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Heterogeneity of English Reading Skills and Its Associations with Learning Backgrounds in Korean EFL Contexts

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Motivated by the effort of diagnostic interventions for EFL learners in Korean educational contexts, this study aims to identify heterogeneous L2 reading skill profiles among students attending the same school. Subsequently, it investigates the impact of learners' L2 learning backgrounds on heterogeneity of these reading skills. Using Latent Profile Analysis on 234 vocational high school students, we identified four distinct profiles: Profile 1, severely weak L2 readers with very low decoding and syntactic knowledge; Profile 2, moderately weak L2 readers; Profile 3, above-average L2 readers; and Profile 4, fairly well-developed L2 readers with good vocabulary breadth. Multinomial regression analysis revealed that profile membership was significantly predicted by positive past learning experiences, extra-curricular English reading, and motivational attitudes. These findings underscore the significant heterogeneity in L2 reading skills within the seemingly homogeneous EFL group and highlight the critical association with past and current educational experiences, emphasizing the importance of tailored interventions based on individual learning histories.

Key words: English reading, Latent Profile Analysis, Multinomial regression, Learning backgrounds, Motivation

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1. INTRODUCTION

Individualized and tailored instruction for English has been a ever-lasting agenda among educational community in Korea. However, since there is little systematic information on what are the strengths or weakness of students' English skills among the same grade levels, teachers have limitation to develop and design more tailored instructions in classrooms. Traditionally, schools have used scores from broad measures of English proficiency to identify low-achieving students in need of instructional support. This approach often fails to provide diagnostic or formative information for them, possibly leading to a mismatch between the specific needs of students and the intervention programs provided (Byean, 2015; Yang, 2019). Moreover, since such approaches focus on identifying low-achieving learners, the educational system often overlooks students whose scores marginally exceed the thresholds, yet who would still benefit significantly from targeted interventions.

In ESL contexts, researchers have made efforts to systemically delineate the sources of L2 reading problems by asking what kinds of L2 reading skill profiles there are among their target populations using the latent profile analysis approach (Lesaux & Kieffer, 2010; O'Connor, Geva, & Koh, 2019; Vargas, Daucourt, Hall, Hart, & Solari, 2023). While these studies offered some insights for heterogeneity of L2 reading skills, these findings provide only a partial picture for EFL learners because there may be variations of key components influencing L2 reading comprehension due to the different L2 learning contexts (Alderson, Huhta, & Nieminen, 2016). For example, previous ESL-based studies included orally measured vocabulary or listening comprehension skills since L2 literacy development of ESL learners follows L2 oral language comprehension development, which is not well supported in EFL contexts. Motivated by this need, a few studies in EFL contexts started to investigate L2 skill profiles, taking into consideration the unique characteristics of L2 linguistic knowledge variables that are relevant to EFL learners' L2 reading comprehension (Kim & Lee, 2021; E. Kim, 2023).

While previous ESL studies have only focused on identifying the different L2 reading skill profiles, there is a clear need to explore the foundational causes behind such heterogeneity, especially in Korean educational contexts (Lee, 2003, 2008, 2010; Song & Kim, 2017; Yang, 2018). These findings will facilitate understanding of the challenges faced by low-level adolescent learners, but also offer insights into potential L2 instructional interventions.

This study aims to bridge this gap by examining not only distinct skill profiles of English reading abilities among Korean vocational high school students, but also by investigating how various aspects of their educational backgrounds—such as prior educational experiences, personal engagement with English, and motivation—impact the formation of these profiles.

2. LITERATURE REVIEW

2.1. L2 Reading Component Skills in EFL Contexts

The present study focuses on five reading-related skills that are well documented in the EFL reading research. Decoding, the ability of translating graphemes into the phonemes, has been widely recognized as a critical factor influencing reading comprehension variability for young L2 learners in both SL and FL contexts (Erbeli & Joshi, 2022; Y. S. Kim, 2012; Huo, Koh, Cheng, Marinova-Todd, & Chen, 2021). As L2 proficiency of EFL learners became more matured, the role of L2 decoding in L2 reading comprehension was often reduced compared to other L2 language skills such as L2 vocabulary, grammar or listening comprehension skills (Sparks, Patton, & Luebbers, 2018; Van Gelderen, Schoonen, Stoel, De Glopper, & Hulstijn, 2007; Yamashita, Shiotsu, & Kusanagi, 2023). For example, for those FL learners who had learned L2 for one year at high school, L2 decoding was a still significant factor for their L2 reading comprehension (Sparks et al., 2018). On the other hand, for those who had learned L2 for more than three years, L2 decoding was not a significant predictor of their current level or growth rate of L2 reading comprehension anymore (Sparks et al., 2018; Yamashita et al., 2023).

In EFL contexts, L2 vocabulary and syntactic knowledge are often operationalized as written linguistic knowledge because they are mostly learned in formal classroom settings where grammar and reading are two most prominent parts of instruction, especially in Korea. This linguistic knowledge was shown to significantly correlate with L2 reading comprehension for EFL learners (Shiotsu & Weir, 2007; Yalin & Wei, 2011; Yamashita & Shiotsu, 2017; Zhang, 2012). Kim and Cho (2015) noted that L2 syntactic knowledge is a more significant predictor of L2 reading comprehension for lower proficiency learners, while L2 vocabulary knowledge is more significant for more proficient learners. Yamashita et al. (2023) validated the significant role of L2 syntactic and vocabulary knowledge in L2 reading comprehension within the longitudinal design with Japanese EFL learners.

A group of L2 reading researchers investigated L2 vocabulary knowledge in terms of breadth and depth dimensions (Proctor, Silverman, Harring, & Montecillo, 2012; Silverman et al., 2015). This inquiry was based on the notion that more qualitatively sophisticated lexical knowledge is associated with fluent integration of words to text, which leads to successful reading comprehension (Perfetti, 2007). In EFL contexts, some studies addressed the critical role of L2 vocabulary depth knowledge by showing its direct and independent effect to L2 reading comprehension beyond the contribution of L2 vocabulary breadth knowledge (Kang, 2020; Li, Zhu, & Wu, 2021). Nevertheless, it seems that the role of L2 vocabulary depth knowledge should not be prioritized over the breadth dimension, depending on L2 proficiency levels. In Li et al., (2021), L2 vocabulary depth knowledge was

not a significant source of poor comprehension of ESL adolescent learners. In Chen and Liu (2020) with adult EFL learners, the role of L2 vocabulary depth knowledge became significant only after the learners had acquired a vocabulary size of 6,000 words.

