

Expanding Insights of Vocabulary Knowledge, Metacognitive Knowledge, and Reading in Teng (2025)

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Abstract

Responding to Teng’s (2025a) longitudinal research on metacognitive knowledge (MCK), breadth of vocabulary knowledge (BVK), and reading proficiency in young EFL learners, this article expands the theoretical and pedagogical framework by addressing underexplored dimensions of developmental dynamics, cognitive-affective moderators, and ecological validity. Conceptually, it advocates for a Dynamic Systems Theory (DST) approach, emphasizing non-linear, recursive trajectories of metacognitive and vocabulary development, especially among early-stage English as a Foreign Language (EFL) learners. Methodologically, the paper proposes multivariate, longitudinal designs—including latent profile analysis (LPA) and cross-lagged panel analysis (CLPA)—to capture intra-individual variability and clarify conditional interactions among morphological awareness, reading fluency, and affective variables. Pedagogically, it underscores embedding metacognitive strategy instruction (MSI) within authentic classroom ecologies, highlighting differentiated, scaffolded instructional practices tailored to learners’ cognitive and affective profiles. Integrating these dimensions bridges theoretical insights and practical pedagogical strategies, contributing to nuanced, ecologically valid models of vocabulary-mediated reading development.

Keywords: metacognitive knowledge, breadth of vocabulary knowledge, reading proficiency, dynamic systems theory, ecological validity, foreign language reading, EFL reading instruction

Reading in a Foreign Language recently published a special issue guest edited by Mark Feng Teng, focusing on conceptualizing individual differences in reading. This issue includes a range of theoretical and empirical studies examining factors that influence reading proficiency across different learner populations. The present article provides a response to Teng’s (2025a) longitudinal study, “Longitudinal analysis of breadth of vocabulary knowledge in mediating metacognitive knowledge and reading in foreign language young learners.” This study investigates the relationships among metacognitive knowledge (MCK), breadth of vocabulary knowledge (BVK), and reading achievement in early foreign language learning contexts. The current article critically discusses Teng’s (2025a) findings and proposes potential extensions to the theoretical framework and methodological approaches in this line of research.

MCK plays a pivotal role in learning by enabling students to select, evaluate, and refine cognitive strategies (Schraw, 1995). Its impact on academic performance is well-established, with research consistently identifying it as a key differentiator between high- and low-achieving students (Flavell, 1979; Veenman et al., 2006). In applied linguistics, Wenden (1998) was among the first to highlight the importance of MCK in language learning, a concept that has gained renewed attention with Teng's (2025b) recent book on metacognition in language teaching. As learners develop metacognitive awareness, they become more proficient at identifying effective learning strategies, setting realistic goals, and self-regulating their progress, a cumulative process evidenced in Teng's (2022, 2024) longitudinal studies. Given these benefits, fostering MCK has emerged as a critical focus in young learners' English as a Foreign Language (EFL) instruction, prompting researchers and educators in applied linguistics to explore how best to cultivate this skill across different domains of English language learning.

Teng (2025a) examined the interplay between MCK, BVK, and reading proficiency in a three-year longitudinal study involving 361 third-grade EFL learners in rural China. Using structural equation modeling (SEM), the study revealed that MCK indirectly enhances reading ability through vocabulary acquisition. Key findings include: (a) interrelationships among MCK, BVK, and reading, where progress in one area supports the others; (b) BVK serving as a mediator between MCK and reading proficiency; and (c) non-linear, individualized trajectories in the development of MCK and BVK over time. These results underscore the importance of integrating metacognitive and vocabulary instruction to enhance reading literacy in young EFL learners.

