4). They were all Thai native speakers with English reported as their second language (mean age = 21.51 years, SD = 3.97 years; 64 females, 22 males, 15 other), and most participants were enrolled in a bachelor's degree programme (88.12%). They demonstrated reasonably high proficiency in English, with an average score of 70% on the Lexical Test for Advanced Learners of English (LexTALE; Lemhöfer & Broersma, 2012), corresponding to the B2 level (upper intermediate) on the Common European Framework of Reference for Languages (see Table 1 for language proficiency ratings). Ethics clearance was obtained from the Human Research Ethics Review Sub-Committee of Thammasat University (Project Code: 137/2563) and informed consent was obtained for each participant prior to study commencement.

All participants provided accuracy data for the key outcome measure of reading comprehension. However, some values were missing for other measures due to technical errors (e.g., internet connection or server issues) or outlier removal. Technical issues particularly affected performance on the listening comprehension test, with usable data available from only half of the sample (50 participants) because the web server failed to record responses during the first phase of recruitment in April 2021. Table 2 (see results) shows the number of participants with valid data for each measure.

Materials

Each participant completed a battery of tests designed to measure L2 reading proficiency and its related component skills in English. The battery included measures of reading and listening comprehension, and seven

component skills tests. Each participant also completed a demographic and language background questionnaire as well as a motivation questionnaire.

Table 1

Descriptive Statistics for L2 English Language Proficiency

L2 English Proficiency	**Mean**
LexTALE	70 (0.1)
Proficiency	
Reading	4.84 (0.97)
Speaking	4.79 (0.82)
Age of Exposure (years)	
Reading	5.76 (3.29)
Speaking	5.52 (3.35)

Note. Standard deviations are in parentheses. LexTALE = Lexical Test for Advanced Learners of English. The range for LexTALE is 0–100. Self-rated proficiency (1 = *non-existent,* 7 = *maximal proficiency*). There were 17 missing cases for speaking proficiency/speaking age, and 8 missing cases for reading proficiency/reading age.

Demographic and Language Background Questionnaire

Every participant provided basic demographic and linguistic information about their L1 and L2(s). This instrument was adapted from Gullifer and Titone (2020) and is based on language history questionnaires commonly used in bilingual research (i.e., LEAP-Q, Kaushanskaya et al., 2020; LHQ3, Li et al., 2020). In Part 1 of the survey, participants reported details such as age, gender, university, degree, and year of study. In Part 2, they provided information about all the languages they knew, as well as their age of exposure and self-rated language proficiency in speaking and reading those languages (see Table 1).

Reading Comprehension and Reading Rate

Each participant read a set of 15 texts selected from training materials used in the ACCUPLACER reading test and the English as a Second Language Reading Skills Test. These tests are used in college or university admissions for L1 and L2 English speakers in North America. Each text was

followed by three 4-alternative-forced-choice comprehension questions that tapped into factual knowledge, inferencing skills, and a participant's ability to understand main ideas. Both the questions and texts appeared in a fixed order for each participant. Each text was written about a natural or historical phenomenon (e.g., Da Vinci's inventions) or about a person (e.g., Samuel Morse) in expository prose. The texts in the reading comprehension test were used in a previous study with a large sample of L2 English learners from various L1 backgrounds, demonstrating high reliability (Siegelman et al., 2024). Twelve of the texts were also used in the MECO study (Kuperman et al., 2023). Across 15 texts, the mean number of letters per word was 4.80 (*SD* = 0.47), with mean word and sentence counts of 139.93 (*SD* = 31.80) and 7.87 (*SD* = 2.59), respectively. The Flesch-Kincaid grade level readability estimate revealed that the texts were in the expected range for high-school or college-level reading (*M* = 10.52, *SD* = 2.61), or an advanced level based on Crossley et al.'s (2011) corpus study. An alternative index using the Coh-Metrix L2 readability score suggested that the texts were in the intermediate range (*M* = 16.18, *SD* = 4.99), according to the mean values reported by Crossley et al. (2011). These estimates indicate that the texts were appropriate for intermediate-to-advanced L2 learners of English.