Previous studies reviewed above focused on revealing the relative importance of specific L2 reading component skills in various educational contexts. Building on this existing research, this study explores how these component skills interact to form distinct skill profiles of EFL readers, particularly among mid to low-proficiency EFL learners.

2.2. L2 Reading Skill Profiles of Previous LPA Studies

Previous research on L2 reading skills primarily analyzed linguistic variables affecting L2 reading comprehension through ANOVA, regression, or SEM frameworks, often treating individual differences as statistical noise and masking the diversity within learner groups (e.g., Bae, 2017; D'Angelo & Chen, 2017; J. Y. Kim, 2016; Li et al., 2021). Unlike these traditional methods, since LPA does not presuppose linearity between variables and reveals the nuanced patterns of responses, LPA is particularly valuable to explore distinct profiles that exist within a seemingly uniform learner group (Bergman & Magnusson, 1997; Hickendorff, Edelsbrunner, McMullen, Schneider, & Trezise, 2018).

LPA-based studies have illuminated heterogeneity in L2 reading skills profiles (E. Kim, 2023; Kim & Lee, 2021; Lesaux & Kieffer, 2010; Li, Kirby, Geva, Koh, & Zhang, 2022; O'Connor et al., 2019; Vargas et al., 2023). For example, Lesaux and Kieffer (2010) investigated fifth-grade ESL learners having L2 reading comprehension difficulties. Utilizing LPA with measures of L2 word and passage level decoding and general and academic vocabulary, they uncovered three heterogeneous L2 reading skill profiles. The pattern of these profiles was characterized by evenly low L2 vocabulary while exhibiting varied L2 decoding abilities. One notable finding was a subgroup defined as "word callers," demonstrating L2 decoding ability above the national average but significantly deficient L2 vocabulary skills. These patterns were similarly observed by Capin et al. (2024) with low-achieving ESL learners in Grades 6 and 7. Their study expanded by examining the differential effects of instructions on L2 reading comprehension outcomes of each subgroup in a longitudinal paradigm. After one year of targeted instructions on L2 decoding and vocabulary skills, the subgroup with the lowest L2 decoding ability showed the steepest growth in L2 reading comprehension. O'Connor et al. (2019)'s study, which identified two profiles among general ESL students in Grade 5 based on L2 phonological awareness, orthographic processing, L2 vocabulary, listening comprehension and reading comprehension, was partially in line with the two studies above (i.e., Capin et al., 2024; Lesaux & Kieffer, 2010). The L2 decoding abilities had greater variations between the subgroups compared to the other L2 comprehension measures including L2 vocabulary and

listening and reading comprehension.

Vargas et al. (2023) identified three different profiles of L2 foundational literacy skills among Grade 1 ESL students, demonstrating that the initial L2 foundational literacy skills influence children' L2 reading development trajectories. Similarly, Ford, Cabell, Konold, Invernizzi, and Gartland (2013) used cluster analysis to explore the diversity of early literacy skills in kindergarten-aged L2 learners and its predictiveness on future L2 literacy skills. Although both studies highlight the diversity in skill profiles, the statistical approaches differ in their interpretability and generalizability. That is, Vargas et al. (2023) used LPA, which groups individuals based on latent variables, like 'unseen power,' inferred from observed variables (e.g., oral reading fluency). This method allows for a deeper understanding of why the subgroups differ, as supported by Muthén (2001). This interpretability is less ensured in case of cluster analysis like Ford et al. (2013) because individuals were grouped merely based on the observed variable scores. Moreover, LPA's use of model fit statistics to determine the number of subgroups enhances the generalizability of findings, unlike cluster analysis, which heuristically determines the number of subgroups based on the scores of observed variables.

It is worth noting that previous LPA studies from ESL contexts used decoding skills and vocabulary size as variables to characterize reading skill profiles of their target populations. Also, since previous ESL studies fundamentally aimed at revealing sources of reading comprehension difficulties, the reading comprehension measure was often not included as a variable in their research design. For EFL learners, however, a broader range of reading skills needs to be examined including syntactic knowledge and vocabulary depth knowledge, as reviewed in the previous section. By integrating L2 reading comprehension as a variable into a broader range of linguistic L2 components, the current study aims to provide a more comprehensive framework for understanding the L2 reading skills of EFL learners.

2.3. Individual Learning Backgrounds Predicting the L2 Reading Skill Profile Membership in Korean Contexts

The current EFL study focuses on the role of time investment and motivational attitudes in L2 literacy development of adolescent EFL learners. Stern's (1983) theory highlights the significant influence of instructional time on L2 learning processes, such as the use of strategies, and its consequent impact on L2 proficiency outcomes. This influence is particularly pronounced in EFL contexts where instructional time often serves as the primary learning resource, unlike in ESL settings where it is one of many (Lee, 2003, 2008). Supporting this, Collier and Thomas (2017) underscored the necessity of sustained time investment in L2 learning in their 32-year-long longitudinal study. They revealed that ESL learners require at least six years of well-structured bilingual education to be able to

confidently use L2 for academic purposes. In contrast to the sustained dedication required for successful L2 acquisition, Lee (2003) found that Korean EFL learners receive up to 730 hours of formal English instruction throughout their schooling. These findings suggest that time-related factors, including instructional time, are crucial sources of individual differences in L2 proficiency development in EFL contexts (Lee, 2010).

Gradman and Hanania (1991) provided empirical support to consider engagement time in L2 research. After they considered comprehensive variables including total contact hours, private education, exposure to and communicative use of L2 in both inside and outside class, extra-curricular listening, and attitudes and motivation, they found that extra-curricular reading was the most significant factor that impacts general L2 proficiency outcomes for adult L2 learners. Extensive reading outside classrooms not only directly influenced L2 proficiency, but also mediated the relation between the effect of many individual differences including exposure and communicative use of English in and out of class and L2 proficiency.

Another important factor to consider in L2 learning for adolescent EFL learners is motivational attitudes. Its significance in academic performance is well-documented in expectancy-value theory (Eccles & Wigfield, 2002) and the self-efficacy concept (Bandura, 1997; Pajares, 1996; Zimmerman, 2000). These theories propose that learners who believe in their capabilities are more likely to be motivated, thereby exhibiting greater effort, persistence, and engagement. Conversely, learners who doubt their abilities tend to expect poor outcomes (Pintrich, 2003). Additionally, task value, a learner' subjective valuation of a task, affects their choice behaviors and is shaped by many factors including interest, utility, importance, and cost. These constructs have been proved to be important in L2 learning contexts (Dörnyei & Ushioda, 2021; Gardner, Lalonde, & Moocroft, 1985), and directly impact the use of learning strategies (Chon & Shin, 2019; Kim, Wang, Ahn, & Bong, 2015; Yau, 2021), goal-setting behaviors (Liem, Lau, & Nie, 2008) and the extent of engagement or efforts (Kim & Kim, 2014; Yang, 2019).

