



Research Article

Early Reading Literacy among Elementary School Students in the Teluk Tomini Coastal Region: A Conceptual Review of Psycholinguistic Processing Barriers



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Abstract. *Early reading literacy in Indonesian elementary schools remains a central national priority, particularly within the Kurikulum Merdeka and the Minimum Competency Assessment (AKM) literacy development agenda. However, existing discussions often emphasise instructional strategy, assessment policy, and teacher competence, with limited attention to psycholinguistic processing barriers that shape how children cognitively and linguistically process written language. This conceptual paper offers a theoretical exploration of psycholinguistic processing barriers that influence early reading literacy development among elementary school students in the Teluk Tomini coastal region of Gorontalo. Drawing on Scarborough’s Reading Rope and the AKM literacy construct, the paper argues that reading literacy is a multidimensional process that integrates decoding, language comprehension, and automaticity. Four major psycholinguistic processing barriers are highlighted: working memory limitations, phonological processing weaknesses, difficulty with vocabulary retrieval, and challenges with attention regulation during reading tasks. These barriers are conceptualised as interconnected developmental barriers that shape decoding efficiency, depth of comprehension, and literacy growth trajectories in coastal socio-cultural ecosystems. The Teluk Tomini context is particularly relevant due to linguistic diversity, dominance of oral tradition, and a limited text-rich literacy environment, which increase the cognitive demands of reading acquisition. By integrating international theoretical models with Indonesia’s literacy policy orientation, this paper proposes a conceptual synthesis that locates literacy failure not only in pedagogical practice but also within child cognitive processing conditions. The paper concludes by offering conceptual implications for curriculum design, assessment calibration, and literacy intervention tailored to coastal primary schools. Future empirical research is recommended to validate this conceptualisation and to develop psycholinguistically informed literacy models for early-grade reading development in coastal Indonesia.*

Keywords. *Early Reading Literacy, Elementary School Students, Psycholinguistic Processing Barriers, Coastal Learning Context, Teluk Tomini Gorontalo.*

1. Introduction

Early reading literacy remains a central educational priority in Indonesia, particularly within the framework of Kurikulum Merdeka and the Minimum Competency Assessment (AKM). Despite ongoing educational transformation, disparities in reading achievement persist, especially in coastal and peripheral regions (Kartini et al., 2025; Nadda, 2025). Empirical findings indicate that many elementary students, particularly in coastal areas, begin formal schooling without adequate reading fluency or comprehension readiness (Fauziah & Desiani, 2025). National data further reveal that reading difficulties remain prevalent among students in rural contexts (BPS, 2024). These challenges are compounded by limited access to printed materials, weak literacy ecosystems, and low parental literacy exposure in coastal communities (Hafizha et al., 2024; Wijaya, 2025). Consequently, early reading literacy development should not be understood solely as a matter of curriculum reform but as a multidimensional cognitive and social urgency.

Existing scholarship in Indonesia has largely emphasized instructional strategies, classroom practices, and assessment tools rather than examining how children cognitively process written language during reading (Rahayu & Dafit, 2024). While pedagogical improvements are essential, limited attention has been directed toward psycholinguistic processing barriers that influence decoding efficiency and comprehension development. This gap becomes particularly significant in multilingual coastal environments, where children navigate diverse linguistic inputs alongside formal instruction in Bahasa Indonesia. The scarcity of psycholinguistic analyses in such contexts underscores the need for a more theoretically grounded exploration of literacy challenges.

From a cognitive-linguistic perspective, early reading literacy is a complex process integrating decoding, phonological processing, vocabulary knowledge, and comprehension capacity (Fern-Pollak & Masterson, 2013). Phonological awareness and vocabulary strength have consistently been identified as major predictors of early reading success (Passenger et al., 2000; Cain & Oakhill, 2019). Scarborough's Reading Rope further conceptualizes reading comprehension as the developmental integration of word recognition and language comprehension strands (Scarborough, 2001). This framework illustrates how phonological awareness, decoding, vocabulary, syntax, and background knowledge intertwine progressively to form skilled reading ability. Contemporary literacy studies also emphasize that reading proficiency requires automaticity and strong language foundations rather than mere sound-letter correspondence (Ehri, 2020; Cain & Oakhill, 2019).