While Teng (2025a) reports important findings on the relationship between MCK and BVK in EFL reading comprehension, there remain underexplored dimensions that highlight the need for more dynamic and context-sensitive approaches. First, the interplay among MCK, BVK, and reading proficiency is neither static nor universally linear; it likely varies across developmental stages, instructional settings, and linguistic backgrounds. For instance, the ontogeny of MCK in young EFL learners—a population often overlooked in favor of adolescent or adult learners—remains poorly understood, particularly how early metacognitive strategies emerge and interact with limited VK. Second, while Teng's (2025a) work demonstrates the mediating role of BVK in linking MCK to reading outcomes, other cognitive-linguistic factors may further modulate this relationship. Morphological awareness, for example, could amplify the efficacy of MCK by enabling learners to decompose novel words, while reading fluency might act as a bottleneck, determining whether MCK translates into efficient text processing. For example, Zhou's (2025) findings highlight several persistent challenges in L2 reading, in particular, reading scientific articles, including: (a) decoding specialized vocabulary, (b) processing syntactically complex sentences, (c) allocating cognitive resources for time management, (d) sustaining motivational drive, and (e) demonstrating accurate quiz comprehension. A multivariate modeling approach—incorporating latent variables and cross-lagged designs—could disentangle the relative contributions of these factors, revealing whether MCK's impact is direct, indirect, or conditional on other learner traits (e.g., working memory, L1 literacy). For example, Sparks et al. (2025) point out that L1 reading achievement directly predicted students' initial level of L2 reading achievement, and L1 print exposure significantly predicted growth of L2 reading achievement. Finally, the ecological validity of these constructs warrants scrutiny: How do classroom practices (e.g., explicit strategy instruction vs. incidental learning) shape the MCK-VK-reading nexus?

Longitudinal and mixed-methods research could uncover trajectories of change and contextual barriers, bridging lab-based findings with real-world EFL reading pedagogy.

Accordingly, this article seeks to expand the theoretical and pedagogical understanding of Teng's (2025a) longitudinal analysis by addressing those underexplored dimensions. First, the paper argues that conceptualizing the MCK—BVK—reading relationship requires a broader theoretical lens that captures the developmental variability across different learner groups, especially in early-stage EFL learners who remain largely overlooked in previous research. Drawing on advances in Dynamic Systems Theory (DST) (Verspoor et al., 2011), cognitive-affective models of self-regulated learning (Efklides, 2011; Teng, 2025a), and vocabulary acquisition frameworks (Schmitt, 2014), the article advocates for an integrative, process-oriented perspective that foregrounds both intra-individual developmental change and contextual sensitivity.

Second, while Teng (2025a) highlighted the mediating role of BVK, further research should explore additional cognitive-linguistic and affective moderators using multivariate, longitudinal modeling. Specifically, future research should incorporate cognitive-linguistic factors such as morphological awareness and reading fluency, as well as affective factors, into integrated models of MCK—BVK—reading relations. Methodologically, employing cross-lagged panel designs will enable researchers to map these pathways more precisely over time, revealing whether MCK exerts independent predictive power on reading proficiency, whether its effects are mediated entirely by vocabulary growth, or whether they are contingent upon the presence of other cognitive capacities. By systematically incorporating these variables into future modeling efforts, researchers can develop a more comprehensive, nuanced account of how metacognitive development supports reading achievement in foreign language contexts.

Finally, to address the issue of ecological validity, future research should systematically examine how different classroom practices, such as explicit strategy instruction versus incidental learning, shape the interplay between MCK, VK, and reading proficiency. Specifically, longitudinal, classroom-embedded, and mixed-methods designs are needed to trace learners' developmental trajectories and identify contextual facilitators or barriers that may influence the effectiveness of metacognitive strategy instruction (MSI) in real-world EFL classrooms. By embedding theoretical models into authentic pedagogical contexts, researchers can bridge the current gap between lab-based findings and classroom realities, ultimately refining instructional designs to promote both theoretical rigor and practical relevance in EFL reading instruction.

Expanding the Discussion on MCK, Vocabulary Knowledge, and Reading

While Teng's (2025a) study has provided empirical evidence for the bidirectional relationships among MCK, BVK, and reading proficiency, its findings also open avenues for further theoretical and pedagogical refinement. To advance this line of research, this discussion elaborates on three critical dimensions: the developmental dynamics underlying the MCK—BVK—reading nexus, the roles of underexplored cognitive-linguistic moderators, and the need for increased ecological validity through pedagogically embedded research.