In EFL research, the importance of motivational attitudes has been empirically investigated as a construct influencing students' current and future learning behaviors. For instance, Hsieh and Kang (2010) demonstrated that self-efficacy plays a critical role, particularly for unsuccessful L2 learners among Korean Grade 9 students. These learners with lower self-efficacy attributed their poor English scores to uncontrollable factors, such as teachers or luck, whereas higher self-efficacy learners attributed their low scores to controllable factors, such as their effort. This difference in attribution leads to significant variations in the use of effective learning strategies. Yau (2021) found that attributing behaviors influenced EFL reading performance among Taiwanese high school learners by catalyzing the use of effective strategies. Furthermore, Yang (2018) described a detrimental cycle among a group of English underachievers at a Korean middle school, who were marginalized due to accumulated academic failures and demotivation.

To the best of our knowledge, E. Kim's (2023) study is one of the few that has attempted to explore the association between L2 reading skill profiles and students' learning backgrounds. However, the current study distinguishes itself from E. Kim's, which focused on elementary school students, by targeting mid- to low-achieving high school EFL learners. Furthermore, our study incorporates a broader range of integral factors, including both past and current L2 learning experiences, with a particular emphasis on time investment and motivational attitudes.

2.4. Current Study

This study seeks to identify and delineate unique profiles of L2 reading skills by examining L2 word decoding, vocabulary breadth and depth, syntactic knowledge, and reading comprehension among EFL learners in a vocational high school in Korea. Additionally, it aims to explore the antecedents contributing to the observed heterogeneity in these skills. To achieve these objectives, the study employs a two-step approach. First, Latent Profile Analysis (LPA) is conducted to determine the latent subgroups of L2 reading skills and to describe the nature of the identified skill profiles. Second, multinomial logistic regression analysis is applied to identify significant predictors of profile membership. The specific research questions are as follows:

1) What types of distinct subgroups of English reading skills display for Korean EFL vocational high school students?
2) How do these students' learning backgrounds predict the likelihood of being classified into distinct profiles of L2 reading skills?

3. METHODOLOGY

3.1. Participants

The participants comprised 234 high school students in Grades 11 and 12 from a girls' vocational high school located in a mid- to low-income area in Seoul, Korea (KOSIS, 2021). These students received formal English education exclusively in Korea, following the national English curriculum. Their English instruction spanned four years in elementary school, with a maximum of three hours per week, and three years in middle school, with up to four hours per week. According to their school teachers, the students' English achievement levels were relatively low compared to national standards. A background survey revealed that approximately 25% of the participants had not made any additional

efforts to improve their English skills, such as attending private tutoring, during their school years. This is noteworthy given the typically competitive English learning environment in Korea (Lee, 2010; Lee & Jang, 2023; Shin & Lee, 2019). Furthermore, only 1.3% of the participants reported reading English books regularly. These findings indicate that the participants were generally mid- to low-level English learners who were less motivated compared to other learners at the same educational level. All participants and their parents provided signed consent forms for participation in the study.

3.2. Instruments

3.2.1. English reading skills

Word decoding. The Test of Silent Word Reading Fluency-2 (Mather, Hammill, Allen, & Roberts, 2014) was used with modification. Participants were provided with rows of unrelated words of increasing difficulty with no spaces (e.g., dolovemytwotreewhy), and was required to identify and separate as many individual words as possibly by drawing lines between them within three minutes (e.g., do/love/my/two/tree/why). Decoding skills involve recognizing phonetic and orthographic patterns, which are crucial for reading comprehension (Hoover & Gough, 1990). This ability was directly assessed by the current instrument by tapping students' ability to efficiently process letter-to-sound conversion patterns without vocalizing. The original test was adapted to increase its sensitivity for the L2 proficiency of the current EFL participants. Some unfamiliar words (e.g., bulb, elves) were replaced to more familiar ones (e.g., bend, selves) at similar difficulty levels and ten more simple words (e.g., and, way, have) were added at the beginning lines. The administration and scoring scheme were maintained from the original battery.

Vocabulary breadth knowledge. The Updated Vocabulary Level Test (Webb, Sasao, & Ballance, 2017) was adapted. The present instrument included each 10 clusters at the 2,000- and 3,000-word levels, respectively. At each cluster, the participants were asked to select three English words out of six choices to match the three given explanations in Korean. They received one point for correctly choosing a word and the total score was 60. Scoring was undertaken dichotomously.

Vocabulary depth knowledge. The Word Associates Format (WAF) test, developed by Read (1993), was used to assess the depth of L2 vocabulary knowledge. In this test, a target word (e.g., calm) is presented, followed by eight different words. Four of these words are associated with the target word, either semantically (e.g., quiet, smooth) or collocationally (e.g., day, sea), while the remaining four words have no such association. Participants were instructed to select the four words that are either synonyms or collocations of the target word. The 14 target words and their corresponding options were chosen based on the participants'

English curriculum. The total possible score for the test was 56.

Syntactic knowledge. The Sentence Structure subtest and the Sentence Assembly subtest of CELF-4 (Semel, Wig, & Secord, 2003) were used to assess L2 syntactic knowledge focusing on syntactic comprehension and production skills. The original oral mode of the task was altered to a written mode. The syntactic comprehension measure required the participants to read each sentence and choose the corresponding picture among the four options. The syntactic production measure required them to formulate grammatically correct sentences by rearranging a set of given words. The total possible score was 36, with scoring conducted dichotomously.

Reading comprehension. The English reading comprehension assessment was developed using 11 passages from the Passage Comprehension subtest of the Woodcock Reading Mastery Test-III (Dean, 2011) and the Analytical Reading Inventory (Woods & Moe, 2011). A total of 16 multiple-choice questions were created, all of which were written in Korean. The original cloze (embedded) questions from the WRMT-III were adapted into eight multiple-choice questions, each with four alternatives. Additionally, a series of literary and informational passages from the ARI were used to create the remaining eight multiple-choice questions. A pilot test was conducted to assess the validity and reliability of these reading comprehension measures with a sample of high school students who were presumed to be at a similar L2 proficiency level. The total possible score for the assessment was 16.