This theoretical orientation aligns with the AKM literacy construct, which prioritizes meaning-making, interpretation, and reasoning rather than mechanical oral reading accuracy

(Kemdikbudristek, 2021). However, although policy frameworks articulate desired literacy outcomes, they provide limited explanation regarding internal cognitive mechanisms that may obstruct children's ability to meet those standards. Psycholinguistic research indicates that children with limited working memory capacity and weak phonological processing experience greater difficulty constructing coherent mental representations of text (Hogan et al., 2021; Gathercole & Baddeley, 2020). In addition, vocabulary retrieval difficulties reduce semantic access during reading, while challenges in attentional regulation increase cognitive overload during complex literacy tasks (Mathur et al., 2020; Landi, 2012; Deacon et al., 2019). These processing constraints may significantly hinder reading fluency and comprehension growth.

The relevance of this perspective becomes more pronounced in the Teluk Tomini coastal region of Gorontalo. The sociolinguistic ecology of this region is characterized by linguistic diversity, strong oral traditions, and relatively limited exposure to text-rich environments. Such conditions intensify the cognitive demands of literacy acquisition, particularly when children must decode and comprehend texts in a language that may not fully align with their dominant oral linguistic system. Coastal literacy disadvantage has been associated with increased cognitive load and reduced reading automaticity (Sulistyo, 2022), further suggesting that psycholinguistic and sociocultural factors interact dynamically in shaping literacy trajectories.

Despite these insights, few studies have conceptually integrated psycholinguistic processing theory with the coastal Indonesian literacy context. This gap indicates the need to reposition early reading difficulty not merely as a pedagogical limitation but as an interaction between internal cognitive constraints and external sociocultural ecology. Accordingly, this conceptual paper aims to develop a theoretically grounded framework for understanding early reading literacy challenges among elementary school students in the Teluk Tomini coastal region. Drawing on Scarborough's Reading Rope (Scarborough, 2001) and the AKM literacy orientation (Kemdikbudristek, 2021), this study identifies four interrelated psycholinguistic processing barriers—working memory limitations, phonological processing weaknesses, vocabulary retrieval difficulties, and attention regulation challenges. By synthesizing these dimensions within the coastal learning context, the paper proposes a multidimensional conceptual model that bridges cognitive theory and national literacy policy, offering implications for curriculum design, assessment calibration, and targeted literacy intervention in coastal primary schools.

2. Methods

This study adopts a conceptual and theoretical review design aimed at developing an integrated explanatory framework for early reading literacy challenges among elementary school students in the Teluk Tomini coastal region. Rather than conducting empirical data

collection, the paper synthesizes established literacy theories and psycholinguistic research findings to construct a context-sensitive interpretation of reading difficulties. The conceptual approach is employed to clarify theoretical relationships, refine key constructs, and situate cognitive processing barriers within a specific sociocultural ecology.

The analytical foundation of this study is anchored in Scarborough's Reading Rope framework (Scarborough, 2001), which conceptualizes reading comprehension as the developmental integration of word recognition and language comprehension processes. This theoretical model is aligned with the AKM literacy construct (Kemdikbudristek, 2021), which emphasizes meaning-making, interpretation, and reasoning as central literacy outcomes. Together, these frameworks provide the normative and cognitive reference points for examining how psycholinguistic constraints may hinder students' literacy development.

The conceptual synthesis was developed through a structured integration of three strands of literature already established in early reading scholarship. First, foundational perspectives on reading as a multidimensional cognitive-linguistic process were examined, particularly those highlighting decoding, phonological processing, vocabulary knowledge, and comprehension capacity (Fern-Pollak & Masterson, 2013; Passenger et al., 2000; Cain & Oakhill, 2019). Second, psycholinguistic studies addressing working memory limitations (Hogan et al., 2021; Gathercole & Baddeley, 2020), phonological processing efficiency, vocabulary retrieval mechanisms, and attentional regulation in reading (Mathur et al., 2020; Landi, 2012; Deacon et al., 2019) were synthesized to identify internal cognitive constraints that may disrupt reading fluency and semantic integration. Third, literature discussing literacy disadvantage and limited literacy ecosystems in coastal or peripheral contexts (Hafizha et al., 2024; Wijaya, 2025; Sulisty, 2022) was incorporated to contextualize these cognitive barriers within the sociolinguistic characteristics of the Teluk Tomini region.