Developmental Variability and Process-Oriented Perspectives

Understanding the relationship between MCK, BVK, and reading proficiency requires moving beyond static, linear conceptualizations toward a more dynamic, process-oriented framework. While Teng's (2025a) longitudinal work represents a recent examination in this area, it predominantly models growth in terms of averaged, population-level trends, potentially overlooking substantial intra-individual variability. Particularly in young EFL learners, metacognitive development may follow nonlinear, recursive trajectories characterized by phases of acceleration, plateau, and restructuring (Teng, 2022, 2024).

DST emphasizes that language learning is a complex, emergent process, shaped by continuous interactions between individual cognitive resources and environmental affordances (Verspoor et al., 2011). Applied to the MCK—BVK—reading nexus, this perspective suggests that learners may experience idiosyncratic developmental pathways, in which gains in MCK sometimes lag behind vocabulary expansion or vice versa. For example, early-stage EFL learners might acquire isolated lexical items relatively quickly through rote memorization yet lack the metacognitive strategies necessary to integrate these words meaningfully into reading comprehension. Conversely, some learners may develop strong metacognitive awareness early on but struggle to leverage it effectively due to limitations in vocabulary depth. These asynchronous developments can contribute to fluctuating reading proficiency across different stages of literacy development.

Moreover, the recursive nature of metacognitive development suggests that prior gains in reading proficiency can, in turn, foster further growth in MCK, generating a positive feedback loop. As learners successfully deploy metacognitive strategies to decode and comprehend increasingly complex texts, their confidence in strategic reading is reinforced, promoting the sustained use of advanced learning strategies (Teng, 2025a). This recursive process not only facilitates vocabulary growth through repeated contextualized encounters but also strengthens metacognitive control over comprehension monitoring and repair.

Capturing these dynamic developmental trajectories requires methodological approaches that transcend static, cross-sectional comparisons. Intensive longitudinal designs, such as individual growth curve modeling and dynamic factor analysis, provide powerful tools for tracing learner-specific pathways of change over time. These approaches enable researchers to examine within-person variability and developmental patterns, rather than relying solely on between-group differences. Furthermore, adopting a microgenetic perspective (Siegler, 2006) could illuminate moment-to-moment shifts in learners' strategic behavior as they engage with authentic reading tasks, offering fine-grained insights into the real-time interplay between metacognitive processes and vocabulary development.

Importantly, a developmentally sensitive framework can also help elucidate why instructional interventions targeting metacognitive strategies often yield heterogeneous effects across learners. Some young learners may benefit substantially from explicit strategy training, while others—due to differences in cognitive maturation, prior literacy experiences, or motivational factors—may require alternative forms of scaffolding (Paris & Paris, 2001). Integrating DST with cognitive-affective models of self-regulated learning (Efklides, 2011) further highlights the role of affective variables such as task-specific confidence and academic emotions in mediating the

uptake of metacognitive strategies. This convergence of cognitive, metacognitive, and affective factors underscores the need for adaptive instructional designs tailored to learners' developmental readiness.

In sum, addressing the developmental variability in the MCK—BVK—reading relationship requires conceptual, methodological, and pedagogical shifts. Conceptually, researchers must recognize that literacy development, especially in young EFL learners, is not a uniform or sequential process but a dynamic interplay of interdependent components. Methodologically, longitudinal, process-oriented designs are essential for capturing individual growth patterns. Pedagogically, instructional strategies should be flexible and responsive to learners' evolving profiles, ensuring that metacognitive instruction aligns with learners' cognitive and affective developmental stages. By embracing this dynamic perspective, future research can generate more nuanced, ecologically valid accounts of how MCK supports vocabulary acquisition and reading comprehension in diverse EFL contexts.