3.2.2. L2 Learning backgrounds

The survey items were developed based on previous studies (Gradman & Hanania, 1991; T. Y. Kim, 2010; Kim & Kim, 2014; J. Y. Kim, 2016) and the researchers' empirical expertise in English education in Korea. A total of 19 items with ordinal scales were included in the analysis. The survey focused on assessing students' past and current learning experiences, self-perceptions of their English abilities, and their attitudes and values toward learning English. Examples of survey questions included: 'Did you study English diligently during elementary school?' 'Did you participate in private English lessons?' and 'Do you believe you will develop strong English skills soon?' Most items were rated on a 4-point Likert scale ranging from 1 (not at all) to 4 (very much). However, three items required specific numerical responses. Of these, two were rated on a 4-point ordinal scale (1 = none, 2 = less than five, 3 = between five and ten, 4 = more than ten), while the remaining item was rated on a 5-point ordinal scale (1 = none, 2 = less than a year, 3 = 1 to 2 years, 4 = 2 to 3 years, 5 = more than 4 years).

3.3. Procedure

All measures were administered during class hours and structured into two sessions. In the first session, participants completed the English learning experiences survey and the L2 syntactic knowledge assessment. These instruments were delivered digitally through Google Forms, and participants used their personal mobile phones to complete them. Due to quarantine measures affecting some classes during the COVID-19 pandemic, the transition to digital formats ensured that all students, whether at school or at home, could complete the assessments under consistent conditions. The second session focused on the remaining measures, including L2 word decoding, vocabulary breadth, vocabulary depth, and reading comprehension, which were administered using a paper-and-pencil format. This session lasted approximately 45 minutes. The entire measurement process was carefully monitored by the researchers and class teachers, following a standardized protocol to maintain consistency and accuracy in administration.

3.4. Analytical Plan

As a preliminary analysis, exploratory factor analysis (EFA) was conducted on the 19 observed survey items. The extracted factors were subsequently used as predictors in the multinomial logistic regression analysis.

To address the first research question, LPA was performed to determine the optimal number of profiles. LPA employs maximum likelihood estimation to identify latent subgroups based on individuals' responses to multiple variables. This technique categorizes similar individuals into homogeneous profiles, reflecting distinct subpopulations within the broader population (Muthén, 2001; Nylund-Gibson & Choi, 2018). Each latent profile is assumed to represent a group with relatively homogeneous characteristics, while differences between profiles capture heterogeneity across the population.

A series of LPA models were tested, beginning with a single-profile solution and incrementally adding more profiles. Model fit was assessed using several statistical criteria, including the Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), adjusted BIC (aBIC), the Lo-Mendell-Rubin (LMR) likelihood ratio test, the bootstrapped likelihood ratio test (BLRT), and entropy values. The optimal model was selected based on the smallest AIC, BIC, and aBIC values, significant LMR and BLRT results, and entropy values close to 1.0, indicating well-defined profiles (Cohan et al., 2008). In addition to statistical criteria, theoretical considerations and principles of parsimony were applied to ensure the selected model was both meaningful and interpretable (Lubke & Muthén, 2005).

A key advantage of LPA over traditional cluster analysis methods is its ability to provide 95% confidence intervals for parameter estimates, including standard errors. Confidence

intervals were used to determine the distinctiveness of profiles. Overlapping confidence intervals on specific measures indicate that profiles are not statistically distinguishable on those measures (Brasseur-Hock, Hock, Kieffer, Biancarosa, & Deshler, 2011). This approach was employed to evaluate the relative strengths and weaknesses of each profile and their unique characteristics.

After identifying the optimal number of profiles, these profiles were used as outcome variables in a multinomial logistic regression analysis to address the second research question. Factors extracted from the EFA were entered as predictor variables to explore the associations between students' English learning backgrounds and their profile membership. Results were interpreted using odds ratios. An odds ratio greater than 1 indicates that an increase in the predictor variable is associated with a higher likelihood of membership in the target profile relative to the referent profile. Conversely, an odds ratio between 0 and 1 suggests a reduced likelihood of membership in the target profile. An odds ratio of 1 signifies no association between the predictor and profile membership.

To ensure comparability across variables with differing total scores, *z*-scores were calculated and used in both LPA and multinomial logistic regression analyses. LPA was conducted using Mplus 8.10 (Muthén & Muthén, 1998-2017), while SPSS 22.0 was employed for multinomial logistic regression analysis, as well as for the computation of descriptive statistics and z-scores.

4. RESULTS AND DISCUSSION

4.1. Preliminary Analysis

The 19 survey items related to L2 learning backgrounds were analyzed using EFA with maximum likelihood extraction and direct oblimin rotation, allowing for the identification of correlated (non-orthogonal) factors. Items with communalities below .3 were excluded from the analysis. The number of factors was determined based on eigenvalues equal to or greater than 1.00. After examining the factor loadings of the remaining 18 survey items, one additional item was removed due to significant cross-loading, resulting in 17 items.

The final EFA yielded four interpretable factors: Positive past learning experiences with English (10 items), current commitment to studying English (2 items), extra-curricular English reading engagement (2 items), and motivational attitude (3 items). Scores for each construct were calculated by summing the individual item scores, yielding maximum possible scores of 40 for Positive Past Learning Experiences, 8 for Current Commitment, 8 for Extra-curricular Reading Engagement, and 12 for Motivational Attitude. The factor loadings and detailed structure for each survey item are presented in Table 1.

TABLE 1

Extracted Factors and Its Related Survey Items and the Factor Loadings

Factor	Survey items	Factor loadings (derived from pattern matrix)			
Positive past learning experiences with English	6. Were you confident in your English during middle school?	.066	.796	-.029	.022
	4. Was it easy to understand English class during middle school?	.086	.772	-.091	.091
	7. Was it easy to understand an English textbook during middle school?	.023	.769	-.081	.110
	8. Did you like English subject during middle school	-.072	.752	-.013	.081
	9. Did you study English almost every day during middle school?	-.111	.702	.260	-.059
	3. Did you focus well in English class during middle school years?	-.069	.591	.033	.246
	5. Was English grammar a big problem for your English during middle school?[a]	-.061	-.575	-.001	.221
	2. Did you study English hard during elementary school?	.030	.518	-.028	.140
	1. Did you like English during elementary school?	.053	.508	-.113	.238
	10. Did you participate in prior learning to learn ahead of the curriculum during middle school?	.188	.421	.169	-.079
Current commitment to studying English	13. Have you spent some time studying English during weekends since you started high school?	-.003	-.022	.813	.105
	12. Do you spend some time studying English during school breaks since you start high school?	.080	-.038	.721	.228
Extra-curricular English reading engagement	17. How many English books have you read?[b]	1.019	-.037	-.137	.136
	18. How many English books do you have in your own bookshelf?[c]	.456	.066	.232	-.092
Motivational attitude	15. Are you currently coping well with the English lessons at school?	.089	.161	.121	.703
	14. Do you believe you will develop strong English skills soon?	.064	.076	.193	.623
	16. Are you aware of the purpose of learning English at school?	-.016	.068	.144	.511

Note.