Reading comprehension was computed as the percentage of correct responses averaged across 45 questions. Reading rate was calculated by summing the total number of words across all 15 texts and dividing this by the total time taken to read them, resulting in an average reading rate in words per minute (wpm). The reliability (Cronbach's alpha) of the reading comprehension test was .85, while that of the reading rate measure was .96.

Listening Comprehension Test

An adapted version of the Lectures, Interviews, and Spoken Narratives Test (LISN; Sommers et al., 2011) was used to assess listening comprehension. The test contained five audio passages, each between 1 and 2 minutes in length. The narrative passages were sourced from Rutgers University Oral History Archives and consisted of personal descriptions of life experiences. They were recorded by male and female professional actors with North American accents. Each narrative was followed by five 4-alternative-forced-choice comprehension questions, presented in a fixed order, making a total of 25 questions. Questions required participants to recall specific information, integrate two or more separate sources of textual information, or make inferences. Listening comprehension, like reading comprehension, was determined by calculating the percentage of correctly answered questions. The mean Flesch-Kincaid grade level readability estimate

was 6.7 (*SD* = 1.41), which corresponds to sixth-grade level. The reliability of the listening comprehension task was .80.

Motivation Survey

Motivation to complete the study was assessed using the Student Opinion Scale questionnaire (Thelk et al., 2009). The survey instrument contains ten statements that probe either the effort aspect of motivation (e.g., "While taking this test, I could have worked harder on it") or the importance aspect (e.g., "I would like to know how well I did on these tests"). Each item was rated on a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*), with scores reflecting the average rankings across 10 questions after scale reversals where needed. Higher scores indicated greater motivation to do well on the test battery. The motivation questionnaire had a reliability of .78.

Component Skills of English Reading Proficiency

We tapped into English reading proficiency using seven component skills tests: a grammaticality judgment task (GJT), a vocabulary knowledge task, the *Lexical Test for Advanced Learners of English (LexTALE)*, a lexical decision task (LDT), a spelling recognition task, an orthographic awareness task, and a text segmentation task. The tests were selected for both theoretical considerations and practical reasons (i.e., online administration). The *Grammaticality Judgement Task (GJT)* was used to assess syntactic knowledge and consisted of 30 items (adapted from Nassaji & Geva, 1999). Items were presented in spoken English (e.g., Johnson & Newport, 1989), and participants judged the grammaticality of each sentence by pressing the appropriate key on the keyboard. Half of the items were ungrammatical (e.g., "Last night the books falled off the shelves.") and half were grammatical (e.g., "The man climbed up the ladder carefully."). Scores on the GJT were per cent correct out of 30. The reliability of this task was .79.

The *Vocabulary Knowledge Test* (adapted from Nation & Beglar, 2007) measures receptive vocabulary size in English and contains 10 items from each 1,000-word segment of a frequency-ranked list of 14,000 English lemmas. Due to time constraints, the current study used a shortened version with up to 70 questions selected from the 2,000 to 8,000 word-frequency bands. The test presents vocabulary items in brief non-defining contexts (e.g., time: They have a lot of **time**) and participants choose the correct answer from four options (e.g., a. money, b. food, c. hours, d. friends). Scores reflected the total number of correct responses across all completed word groups. However, the test was discontinued for some participants in thousands 6–8 if they made four or more errors in any one of these bands

(see Appendix S3 in Siegelman et al., 2024 for further explanation of the scoring procedure). The reliability of this task was .92.

Vocabulary knowledge was also assessed with two self-paced lexical decision tasks: the *Lexical Test for Advanced Learners of English* (LexTALE; Lemhöfer & Broersma, 2012), validated for measuring vocabulary in medium- to highly-proficient L2 learners, and an in-house lexical decision task (LDT) specifically designed for this study. LexTALE consists of 60 items (40 words, 20 pseudowords) while the LDT contains 300 items (150 words, 150 nonwords). In both tasks, participants decided as quickly and accurately as possible whether a letter string was a real English word (e.g., *invent* vs. *arsher*) by pressing the appropriate key on the keyboard. Both accuracy (percentage correct) and speed (reaction times in milliseconds) were measured for each task. The overall reliability of these tasks was high (accuracy = .86 & .96; reaction times = .96, & .97 for LexTALE and the LDT, respectively).