Toward a Multivariate Understanding of Vocabulary-Mediated Reading Development

While Teng's (2025a) study has demonstrated the mediating role of BVK in linking MCK to reading proficiency, the relationship is unlikely to operate in isolation. Vocabulary learning is a cognitively demanding and context-sensitive process, shaped by multiple interacting variables that may moderate the effectiveness of MCK in promoting reading outcomes (Schmitt, 2010). Zhou (2024) conceptualizes reading as a complex cognitive process that necessitates the automatization of lower-level skills, particularly word recognition, to enhance L2 reading proficiency through extensive reading. To advance theoretical precision, future research should adopt multivariate models that integrate cognitive, linguistic, and affective factors into the analysis.

One critical moderator is morphological awareness, defined as learners' ability to analyze and manipulate the morphemic structure of words (e.g., prefixes, roots, suffixes). Empirical research has demonstrated that morphological awareness not only facilitates vocabulary acquisition (Kieffer & Lesaux, 2012) but also strengthens learners' ability to deploy metacognitive strategies effectively during reading (Teng & Zhang, 2022). By decomposing unfamiliar words into meaningful subunits, learners can make monitoring and inferencing processes more efficient, thereby amplifying the role of MCK in promoting both vocabulary growth and reading comprehension (Zhang & Koda, 2012). This interactive mechanism underscores the need to integrate morphological instruction within metacognitive strategy training to optimize reading outcomes.

Reading fluency represents another potential moderator in this nexus. As a key indicator of reading proficiency, fluency mediates the extent to which metacognitive strategies translate into efficient text processing (Grabe, 2010). Learners with higher reading fluency may benefit more from MCK because they can allocate cognitive resources to higher-level comprehension processes rather than basic decoding. Conversely, learners with limited fluency may experience a bottleneck, restricting the impact of MCK despite adequate vocabulary growth. Furthermore, cognitive-affective factors such as working memory and L1 literacy may influence reading (Bui & Zhang, 2025). Efklides's (2011) metacognitive and affective model of self-regulated learning

(MASRL) also highlights how learners' cognitive capacity and emotional states interact with metacognitive processes, influencing both learning behaviors and outcomes.

Methodologically, cross-lagged panel designs may offer a promising analytical pathway for examining temporal relationships and causal dynamics over time. By employing longitudinal multivariate models, future research can move beyond linear assumptions and reveal the complex interplay among MCK, BVK, and reading proficiency, thereby contributing to a more dynamic and context-sensitive understanding of EFL reading development.

Embedding Metacognitive Strategy Research into Authentic Classroom Contexts

While the benefits of MSI in supporting reading comprehension have been extensively documented (Wenden, 1998; Teng, 2020), much of this research has been conducted in controlled environments with limited consideration of the complexities inherent in real-world classrooms. Consequently, there is a growing recognition of the need to enhance the ecological validity of MSI research by embedding theoretical models into authentic pedagogical contexts. This integration is essential not only for testing the robustness of theoretical claims but also for refining instructional designs that align with the dynamic realities of language learning classrooms.

The theoretical imperative for embedding MSI in authentic contexts is grounded in situated learning theory (Lave & Wenger, 1991), which emphasizes that learning is most effective when it occurs through participation in meaningful sociocultural practices. Within classroom environments, learners engage in situated activities shaped by the dynamic interplay of teacher scaffolding, peer collaboration, institutional demands, and individual learner variability. These factors constitute a complex learning ecology in which metacognitive strategies are not merely taught but actively interpreted, adapted, or resisted by learners, depending on contextual affordances.

Critically, research situated in authentic classrooms can illuminate the conditions under which metacognitive strategies translate into measurable reading gains. For example, learners with limited vocabulary knowledge may require scaffolded MSI that explicitly addresses the interplay between metacognitive monitoring and lexical processing (Teng, 2022). Additionally, ecological validity necessitates careful attention to how instructional delivery—whether explicit, guided, or incidental—shapes learners' uptake and sustained use of metacognitive strategies (Schraw, 1998). Such nuanced understandings cannot be fully captured through laboratory-based or decontextualized studies.