[a]This item was reverse-coded so that, like other items, a higher number indicates a more positive response.

[b]This item was rated as follows: 1 = *none*, 2 = *less than five*, 3 = *between five and ten*, 4 = *more than ten*

[c]This item was rated as follows: 1 = *none*, 2 = *less than ten*, 3 = *between ten and twenty*, 4 = *thirty or more*

Table 2 provides descriptive statistics, including reliability and correlations of all observed variables based on raw scores. Reliability was assessed using Cronbach's alpha for the L2 reading skill measures and composite reliability (CR) for the learning background factors derived from EFA. Most variables demonstrated excellent to acceptable internal consistency (Cronbach's $\alpha \geq .87$; CR $\geq .65$). However, the reading comprehension measure exhibited only moderate reliability ($\alpha = .50$). All correlations among the variables were statistically significant, ranging from .13 to .69.

TABLE 2

Descriptive Statistics of All Study Variables by Raw Scores (*N* = 234)

	1.	2.	3.	4.	5.	6	7	8	9
1. English word decoding	-								
2. English vocabulary breadth	.69**	-							
3. English vocabulary depth	.40**	.62**	-						
4. English syntactic knowledge	.65**	.60**	.42**	-					
5. English reading comprehension	.52**	.54**	.41**	.47**	-				
6. Positive past learning experiences	.45**	.42**	.19**	.45**	.34**	-			
7. Current commitment to English	.18**	.19**	.13*	.18**	.21**	.29**	-		
8. Extra-curricular English reading engagement	.38**	.26**	.17**	.40**	.30**	.39**	.27**	-	
9. Motivational attitude	.41**	.37**	.26**	.41**	.25**	.52**	.51**	.27**	-
M	57.57	20.68	30.06	20.69	6.41	21.08	3.73	3.61	8.04
SD	30.40	11.23	10.84	6.39	2.51	6.25	1.52	1.38	2.17
Minimum	0	0	0	3	2	10	2	2	3
Maximum	126	59	50	36	16	37	8	8	12
Cronbach α / Composite Reliability	[a]	.93	.90	.87	.50	.83	.74	.74	.65

Note. * $p < .05$. ** $p < .01$

[a]Test-retest reliability = .92; alternate-form reliability = .83 (Mather et al., 2014)

4.2. Latent Profile Analysis of L2 Reading Skills

The z-scores of L2 reading-related variables were utilized for the Latent Profile Analysis (LPA) due to differing total scores among the variables. We estimated LPA models starting from a two-class solution and continued adding classes until the inclusion of an additional class resulted in insignificant Lo-Mendell-Rubin (LMR) and Bootstrap Likelihood Ratio Test (BLRT) values, or no substantial reduction in AIC, BIC, or aBIC. Table 3 presents the goodness-of-fit indices for models ranging from two to six profiles. Although the AIC, BIC, and aBIC decreased with each added class, the rate of decrease became less pronounced in models with four to six classes.

TABLE 3

Goodness-of-fit Statistics for Latent Profile Models

No. of profile	AIC	BIC	aBIC	Entropy	LMR *p*	BLRT *p*	Percentage in each profile (%, in order of size)					
							1	2	3	4	5	6
2	2971.20	3026.48	2975.77	.865	0.000	0.000	64.5	35.4				
3	2852.98	2929.00	2859.27	.879	0.000	0.000	47.0	31.2	21.7			
4	**2791.02**	**2887.77**	**2799.02**	**.886**	**0.002**	**0.000**	**46.2**	**24.8**	**19.7**	**9.4**		
5	2763.87	2881.35	2773.59	.869	0.346	0.000	33.8	25.2	20.9	10.7	9.4	
6	2734.38	2872.59	2745.81	.894	0.068	0.000	33.3	25.2	18.8	10.7	9.4	2.5

Note. AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; aBIC = Sample-size Adjusted BIC; LMR = Lo-Mendell-Rubin Likelihood Ratio Test; BLRT = Bootstrapped Likelihood Ratio Test.

Regarding entropy, all models demonstrated a good fit to the data, with values greater than 0.80. Given that the BLRT generally has superior statistical power compared to the LMR in the LPA approach (Tein, Coxe, & Cham, 2013), the six-class model initially appeared to be the most optimal for our dataset. However, the smallest profile in this model constituted only 2.5% of the data. The five-class model, while supported by significant BLRT values, was not supported by LMR. Moreover, this model featured two contrasting subgroups that were almost homogeneous in other measures, except for a significant difference in L2 vocabulary depth. Since L2 vocabulary depth is not widely supported as a critical factor for low-level L2 learners (Chen & Liu, 2020; Li et al., 2021), the five-class model is less likely to accurately represent the current EFL participants. Ultimately, the four-class model, which exhibited significant LMR (p = .002) and BLRT (p = .000) values and had a representative percentage in each profile, was selected as the final LPA model.

Overall, the four profiles identified in our study revealed ordinal differences in the measured L2 reading skills. However, the subgroups were not strictly stratified; instead, they

were distinguished by their relative strengths and weaknesses. This information is summarized in Table 4 and visually represented in Figure 1.

TABLE 4

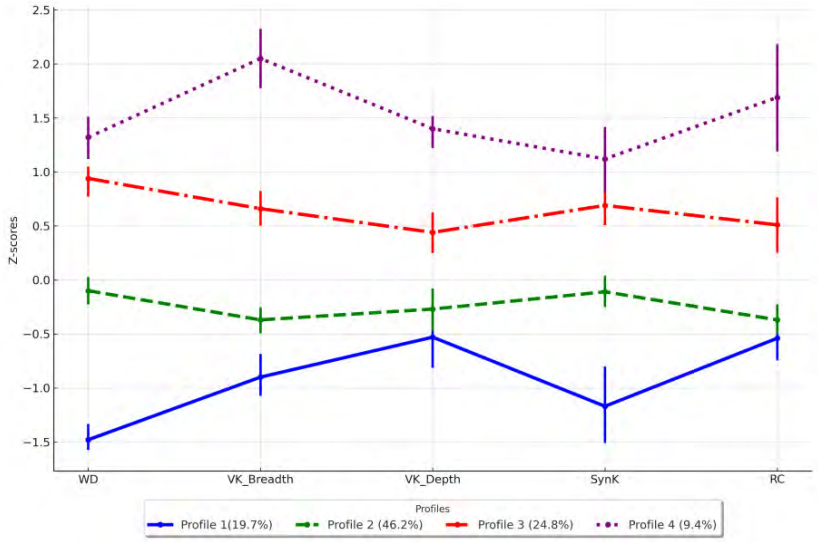
Estimated Means and Standard Errors of L2 Reading Skills by Sub-groups (*N* = 234)