Orthographic knowledge was measured using a *Spelling Recognition Test* (Andrews & Hersch, 2010), an *Orthographic Awareness Test* (Siegel et al., 1995), and a *Segmentation Test*. In the spelling test, participants judged the spellings of 44 items; half were spelled correctly and half contained spelling errors (e.g., *conveinient*, *sincirely*). Scores reflected the percentage of correct responses across items. In the *Orthographic Awareness Test*, participants were presented with 30 pairs of pronounceable pseudowords in English (e.g., *fyeth – fieth*) and asked to quickly select one item per pair that most looked like a real English word. Scores were the percentage of correct items for each participant. The orthographic awareness and spelling tests had reliabilities of .72, and .80, respectively.

In the *Segmentation Test*, participants were presented with a paragraph of unspaced text (e.g., "Orangejuiceisaliquidextractoftheorangetreefruit") and asked to insert spaces at appropriate word boundaries for English. Participant scores reflected the total number of words segmented correctly within a 90-second time limit.

Procedure

This research represents an individual site analysis of the English Reading Online project (ENRO; Siegelman et al., 2024), a comprehensive data resource with over 7,000 university-level participants from a wide range of L1 backgrounds who completed the same battery of tests. ENRO was designed to investigate both the differences and similarities in reading patterns among speakers of different L1s who use English as their L2. The entire dataset is available through ENRO's Open Science Framework repository (https://osf.io/gzyqf). The data for the Thai learners of English were collected using an in-house web-based platform designed by the Reading

Laboratory, McMaster University. Participants first read the informed consent form in English and then completed the demographic and language background questionnaire. The remainder of the test battery was presented in a fixed order, beginning with the reading comprehension task. The grammaticality judgement, listening comprehension, spelling recognition, and vocabulary knowledge tasks followed. The motivation survey was presented next, followed by the orthographic awareness, text segmentation, LexTALE, and lexical decision tasks. The entire test battery took approximately 1.5 hours to complete, with participants taking part individually.

Results

This section reports four main analyses. First, summary statistics for the test battery are presented followed by a correlational analysis examining the relationships between the measures of reading and listening performance and the component skills of English reading proficiency (Tables 2–3). The third analysis explores how the measured variables load onto latent factors using exploratory factor analysis (Table 4). The final analysis determines the amount of variance in reading and listening performance that can be explained by L2 component skills.

Descriptive Statistics

Table 2 shows the number of participants with valid data for each measure in the test battery. The total number of missing values was generally small (0.99–4.95% of participants) and these arose either as a result of technical problems associated with online data collection or because of data cleaning. For example, reading rates were only considered valid between 89–804 wpm; that is, rates three times slower or faster than the estimated silent reading rate of 238 wpm for L1 English readers (Brysbaert, 2019). Values outside of this range were discarded during initial data processing (see Siegelman et al., 2024), which resulted in a loss of all trials for some participants (11 missing values, 10.89% of sample). The reason for missing text segmentation values was because some participants did not insert any spaces during the allocated 90-second period (7 missing values, 6.93% of sample). The biggest data loss occurred with the listening comprehension test (51 missing values, 50.5% of sample) as a result of server error, which failed to record participant responses during the initial recruitment phase.

Table 2

Means and Standard Deviations (in Parentheses) for L1 and L2 Participants on Measures of Reading Comprehension, Motivation, and Component English Skills