Moreover, authentic contexts reveal the cognitive, affective, and social contingencies that mediate or moderate MSI's effectiveness. Learners may experience cognitive overload when simultaneously applying metacognitive strategies and processing unfamiliar linguistic input or encounter socio-affective barriers such as anxiety or reluctance to engage publicly in strategic behaviors (MacIntyre & Gardner, 1994). Variations in classroom discourse patterns, feedback practices, and peer interaction norms further condition the extent to which MSI translates into observable learning gains. Embedding MSI within these ecologically valid contexts thus offers dual benefits: enhancing the transferability of metacognitive strategies to real-world academic

tasks and generating theoretically grounded insights into the mechanisms through which MSI functions in complex instructional environments.

From a methodological standpoint, advancing MSI research within authentic classrooms calls for longitudinal, mixed-methods designs that can trace developmental trajectories over extended periods (Verspoor et al., 2011). Quantitative measures of reading comprehension and metacognitive awareness should be complemented by qualitative data, such as classroom observations, learner diaries, and teacher reflections, to provide a comprehensive account of the instructional ecology. Moreover, adopting DST frameworks can help conceptualize the fluctuating interactions among MCK, vocabulary growth, and reading proficiency over time.

Ultimately, embedding MSI research into authentic classroom contexts bridges the longstanding gap between theory and practice in applied linguistics. It enables researchers to move beyond idealized instructional scenarios and engage with the situated realities of EFL reading pedagogy. By foregrounding ecological validity, researchers can generate pedagogical insights that are both theoretically rigorous and practically actionable, contributing to more context-sensitive models of metacognitive development in second language reading.

Theoretical Understandings

Expanding on Teng’s (2025a) theoretical understanding, I conceptualize a dynamic systems framework for delineating the MCK-VK-reading nexus (**Figure 1**).