	Profile 1		Profile 2		Profile 3		Profile 4	
n, proportion	*n* = 46, 19.7%		*n* = 108, 46.2%		*n* = 58, 24.8%		*n* = 22, 9.4%	
	Severely weak with very low decoding and syntactic knowledge		Moderately weak		Above-average		Fairly well-developed with good vocabulary breadth	
Variables	*M* (raw)	*SE*	*M* (raw)	*SE*	*M* (raw)	*SE*	*M* (raw)	*SE*
WD	-1.48 (11.72)	0.06	-0.10 (53.92)	0.06	0.94 (85.93)	0.07	1.32 (96.59)	0.10
VK_ Breadth	-0.90 (10.46)	0.10	-0.37 (16.39)	0.06	0.66 (27.97)	0.08	2.05 (43.91)	0.14
VK_ Depth	-0.53 (24.39)	0.15	-0.27 (27.02)	0.10	0.44 (34.55)	0.10	1.40 (45.05)	0.08
SynK	-1.17 (13.09)	0.18	-0.11 (20.05)	0.07	0.69 (25.21)	0.09	1.12 (27.86)	0.15
RC	-0.54 (5.02)	0.10	-0.37 (5.45)	0.07	0.51 (7.74)	0.13	1.69 (10.45)	0.25

Note. WD = Word decoding; VK_Breadth = Vocabulary breadth knowledge; VK_Depth = Vocabulary depth knowledge; SynK = Syntactic knowledge; RC = Reading comprehension.
M = mean scores by z-scores. The raw scores are provided in parentheses.

FIGURE 1

Line Plot with z-scores on Each Reading Skill and the Associated 95% Confidence Intervals for the Four Profiles of Korean EFL Vocational High School Learners (*N* = 234)



Note. WD = Word decoding; VK_Breadth = Vocabulary breadth knowledge; VK_Depth = Vocabulary depth knowledge; SynK = Syntactic knowledge; RC = Reading comprehension.

Profile 1 was labeled as 'Severely Weak L2 Readers with Very Low Decoding and Syntactic Knowledge' (n = 46, 19.7% of the total). This group performed the lowest across all measures. In particular, these students exhibited significantly low performance in L2 decoding and L2 syntactic knowledge, scoring nearly 1.5 *SD* below the average in L2 decoding (*SE* = 0.06) and more than 1.0 *SD* below in L2 syntactic knowledge (*SE* = 0.18). The issues for these students were not only severe, but also specific, as they underperformed on all L2 reading-related measures, with pronounced difficulties in L2 decoding and syntactic processes. These struggles were marked by two distinct valleys in their performance profiles, which were not observed in other subgroups, whereas Profiles 2 and 3 demonstrated relative strengths in L2 word decoding and syntactic knowledge. The raw scores highlight the extent of these struggles: students in Profile 1 correctly decoded at most 12 words in three minutes, whereas students in Profile 4, who performed the best, decoded nearly 100 words in the same time frame. This significant disparity challenges the common assumption that L2 decoding is easily mastered after a few years of English literacy education, even in FL contexts (Sparks et al., 2018; Van Gelderen et al., 2007; Yamashita et al., 2023). The presence of Profile 1 suggests that many students in EFL classrooms continue to grapple with decoding words and processing basic syntactic structures, even after more than seven years of formal English education.

Profile 2 (n = 108, 46.2% of the total), the largest subgroup, was labeled as 'Moderately Weak L2 Readers.' As indicated by the confidence intervals, the means of all measures were at or slightly below the average of the current participants. Both Profile 1 and Profile 2 displayed similar performance in L2 vocabulary depth knowledge and L2 reading comprehension, as suggested by the overlapping confidence intervals.

Profile 3 (n = 58, 24.8% of the total) was labeled as 'Above-Average L2 Readers.' The means for all measures were above the overall group average. The mean score for L2 word decoding was particularly high relative to other skills, and the average of their L2 syntactic knowledge was not significantly different from that of Profile 4, as indicated by overlapping confidence intervals. This data suggests that Profile 3 showed relative strengths in L2 decoding and syntactic knowledge. However, the most pronounced difference between Profile 3 and Profile 4 was in L2 vocabulary breadth knowledge, suggesting that Profile 3's main weakness, compared to Profile 4, lies in the size of their L2 vocabulary knowledge.

Profile 4 (n = 22, 9.4% of the total) was labeled as 'Fairly Well-Developed L2 Readers with Good Vocabulary Breadth Knowledge.' They scored between 1 and 2 SD above the group average across all five measures. Profile 4, the highest-performing subgroup, exhibited relatively strong L2 vocabulary breadth knowledge, but weaker vocabulary depth knowledge. This suggests that while students in this subgroup have developed a broad vocabulary, they need further development in the depth of their L2 vocabulary knowledge. In contrast, vocabulary depth is not a priority for students in Profiles 1 and 2, as evidenced by their low mean scores in other skill areas. Research suggests that the role of L2 vocabulary depth becomes more critical only after a certain level of L2 proficiency is attained (Chen & Liu, 2020; Li et al., 2021). Therefore, students in Profile 4 would benefit from interventions focused on deepening and sophisticating their L2 lexical knowledge, which is crucial for fluent text comprehension (Lesaux, Kieffer, Faller, & Kelley, 2010; Perfetti, 2007). Extensive reading could further enhance their understanding and application of known words through repeated encounters in meaningful contexts, thereby deepening and sophisticating their vocabulary knowledge (Nation, 2015, 2017; Pigada & Schmitt, 2006).

One last noteworthy finding is that the identified profiles of L2 reading skills among current EFL learners differed not only in decoding but also in linguistic skills, including vocabulary. This contrasts with findings from many studies on ESL learners, where the mechanical skills of decoding were the main source of characterizing different L2 reading skill profiles, while L2 vocabulary was less homogeneous across profiles (e.g., Capin et al., 2024; Lesaux & Kieffer, 2010; O'Connor et al., 2019).