	L1	L2		
Measure	**Mean (SD)**	**Mean (SD)**	**Range**	***N***
Motivation	3.59 (0.60)	3.43 (0.45)	1.9–4.6	101
Reading comprehension	0.73 (0.15)	0.69 (0.15)	0.22–0.89	101
Listening comprehension	0.64 (0.18)	0.52 (0.18)	0.16–0.88	50
Reading rate	267.30 (106.35)	192.36 (96.34)	107.21–543.83	90
Grammatical knowledge	0.87 (0.09)	0.63 (0.11)	0.37–0.87	96
Vocabulary knowledge	62.25 (9.11)	47.9 (13.7)	18–69	100
LexTALE: Accuracy	0.86 (0.11)	0.7 (0.1)	0.45–1	100
RTs	969 (283)	1292 (541)	489–4192	100
LDT: Accuracy	0.85 (0.12)	0.75 (0.09)	0.52–0.96	100
RTs	721 (114)	812 (143)	474–1168	100
Spelling	0.86 (0.09)	0.81 (0.1)	0.48–1	99
Orthographic awareness	0.89 (0.10)	0.9 (0.07)	0.63–1	100
Text segmentation	41.31 (13.14)	33.21 (14.07)	0–74	94

Note. L1 data source: Siegelman, N. et al. (2024). Rethinking first language–second language similarities and differences in English proficiency: Insights from the English Reading Online (ENRO) project. *Language Learning*, *74*(1), 249–294. LexTALE = Lexical Test for Advanced Learners of English; LDT = lexical decision task; RTs = reaction times.

Table 2 provides the means and standard deviations for L2 participants on all tasks from the test battery. The data for L1 participants were obtained from the ENRO study (N = 3,853) and are included for comparison purposes (see Siegelman et al., 2024 for a comprehensive L1-L2 analysis). General trends in the data indicate both similarities and differences between L1 and L2 participants in terms of component English skills. L2 participants were slower readers and had lower performance on measures of listening comprehension, grammar knowledge, vocabulary knowledge including lexical decision performance (speed and accuracy), and text segmentation. However, there appears to be relatively little differentiation between L1 and L2 participants with respect to reading comprehension performance, orthographic awareness, spelling, and motivation to excel in the study.

Correlations among Variables

Pearson correlation coefficients were computed to examine the relationships between the predictor variables and the main outcome variables of reading comprehension, listening comprehension, and reading rate for the L2 participants (see Table 3). The results showed that L2 reading comprehension was most strongly associated with listening comprehension. Among the component English skills, higher scores on the spelling and vocabulary knowledge tests, including LDT accuracy, were associated with better reading comprehension. The strongest predictors of listening comprehension were grammar knowledge and LDT accuracy. Orthographic knowledge also correlated significantly with listening comprehension, with better performance on the measures of spelling, orthographic awareness, and text segmentation associated with better listening comprehension. Reading rate, on the other hand, was generally uncorrelated with the component English skills but it was weakly and negatively correlated with the accuracy-based measures of reading and listening comprehension, as well as with word processing speed indexed by the lexical decision tasks (LexTALE RTs, LDT RTs).

Factor Analysis

Exploratory factor analysis (EFA) is valuable tool for uncovering latent constructs not directly observable through pairwise correlational analysis. In L2 reading research, it is commonly used to determine whether decoding and comprehension can be distinguished as separate components. In this study, EFA was used to examine how the various L2 component skills grouped together onto distinct factors. It was performed with minimal residual extraction and oblique rotation because of the shared variance between variables noted in the correlational analysis. The analysis yielded a three-factor solution that accounted for just over half of the overall variance in the data (52%). Table 4 provides the EFA results, including factor loadings above 0.4 from the rotated solution and the amount of cumulative variance explained by each factor.

Table 3

Correlation Matrix for the Main Measures in the Test Battery

Measure	1	2	3	4	5	6	7	8	9	10	11	12
1. Read comp	–											
2. Lisn comp	.65***											
3. Reading rate	–.29**	–.33*										
4. Gram knowl	.30**	.49***	–.06									
5. Vocab knowl	.54***	.22	–.08	.25*								
6. LexTALE (Acc)	.37***	.41**	.04	.26*	.36***							
7. RTs	.29**	.11	–.27*	–.06	.24*	.35***						
8. LDT (Acc)	.56***	.51***	–.17	.37***	.48***	.57***	.23*					
9. RTs	.17	–.09	–.31**	.03	.18	.03	.57***	.23*				
10. Spelling	.47***	.53***	–.08	.27**	.55***	.44***	.20*	.52***	.09			
11. Ortho score	.28**	.39**	–.03	.22*	.17	.34***	.07	.36***	–.04	.40***		
12. Segmentation	.28**	.45**	–.13	.29**	.08	.44***	–.09	.34***	–.26*	.30**	.30**	
13. Motivation	.08	.17	–.17	.06	.11	.16	.30**	.18	.29**	–.07	.009	–.15