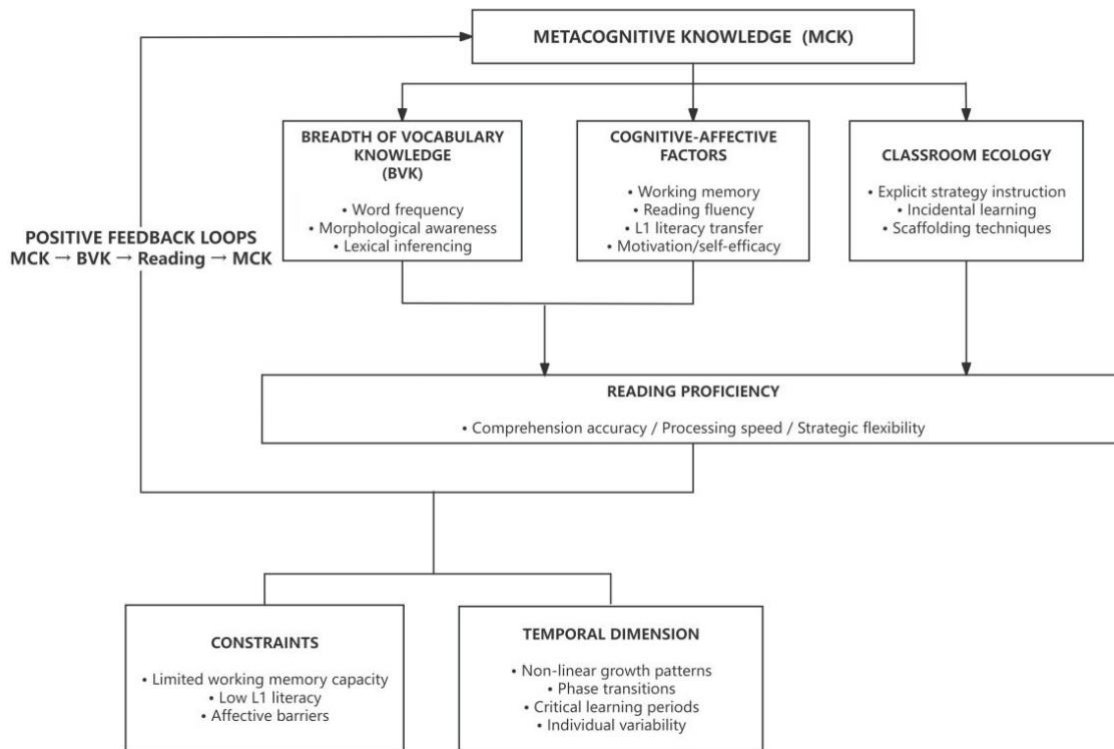


Figure 1. Dynamic systems framework for MCK-BVK-Reading

Figure 1 presents a dynamic systems model illustrating how MCK contributes to reading proficiency in EFL learners. At the top of the model, MCK encompasses skills such as planning, monitoring, evaluating, and selecting strategies. MCK directly influences three key components: BVK, cognitive-affective factors, and classroom ecology. BVK refers to aspects like word frequency, morphological awareness, and lexical inferencing, which together facilitate vocabulary growth. Cognitive-affective factors include working memory, reading fluency, L1 literacy transfer, and motivation or self-efficacy, all of which can either support or constrain reading development. Classroom ecology describes the instructional environment, including explicit strategy instruction, incidental learning, and scaffolding provided by teachers. These three components collectively contribute to reading proficiency, which is defined in the model by comprehension accuracy, processing speed, and strategic flexibility.

Importantly, the model depicts positive feedback loops: as learners enhance their reading proficiency, this in turn further develops their MCK, creating a cycle of improvement. At the bottom of the model, two additional sets of factors shape how effectively learners progress through the model over time. These are constraints, such as limited working memory, low L1 literacy, and affective barriers, and the temporal dimension, which includes non-linear growth, phase transitions, and individual variability. In sum, this model emphasizes that reading development is the result of multiple interacting factors, with MCK as a central driver. Progress is influenced by both supportive elements, such as vocabulary knowledge and classroom context, and by various constraints and developmental patterns.

This model integrates multiple theoretical perspectives to explain the dynamic interplay between MCK, BVK, and reading development. At its core, the framework builds upon Flavell's (1979) foundational metacognitive theory and Wenden's (1998) application of metacognition to language learning, positioning MCK (encompassing planning, monitoring, evaluating, and strategy selection) as the central driver of reading development (Teng, 2020). The recursive relationship between MCK and reading outcomes is empirically supported by Teng and Zhang's (2021) longitudinal work with EFL learners.

The mediating role of vocabulary knowledge draws substantially from Nation's (2001) vocabulary acquisition framework and Perfetti's (2007) Lexical Quality Hypothesis, which collectively emphasize how robust lexical representations (including morphological awareness and word frequency effects) facilitate reading comprehension. This mediation pathway is further refined by Teng's (2025a) findings on BVK as a bridge between metacognition and reading success. The model incorporates key cognitive-affective factors that moderate this relationship, including working memory capacity (Baddeley, 2003), reading fluency (Grabe, 2010), L1 literacy transfer (Sparks et al., 2025), and motivational constructs such as self-efficacy (Efklides, 2011). Collectively, these cognitive and affective variables shape learners' capacity to apply metacognitive strategies efficiently, thereby modulating how effectively learners translate vocabulary knowledge into enhanced reading proficiency.

Contextual influences are theorized through the classroom ecology component, which synthesizes Vygotsky's (1978) zone of proximal development with Lave and Wenger's (1991) situated learning theory. This acknowledges how instructional approaches (explicit strategy

instruction, incidental learning opportunities) and social interactions shape developmental trajectories (see a meta-analysis, Ueno et al., 2025). The integrative framework adopts a dynamic systems orientation informed by Verspoor et al. (2011) and Larsen-Freeman (2006), effectively capturing the nonlinear, individualized nature of reading development. This perspective highlights essential features such as positive feedback loops—where MCK facilitates vocabulary acquisition, which enhances reading proficiency, subsequently reinforcing metacognitive development—as well as constraints such as limited working memory capacity, low L1 literacy levels, and affective barriers (Bui & Zhang, 2025). Additionally, the temporal dimension, emphasizing nonlinear growth patterns, critical learning periods, phase transitions, and substantial individual variability, underscores the importance of longitudinal, developmental frameworks in capturing authentic trajectories of reading proficiency. Ultimately, reading proficiency itself is conceptualized through Zhou's (2024) integrated reading systems framework, comprising comprehension accuracy, processing speed, and strategic flexibility as primary indicators of effective reading competence.