4.3. EFL Learning Background Factors on the Profile Membership

Next, four learning background factors—defined from the EFA—were added to the LPA

model using a multinomial logistic regression approach. The analysis was conducted using z-scores to normalize the influence of each factor, given that they represent different numbers of observed variables, thereby enhancing comparability (Hair, Black, Babin, & Anderson, 2018). Table 5 presents the means and standard deviations of each factor in *z*-scores across the four subgroups of English reading skill profiles. The means generally increase ordinally from Profiles 1 to 4, with the exception of the current commitment to English factor, where the divergence in z-scores is minor compared to the other three factors.

TABLE 5

Means and Standardized Deviations of Predictor Variables by Sub-groups (*z*-score)

Predictors	Profile 1	Profile 2	Profile 3	Profile 4
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*
Positive past learning experiences	-.56 (.82)	-.22 (.84)	.44 (1.00)	1.02 (.81)
Current commitment to English	-.30 (.90)	-.18 (.89)	.46 (1.10)	.27 (.98)
Extra-curricular English reading	-.50 (.90)	-.12 (.88)	.40 (1.06)	.61 (.97)
Motivational attitude	-.67 (1.00)	-.16 (.89)	.58 (.88)	.65 (.55)

Note. Profile 1 = Severely weak L2 readers with very low decoding and syntactic knowledge; Profile 2 = Moderately weak L2 readers; Profile 3 = Above-average L2 readers; Profile 4 = Fairly well-developed L2 readers with good vocabulary breadth knowledge.

A series of multinomial logistic regression models were estimated to assess whether these individual differences significantly predicted the likelihood of a student belonging to a specific English reading skill profile. Profiles N and N-1 were regressed on the four predictors, with Profile N-1 serving as the reference group. The log odds of the multinomial logistic regression are reported in Table 6.

The multinomial regression results reveal that positive past learning experiences, extra-curricular English reading engagement, and motivational attitudes played a significant role in elevating learners from lower to higher proficiency levels. Positive past learning experiences significantly increased the probability of membership in higher profiles relative to lower profiles in most comparisons. For instance, for every one-unit increase in positive past learning experiences, students were approximately twice as likely to be classified into Profile 4 compared to Profile 3. However, this factor did not significantly predict the probability of membership in Profile 2 relative to Profile 1, suggesting that these two profiles do not significantly differ in their past English learning experiences. These findings support the idea that substantial time investment in L2 learning—especially in EFL contexts—is crucial (Lee, 2003; Stern, 1983). Similar to the Matthew effect (Stanovich, 1986), L2 learners who have accumulated early L2 learning experiences gain initial advantages that lead to greater educational gains over time. Nevertheless, the insignificant effect of past

learning experiences in predicting membership in Profile 2 compared to Profile 1 indicates that there is a lack of meaningful past learning experiences distinguishing these two groups.

TABLE 6

Predictors of English Reading Skill Profile Membership (*z*-score)

Predictors	*B*	*SE*	*p*	*OR*
Profile 4 versus Profile 3				
Positive past learning experiences	.801*	.326	.014	2.228
Current commitment to English	-.272	.297	.360	.762
Extra-curricular English reading	.090	.257	.726	1.094
Motivational attitude	-.096	.399	.810	.909
Profile 4 versus Profile 2				
Positive past learning experiences	1.276***	.334	.000	3.584
Current commitment to English	.047	.301	.875	1.048
Extra-curricular English reading	.446	.261	.088	1.563
Motivational attitude	.573	.395	.147	1.773
Profile 4 versus Profile 1				
Positive past learning experiences	1.407***	.392	.000	4.084
Current commitment to English	-.236	.351	.501	.790
Extra-curricular English reading	.927**	.338	.006	2.527
Motivational attitude	1.156**	.438	.008	3.177
Profile 3 versus Profile 2				
Positive past learning experiences	.475*	.219	.030	1.609
Current commitment to English	.319	.201	.113	1.375
Extra-curricular English reading	.356	.190	.061	1.428
Motivational attitude	.669*	.258	.010	1.952
Profile 3 versus Profile 1				
Positive past learning experiences	.606*	.297	.041	1.833
Current commitment to English	.036	.267	.894	1.036
Extra-curricular English reading	.837**	.285	.003	2.309
Motivational attitude	1.252***	.318	.000	3.497
Profile 2 versus Profile 1				
Positive past learning experiences	.131	.258	.612	1.139
Current commitment to English	-.283	.232	.222	.753
Extra-curricular English reading	.481	.253	.058	1.617
Motivational attitude	.583*	.239	.015	1.792

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.
Profile 1 = Severely weak L2 readers with very low decoding and syntactic knowledge; Profile 2 = Moderately weak L2 readers; Profile 3 = Above-average L2 readers; Profile 4 = Fairly well-developed L2 readers with good vocabulary breadth knowledge.

Extra-curricular English reading engagement significantly influenced the likelihood of membership in Profiles 4 and 3 compared to Profile 1. For every one-unit increase in this factor, the probability of belonging to Profile 4 increased by approximately 2.5 times, while the probability of belonging to Profile 3 increased by about 2.3 times, relative to Profile 1. However, beyond these comparisons, this factor did not significantly affect the probability

of membership in other profiles. This finding appears inconsistent with prior research emphasizing the importance of extra-curricular reading in shaping L2 proficiency among learners (Gradman & Hanania, 1991). The lack of significant effects in other subgroup comparisons may stem from the limited engagement in extra-curricular English reading activities among these mid- to low-level EFL learners, possibly due to weaker motivation and less supportive environments for L2 literacy development.

Motivational attitudes, encompassing self-efficacy, expectancy for success, and valuation of L2 learning, emerged as the only significant predictor facilitating the transition from the lowest proficiency group (Profile 1) to a higher proficiency group (Profile 2). This underscores the critical role of motivation, particularly self-efficacy, in driving progress for low-achieving learners, such as those in Profile 1. Previous research supports the notion that motivation is a primary driver of engagement and participation in academic tasks, including EFL learning (Bandura, 1997; Dörnyei & Ushioda, 2021; Eccles & Wigfield, 2002; Pintrich, 2003; Wigfield & Eccles, 2000). As noted by Hsieh and Kang (2010), low-achieving learners often attribute their poor performance in English to uncontrollable factors, such as teachers or luck, which can lead to further demotivation and disengagement.

To address these challenges, targeted interventions to enhance motivation are essential. Strategies such as increasing classroom engagement, designing achievable assignments, and emphasizing the relevance of English skills to future career are particularly critical for students in Profile 1. Such interventions can help mitigate demotivation and support these learners in improving their educational outcomes (T. Y. Kim, 2010; Song & Kim, 2017).