Note. Read comp = reading comprehension; Lisn comp = listening comprehension; Gram knowl = grammatical knowledge; Vocab knol = vocabulary knowledge; LexTALE (Acc) = Lexical Test for Advanced Learners of English, accuracy; LDT (Acc) = lexical decision task, accuracy; RTs = reaction times; Ortho score = Orthographical awareness.

* $p. < .05$ ** $p. < .01$ *** $p. < .001$

Several of the accuracy-based L2 component reading skills loaded onto Factor 1, including accuracy in decoding printed words, as measured by performance on the LDTs, vocabulary knowledge, spelling, and orthographic awareness. Both reading and listening comprehension loaded onto Factor 2, indicating that text comprehension quality is a distinct factor in L2 reading proficiency. Additionally, reading rate loaded negatively onto this factor, suggesting that readers who were better at comprehending the texts also read more slowly. Factors 1 and 2 were moderately correlated with each other (r = .48). The LDT RT measures (after logarithmic transformation) grouped onto Factor 3, suggesting that speed in decoding printed words is a distinct factor underlying L2 reading behaviour. This factor did not correlate with the other factors. In sum, the three-factor structure suggests that L2 reading in university-level Thai learners of English is multidimensional, as observed in other studies.

Table 4

Exploratory Factor Analysis for L2 Reading Proficiency

Measure	Factor 1	Factor 2	Factor 3
LexTALE	0.69		
LDT	0.67		
Spelling	0.66		
Vocabulary knowledge	0.66		
Orthographic awareness	0.40		
Listening comprehension		0.92	
Reading comprehension		0.41	
Reading rate		−0.54	−0.44
LDT RT			0.84
LexTALE RT			0.75
Grammar knowledge			
Text segmentation			
Cumulative variance explained	22%	38%	52%

Note. LexTALE = Lexical Test for Advanced Learners of English; LDT = lexical decision task; RTs = reaction times. Grammar knowledge and text segmentation did not meet the factor loading threshold.

Hierarchical Regression Analyses

In the final analysis, a series of linear regression analyses were conducted to determine the relative contributions of the predictor variables to three outcome variables: reading comprehension, reading rate, and

listening comprehension (see Kuperman et al., 2023; Siegelman et al., 2024, for similar approaches). A partitioning-of-variance approach assessed variability in each dependent variable based on predictors of L2 knowledge (or component English skills) and the companion proficiency variable of comprehension (either L2 listening comprehension or L2 reading comprehension). L2 knowledge was entered in the first step of the model, with the following variables entered in a fixed order for each analysis: orthographic awareness, spelling, text segmentation, LexTALE scores, LDT scores, vocabulary knowledge, grammatical knowledge, and motivation. Although motivation is an extralinguistic skill that did not correlate with any of the behavioural variables, it was included with L2 component skills in Step 1. In Step 2, the corresponding comprehension measure was included in the model for the outcome variables of reading and listening comprehension, respectively. This helped to determine whether the accompanying comprehension measure accounted for additional unique variance in L2 reading proficiency when added to the model. Response times (RTs) for both LDTs were included only in the reading rate model as these are chronometric measures related to processing speed.

For reading comprehension, L2 knowledge comprising the component reading skills explained a fairly large amount of total variance (31.4%). The explanatory power of the reading comprehension model increased by 19.7% with the addition of listening comprehension as the companion proficiency variable in Step 2. The total variance explained by this model was 51.1% (ΔR^2 = 19.7%). With listening comprehension as the outcome measure, L2 knowledge accounted for 44.8% of the variance in listening accuracy. Adding reading comprehension as the companion proficiency variable to the model in Step 2 led to a modest increase in explained variance (ΔR^2 = 5.8%). Thus, the total variance of 50.6% in listening comprehension was explained by L2 knowledge and reading comprehension. Finally, with reading rate as the outcome variable, word decoding speed accounted for 13.9% of the variance in Step 1. A notable increase in variance (ΔR^2 = 12.1%) occurred with the addition of L2 knowledge in Step 2, resulting in a total of 26% variance explained for reading rate. In sum, this suggests that L2 knowledge had a smaller impact on reading rate compared to reading and listening comprehension.