This integrative model advances current understanding by: (a) bridging metacognitive theory with vocabulary and reading research, (b) incorporating dynamic systems principles to explain developmental variability, and (c) situating cognitive processes within authentic instructional contexts. It offers both theoretical precision for researchers in applied linguistics and practical insights for educators working with young EFL learners.

Pedagogical Implications

The findings reported in Teng's (2025a) longitudinal study suggest several pedagogical considerations for improving EFL reading instruction, particularly for young learners in similar contexts.

Integrating Metacognitive and Vocabulary Instruction

At the core of these implications is the recognition that MCK does not function as an isolated predictor of reading proficiency but rather operates through its interaction with vocabulary development. This highlights the need for pedagogical approaches that integrate MSI with systematic vocabulary enrichment, rather than treating them as separate instructional goals. Research has consistently demonstrated that MSI enhances reading comprehension by promoting learners' awareness and regulation of their cognitive processes (Veenman et al., 2006). For example, teachers might introduce "think-aloud" activities in which students are encouraged to verbalize their reasoning and problem-solving steps while reading a text. However, such strategies are most effective when learners have sufficient vocabulary knowledge to apply them meaningfully. To address this, teachers can organize collaborative word-mapping exercises, where students work together to build semantic webs for new vocabulary, thus linking strategy use and vocabulary growth. This underlines the necessity of combining metacognitive training with targeted vocabulary development to achieve optimal reading outcomes.

Second, the mediating role of BVK between MCK and reading proficiency underscores that vocabulary instruction should not rely solely on incidental learning; instead, it necessitates

systematic and intentional pedagogical intervention. Vocabulary teaching should move beyond decontextualized memorization toward contextualized, meaning-oriented practices. For example, teachers can use semantic mapping to connect new words to prior knowledge, or have students break down words into roots and affixes. Repeated exposure to new vocabulary can be built into games, reading, or writing tasks. For younger learners, incorporating narrative-based vocabulary learning and multimodal materials (e.g., visuals, gestures, multimedia) can facilitate the connection between form and meaning while maintaining engagement. Importantly, vocabulary instruction should be closely aligned with the metacognitive strategies being taught, so learners can actively apply planning, monitoring, and evaluation skills to their vocabulary development.

Differentiated and Equitable Instruction

The longitudinal design of Teng's (2025a) study reinforces the cumulative nature of reading development, wherein early advantages or disadvantages tend to magnify over time. This finding carries significant implications for equity in language education. Learners with underdeveloped MCK or limited vocabulary at early stages are at heightened risk of falling further behind unless these gaps are addressed through timely intervention. Consequently, differentiated instruction—the deliberate adaptation of tasks to accommodate learners' varying levels of metacognitive readiness and lexical proficiency—should serve as a foundational principle in instructional planning. For example, teachers can assign texts at different levels and provide targeted vocabulary lists or metacognitive prompts for students who need extra support. These strategies help all learners participate meaningfully and lead to more equitable access to learning. Such practices not only mitigate the risk of cumulative disadvantage but also promote sustained learner engagement and progressive literacy development across diverse learner profiles.

Sustained and Coherent Curriculum Design

The ecological nature of this study emphasizes the necessity of embedding these practices in sustained, curriculum-wide efforts, rather than relying on short-term interventions. EFL curricula should be designed with longitudinal coherence, ensuring that metacognitive and lexical development goals are reinforced consistently across grade levels. EFL curricula should be designed with longitudinal coherence, ensuring that metacognitive and lexical development goals are reinforced consistently across grade levels. For example, schools can implement a spiraled curriculum that revisits key vocabulary and metacognitive strategies each year, supported by regular formative assessments that track both strategy use and vocabulary growth. Classroom-based action research projects can complement this process, empowering teachers to adapt strategies based on learners' ongoing needs.