In our study, current commitment to studying English did not significantly predict membership probability in any profile. This insignificant effect cannot be attributed to potential bias arising from an unbalanced number of variables across factors, as the composite reliability of the current commitment to English factor was 0.74 (see Table 2), indicating sufficient reliability (Raykov, 1997). Furthermore, this finding does not contradict the body of research emphasizing the critical role of time investment in L2 learning within EFL contexts (Collier & Thomas, 2017; Lee, 2003; Stern, 1983). Considering the minor differences in the mean scores of this factor across the four profiles, which ranged from -0.30 to 0.27 (see Table 5), it appears that the current participants—who have been attending a vocational school for over a year—did not exhibit significant individual differences in their current effort toward learning English. This lack of variation suggests that current commitment to English may play a less significant role in shaping English reading skill profiles, at least among these adolescent EFL learners who are not pursuing higher education.

5. PEDAGOGICAL IMPLICATIONS

The findings of this study have several important pedagogical implications for English instruction in EFL contexts. First, the identification of heterogeneous profiles of L2 reading skills underscores the necessity of adopting a person-centered diagnostic approach to assess students' overall English reading abilities. This approach shifts away from the traditional variable-focused dichotomy that categorizes learners as either 'poor' or 'not poor' readers. Instead, it supports the development of tailored interventions that address the diverse needs of learners. For instance, students in Profile 4, who may not be classified as poor L2 readers in general classroom settings, still exhibit specific weaknesses, such as limited vocabulary depth. These students could benefit from targeted instruction, particularly through extensive reading practices. By incorporating extensive reading beyond textbooks, EFL learners gain opportunities to process vocabulary and grammar rules in context, which can enhance both reading fluency and comprehension abilities (Yamashita, 2015).

Second, the findings highlight the need to reconsider the emphasis on grammar instruction in English classrooms, particularly within the Korean EFL context. Nearly 30% of the students (Profiles 3 and 4) excelled in L2 syntactic knowledge compared to group averages, reflecting the heterogeneous development of syntactic skills among learners at similar grade levels. However, grammar instruction in many Korean and other EFL classrooms often follows a rigid, uniform approach, heavily emphasizing rules in a step-by-step manner. This can lead to misconceptions among students, fostering the belief that learning grammar is excessively challenging and requires substantial commitment (Liu, 2011; Shiu, 2011). To address this issue, it is advisable to adopt a differentiated approach to form-focused instruction that aligns more closely with students' specific strengths and weaknesses, thereby making grammar learning more accessible and effective.

Finally, special attention should be given to the most struggling students, such as those in Profiles 1 and 2, who constitute a significant portion of the study group. These students require a holistic approach that addresses both their linguistic challenges and motivational needs. Supporting these learners involves fostering positive beliefs in their learning potential and emphasizing the relevance of English skills to their future aspirations. Early identification and intervention are critical to prevent these students from becoming further disengaged from English learning. Targeted instruction focusing on foundational skills, such as L2 decoding, vocabulary, and basic syntactic knowledge, could lead to meaningful growth among these learners (Capin et al., 2024; Lee & Lee, 2024). Without such support, these students risk remaining on low and declining developmental trajectories established during the early stages of English education (Ford et al., 2013; Mancilla-Martinez, Kieffer, Biancarosa, Christodoulou, & Snow, 2011; Ryu & Lee, 2024; Vargas et al., 2023; Yamashita et al., 2023).

6. LIMITATIONS, FUTURE STUDIES, AND CONCLUSIONS

This study provides important insights into the latent subgroups of L2 reading skills among EFL learners in a vocational high school context and their association with past and current learning experiences. By employing a person-centered approach, we identified distinct profiles of L2 reading skills, highlighting the heterogeneity of learners even within similar educational settings. These findings emphasize the importance of tailoring instructional interventions to address the specific needs of diverse learner groups. However, several limitations must be acknowledged, along with recommendations for future research.

First, the factor structure revealed that two factors were represented by only two items each, raising potential concerns regarding the reliability and robustness of these factors. While small-item factors can provide meaningful insights, they are more prone to measurement error and may limit the generalizability of the findings. Future research should focus on developing more comprehensive instruments to capture a broader range of factors influencing EFL learners' L2 proficiency, including additional affective and cognitive variables.

Second, the mean scores for L2 reading comprehension in Profiles 1 and 2 did not differ significantly. This suggests that the current reading comprehension measure may have been too challenging for low-proficiency learners, potentially obscuring finer distinctions in their abilities. Future studies should consider using test items calibrated to the proficiency levels of lower-performing learners to better differentiate their skills and capture more nuanced variations in reading comprehension.

Third, the interpretation of profiles in this study relied on group averages within the current sample due to the absence of national standards and the unsuitability of commercially available standardized English assessments for low-level participants. Consequently, the strengths and weaknesses of each profile were evaluated relative to this sample rather than against objective benchmarks, differing from prior ESL studies (e.g., Capin et al., 2024; Lesaux & Kieffer, 2010). For instance, while Profile 4 was identified as the strongest group within this study, its classification may not align with national standards, necessitating caution in interpreting the labels. To address this limitation, future studies should explore the development of EFL-specific L2 reading proficiency benchmarks or employ longitudinal designs to observe how these profiles evolve over time and respond to targeted educational interventions. A dynamic, longitudinal perspective would provide a robust framework for understanding learners' reading trajectories and for designing effective, evidence-based instructional strategies.

Despite these limitations, a key strength of this study lies in the application of a person-centered analytical approach. This method allowed us to identify heterogeneous subgroups with distinct configurations of L2 reading skills and examine their associations with learning

backgrounds through multinomial logistic regression analysis. The findings underscore the critical importance of moving beyond traditional one-size-fits-all approaches to English instruction, advocating for more systematic, tailored interventions that leverage learners' unique strengths and address their specific weaknesses.

Moreover, this study highlights the diversity in L2 reading skill development even among learners at similar grade levels, reinforcing the need for diagnostic tools that capture this heterogeneity. For struggling learners, early identification and targeted support that combines foundational linguistic instruction with motivational enhancement are essential to fostering meaningful progress. Additionally, the findings underline the potential of extensive reading practices to address specific deficits, such as vocabulary depth, while promoting overall reading comprehension and fluency.

In conclusion, this study contributes to a deeper understanding of the heterogeneity in L2 reading skills among EFL learners and emphasizes the importance of tailored educational practices. Future research should continue to refine and expand diagnostic frameworks, explore longitudinal changes in learner profiles, and develop interventions informed by these evolving insights. By addressing the diverse needs of learners, educators and policymakers can promote equitable and effective English instruction that supports all students in achieving their full potential.

Applicable levels: Elementary, secondary

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