Discussion

The current study employed a component skills approach to determine the factors underlying L2 reading proficiency in a group of Thai EFL university students. Data were collected online via a web-based portal, using a comprehensive battery of tests designed to tap into several

component reading skills previously identified as important determinants of L2 reading behaviour (Jeon & Yamashita, 2014, 2022). Two aspects of English reading proficiency were measured: reading fluency and reading comprehension, while participants' linguistic comprehension was assessed using a listening test. The results revealed several key findings. Firstly, L2 listening and reading comprehension were strongly correlated. Furthermore, the exploratory factor analysis produced a three-factor model comprising word-decoding skills (accuracy on lexical decision tasks, spelling, vocabulary, orthographic measures), linguistic comprehension (listening, reading comprehension), and word-processing speed (RTs on lexical decision tasks) as latent factors that accounted for just over half of the overall variance in the data. Finally, the results from the hierarchical multiple regression analysis indicated that L2 knowledge was the main source of individual variability in English reading and listening comprehension, but it had a smaller impact on reading fluency (measured by reading rate). The main findings will be discussed in detail below.

The finding that L2 listening comprehension is the strongest predictor of L2 reading comprehension was expected and directly addresses the first research question. A strong relationship between listening and reading comprehension is also consistent with observations from the second language reading literature, in both individual studies and meta-analyses (e.g., Jeon & Yamashita, 2014, 2022; Kang, 2020; Siegelman et al., 2024; Xu & Zhang, 2024). The first finding therefore supports the view that a common set of cognitive processes underlie the ability to comprehend language whether one is reading or listening (Jeon & Yamashita, 2022), as proposed by the Simple View of Reading (SVR; Gough & Tunmer, 1986; Hoover & Gough, 1990). Additional support for the SVR is provided by the exploratory factor analysis: five of the word-decoding accuracy measures formed one factor (i.e., vocabulary knowledge, both LDTs, spelling, orthographic awareness), two linguistic comprehension measures formed a second factor (i.e., reading, listening comprehension), and two word-processing speed measures formed a third (i.e., response times on both LDTs). Although decoding accuracy and comprehension abilities formed distinct clusters, they were closely related. This finding aligns with previous studies which have investigated the SVR for second language readers (e.g., Bonifacci & Tobia, 2017; Hoover & Gough, 1990; Kang, 2020, 2021; Sparks & Patton, 2016; Verhoeven & van Leeuwe, 2012; Xu & Zhang, 2024). These studies highlight how effective L2 reading comprehension relies on a combination of decoding and linguistic comprehension abilities. The findings in the current study also reinforce the general applicability of the SVR framework to more experienced L2 learners who have had early exposure to English as a foreign language. Nevertheless, although the SVR offers a popular and parsimonious

framework for understanding L2 reading comprehension, it has faced some criticism for being overly simplistic (e.g., Chen & Vellutino, 1997; Joshi & Aaron, 2000). The exploratory factor analysis also indicates that word-processing speed, or speed of lexical access, is an important but distinct component of L2 reading proficiency, as also observed in several recent studies (e.g., Kuperman et al., 2023; Siegelman et al., 2024). This suggests that a broader and more comprehensive framework of L2 reading is needed.