Professional Development and Collaborative Practice

Given the dynamic and individualized nature of metacognitive development revealed in this study, professional development for EFL teachers should include training in metacognitive pedagogy and vocabulary instruction. Teachers need to be equipped not only with theoretical understanding but also with practical strategies for integrating these components into classroom routines. For example, regular teacher workshops or peer observation sessions can support the practical integration of metacognitive and vocabulary strategies in the classroom. Collaborative

learning communities among teachers, where experiences and effective practices are regularly shared, can foster innovation and sustained commitment to pedagogical improvement. By aligning MSI with contextualized vocabulary development and embedding these practices within coherent curricular designs, educators can more effectively address the complex demands of EFL reading instruction. These pedagogical shifts will promote sustained literacy development, reduce achievement disparities, and foster more autonomous, reflective, and capable language learners.

Future Research Directions

To advance the theoretical and pedagogical understanding of MCK, vocabulary development, and reading proficiency, future research should pursue three key directions. First, greater methodological attention should be given to capturing intra-individual developmental dynamics. Process-oriented designs—such as growth mixture modeling, dynamic factor analysis, and microgenetic methods—can illuminate the recursive and nonlinear trajectories through which MCK, vocabulary growth, and reading proficiency co-develop over time, thereby moving beyond population-averaged inferences.

Second, future studies should adopt multivariate, moderated frameworks to disentangle the conditional mechanisms underlying vocabulary-mediated reading development. Incorporating cognitive-linguistic moderators (e.g., morphological awareness, reading fluency) and affective variables (e.g., task-specific confidence, academic emotions) will facilitate a more comprehensive account of how MCK operates within real-world learning environments. Longitudinal SEM combined with latent profile analysis (LPA) and cross-lagged panel analysis (CLPA) may offer a robust analytical pathway for modeling these complex interacting influences.

Third, enhancing ecological validity remains a critical imperative. Embedding metacognitive strategy research within authentic classroom ecologies, supported by longitudinal mixed-methods designs, will help bridge the persistent gap between theory and instructional practice. These methodological refinements will collectively generate more nuanced, context-sensitive models of reading development, with direct relevance for EFL pedagogy.

Conclusions

This study expands Teng's (2025a) longitudinal research by addressing three underexplored areas in EFL reading development. First, it highlights the developmental variability and non-linear trajectories of MCK, BVK, and reading, emphasizing the need for process-oriented, longitudinal methodologies that capture intra-individual change. Second, it advocates a multivariate perspective incorporating cognitive-linguistic moderators such as morphological awareness and reading fluency, alongside affective factors, to unravel the complex, conditional pathways through which MCK influences reading via vocabulary growth. Third, this study underscores the importance of embedding MSI within authentic classroom contexts, enhancing ecological validity and providing insights into how real-world instructional factors mediate

learners' strategic engagement and literacy outcomes. Pedagogically, integrating metacognitive and vocabulary instruction with differentiated, scaffolded support tailored to learners' evolving profiles can mitigate cumulative disadvantages and promote equitable, sustained reading development. Overall, this integrative framework further develops the theoretical understanding of Teng's (2025a) longitudinal findings by incorporating developmental dynamics, multivariate moderators, and ecological validity into the study of MCK, vocabulary acquisition, and reading proficiency. It also enriches pedagogical approaches by translating these complex interactions into actionable strategies that address learners' evolving cognitive and affective needs within authentic EFL classrooms. By linking Teng's empirical research with real-world instructional complexities, this work contributes to a better understanding of how to support the development of more autonomous, reflective, and proficient young EFL readers.

Declaration of AI Use in the Writing Process

During the writing of this work the author used generative AI-assisted technologies for the purpose of enhancing the clarity, coherence, and academic expression of selected passages, as well as refining theoretical framing and terminology based on the author's original ideas and structure. The author takes full responsibility for the content and intended meaning of this article.

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