As outlined earlier, L2 reading is a complex and multifaceted construct involving several subskills or component processes (Koda, 2007). The second research question aimed to account for the sources of variance in the three outcome measures of English proficiency: reading comprehension, listening comprehension, and reading rate (fluency). The findings revealed that L2 component skills or knowledge (e.g., grammar, vocabulary, orthographic knowledge) explained a significant proportion of the variance in L2 reading comprehension, consistent with several previous studies (e.g., Bernhardt, 2011; Jeon & Yamashita, 2014, 2022). In this study, 31% of the overall variance in reading comprehension was attributed to L2 knowledge, aligning with Bernhardt's (2011) meta-analysis, which attributed 30% to L2 knowledge. The main findings are also consistent with large-sample megastudies that have quantified the variance in English reading comprehension for L2 readers from a wide variety of L1 backgrounds. For example, Kuperman et al. (2023) found that L2 knowledge explained 24% of the variance in L2 reading comprehension (compared to 31% in this study), while an additional 16% of the variance was attributed to L1 reading comprehension abilities. Similarly, Siegelman et al. (2024), using the same test battery as the current study, found that L2 knowledge accounted for the majority of the variance in L2 reading (50%) and listening comprehension (41%). Notably, Siegelman et al. included listening comprehension alongside L2 knowledge in their partition-of-variance analysis, whereas it was added in Step 2 of the regression model in this study. Including listening comprehension in the current study resulted in a model that explained 51% of the variance in reading comprehension, comparable to the findings of Siegelman et al. Furthermore, L2 knowledge explained most of the variance in L2 listening accuracy (45%), with L2 reading comprehension contributing a modest amount (6%) of variance in Step 2. By contrast, L2 knowledge explained 26% of the variance in reading rate, roughly half of what it explained for reading and listening comprehension.

This distinction between comprehension and fluency was observed in all analyses reported above. In the correlational analyses, reading rate correlated significantly with other chronometric measures, such as response times on the lexical decision tasks, but it did not correlate with any other L2 component skills. In the exploratory factor analysis, reading rate loaded

negatively on the word-processing speed factor, suggesting that a quicker reading pace was associated with faster word recognition. Conversely, reading rate also loaded negatively (and more strongly) on the comprehension factor. In the regression analyses, the total amount of explained variance was much lower for reading rate (26%) compared to reading and listening comprehension (51%). The finding that reading rate loaded onto two distinct factors suggests that it is a complex multidimensional variable influenced by both lower-level (word decoding speed) and higher-level (comprehension) processes. The stronger negative loading on the comprehension factor indicates that slower readers exhibited higher comprehension accuracy (see also, Kuperman et al., 2023; Siegelman et al., 2024), reflecting a clear speed–accuracy trade-off (Heitz, 2014; Wickelgren, 1977). This suggests that while faster L2 readers tend to recognise and process single words quickly, they also need to adjust their reading speed when engaging with more complex texts to ensure accurate comprehension. Therefore, speed alone does not guarantee effective comprehension.

Considered together, these findings indicate a dissociation between two facets of reading proficiency: reading rate (fluency) and comprehension. Further support for this distinction comes from several studies which have directly compared L1 and L2 reading in samples of university students within the same study (e.g., Busby & Dahl, 2021; Kuperman et al., 2023; Shaw & McMillion, 2008, 2011; Siegelman et al., 2024). L2 learners at the university level are often required to read academic texts written for native English speakers and typically read approximately 25-30% slower than their native-speaking counterparts. Nevertheless, these studies found that L2 readers were comparable to L1 readers in terms of comprehension accuracy. Furthermore, in a study by Pecorari et al. (2024), Swedish graduate students had an average L2 English reading rate of 175 words per minute (wpm) based on the Nelson-Denny Reading Test (NDRT; Brown et al., 1993). Although Pecorari et al. did not directly compare L1 and L2 readers, they argued that their L2 readers read significantly slower than both the NRDT L1 reading norms and Brysbaert's (2019) estimate of 238 wpm, which is identified as the average silent reading rate for L1 English readers. The descriptive statistics from the current study further substantiate this observation. As shown in Table 2, L2 readers, who read the same texts as L1 participants in Siegelman et al. (2024), had an average reading rate of 192 wpm, which is approximately 30% slower than the average reading rate of 267 wpm observed for L1 readers. Yet both groups showed roughly comparable comprehension accuracy (69% vs. 73% for L2 & L1 readers, respectively). Overall, these findings suggest that while native-like comprehension accuracy may be achievable in L2 reading, especially for older or more proficient learners, matching the reading speed of L1 readers remains quite challenging.

Limitations and Future Directions

The study has some limitations that affect the generalisability of the findings. One limitation is the relationship between grammatical knowledge, as measured by the grammaticality judgement task (GJT), and L2 reading comprehension. Although grammar knowledge was expected to strongly predict L2 reading comprehension (e.g., Jeon & Yamashita, 2014, 2022), it was only weakly, albeit significantly, correlated with L2 reading comprehension in the current study. However, grammar knowledge did corelate more strongly with L2 listening comprehension. The weaker relationship with L2 reading comprehension may have occurred because the GJT was operationalised in auditory format, requiring participants to judge the grammaticality of spoken utterances. It is plausible that participants who were better at listening comprehension performed better on the GJT because of the shared auditory processing demands across tasks. Conversely, reading comprehension relies more on visual information and may not benefit from shared auditory processing. An alternative explanation could be data loss in the listening comprehension test. Siegelman et al. (2024), who used the same battery of tests with a much larger sample of L2 readers, found that grammar knowledge correlated moderately with L2 reading comprehension and strongly with L2 listening comprehension. Thus, the observed findings align with Siegelman et al.'s, though the relationships between these variables are weaker in this study. It is thus unlikely that the weaker relationship observed reflects a qualitative difference between Thai learners and those from other L1 backgrounds. Future work can help by ensuring comparable sample sizes and by exploring how administration modality affects the relationship between grammar knowledge and L2 reading and listening comprehension.

Another limitation concerns test selection, which was constrained by both the online testing format and time constraints. Key component skills including morphological and phonological awareness were not included, and general cognitive measures linked to L2 reading proficiency (e.g., working memory, metacognitive awareness) were also omitted. Additionally, the study did not include L1 (Thai) reading measures. Future research should develop tests of Thai component skills so that reading and listening comprehension, as well as reading fluency, can be compared in L1 and L2 speakers. This would provide greater insight into the factors underlying L2 reading behaviour, particularly in relation to fluency and speed-accuracy dynamics.

Despite these limitations, the outcome measures in the test battery demonstrated high to excellent reliability, indicating that the selected tests are well-suited for detecting individual differences in L2 component skills as well as reading and listening comprehension. Furthermore, the study contributes to the L2 literature in several ways. First, the findings provide empirical

support for the Simple View of Reading (SVR; Gough & Tunmer, 1986; Hoover & Gough, 1990), illustrating its relevance to university-level L2 learners who have studied English as a foreign language since childhood. The SVR serves as a valuable framework for developing pedagogical interventions that specifically target decoding and language comprehension skills. Second, the component skills approach enhances our understanding of the specific skills contributing to L2 reading behaviour. Results support the notion that language users integrate various component skills during reading comprehension, emphasising the need to develop subskills such as accurate and rapid word recognition, effective oral language comprehension, and knowledge of orthography, vocabulary, and grammar, alongside reading fluency. These insights can help instructors identify specific areas of weakness through assessment, enabling targeted instruction or support that can be particularly beneficial for lower-proficiency learners. Third, the findings further underscore the role of listening comprehension in reading. By integrating visual and auditory input, language teachers can develop comprehension skills across modalities, thereby enhancing overall linguistic comprehension.

Furthermore, the study indicates that reading fluency plays a complex role in L2 comprehension. While we cannot account for the larger amount of unexplained variance in reading fluency compared to comprehension, previous work (e.g., Kuperman et al., 2023) suggests that L1 reading abilities may influence L2 reading fluency more than comprehension. Further research should explore the intricate relationships among fluency, comprehension, and other factors, including L1 reading skills, metacognition, and working memory. Future studies should also closely examine how reading speed and accuracy interact with various factors such as language proficiency, text types (e.g., academic, narrative, technical), reading goals (e.g., skimming, scanning, detailed reading), and strategies (e.g., summarising, making inferences) that are employed in second language reading. Continued exploration of these areas would significantly advance the field of second language reading, benefiting language learners and teachers alike.

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