Through this layered theoretical integration, four interrelated psycholinguistic processing barriers were conceptually identified: working memory limitations, weak phonological processing, vocabulary retrieval difficulties, and challenges in attentional regulation. These barriers were analytically mapped onto the developmental strands of Scarborough's Reading Rope to examine how each may interfere with word recognition efficiency, language comprehension depth, and reading automaticity. The coastal sociolinguistic context was interpreted as a modifying condition that potentially intensifies cognitive load due to linguistic diversity, oral-dominant traditions, and limited exposure to text-rich environments.

This study is limited to theoretical conceptualization and does not provide empirical measurement or statistical validation of psycholinguistic variables. Instead, it offers a

structured conceptual model intended to guide future empirical investigation and intervention design in early-grade coastal literacy settings.

3. Results

Early reading literacy development in Teluk Tomini must be understood as a cognitive-linguistic developmental process shaped by internal processing and external sociocultural context. Children must decode symbols, construct meaning, and activate linguistic representations in a multilingual coastal context. These demands increase processing costs because children must operate within linguistic variation and limited print access. Studies show that regional ecological factors strongly influence the processing load of literacy and reading outcomes in Indonesia's coastal schools. International research also confirms that literacy progress depends on the alignment between cognitive capacity and the input from the literacy environment (UNESCO, 2023). Therefore, understanding this dual interaction provides a basis for mapping how psycholinguistic processing barriers operate in this context.

The four key psycholinguistic processing barriers are working-memory limitations, weak phonological processing, difficulty with vocabulary retrieval, and challenges with attention regulation. These barriers weaken decoding efficiency, reduce the ability to construct meaning, and limit automaticity in early reading. When decoding and comprehension move slowly, the reading pathway becomes unstable and fragile. Research shows that poor phonological access and low working memory capacity lead to slow and error-prone decoding (Swanson, 2021). Studies also reveal that weak vocabulary retrieval systems reduce semantic access and limit meaning integration during reading (Perfetti, 2020). Therefore, these four processing barriers represent the core internal sources of reading instability that must be examined conceptually.

Scarborough's Reading Rope provides a theoretical framework for identifying where breakdown occurs within the reading processing system. The Rope separates reading development into word recognition strands and language comprehension strands, both of which must increase in fluency to reach skilled reading. Weakness in any strand increases reading vulnerability, especially among young readers who are still shaping linguistic representation. Recent literacy research confirms that the Rope remains a strong analytic framework for linking component-level processing to reading mastery (Ehri, 2020). This model is widely used to diagnose reading difficulty through precise psycholinguistic mapping in early literacy research (Cain & Oakhill, 2019). Therefore, Scarborough's Rope becomes an essential interpretive frame to connect psycholinguistic barrier analysis with literacy development.

At the same time, the AKM literacy construct positions reading as meaning-making, reasoning, and interpretation, rather than solely decoding accuracy. AKM demands that students evaluate information, analyse text, and construct meaning across literacy tasks beyond sound-letter correspondence. This means that decoding skill is not the final measure of literacy success in Indonesian national assessment. The national literacy policy under Kurikulum Merdeka prioritises comprehension performance over mechanical reading output (Kemdikbudristek, 2021). Studies also show that comprehension-based instruction leads to more sustainable literacy outcomes in Indonesian primary schools. Therefore, literacy must be understood as the integration of decoding and reasoning capacities, which necessitates strategic intervention.

In coastal multilingual contexts like Teluk Tomini, literacy interventions must focus on reducing psycholinguistic processing burden rather than increasing repetitive drills. Strengthening phonological processing, vocabulary richness, memory scaffolding, and support for attention regulation is necessary to build stable reading growth. Instruction must help children build processing fluency in manageable steps aligned with their cognitive readiness. Research indicates that literacy progress is stronger when interventions align with cognitive processing capacity and ecological context. Coastal literacy studies also show that oral narrative-based vocabulary development improves comprehension and conceptual retention in early grades. Therefore, literacy failure in Teluk Tomini should be interpreted as a mismatch between cognitive capacity and ecological demand, which directly supports the argument for a psycholinguistically based literacy intervention design.

4. Discussion

By integrating these three tiers, the framework moves beyond a deficit-oriented view of early reading difficulties and offers a holistic perspective that captures the interplay between cognitive constraints and contextual realities in coastal and low-resource settings.

4.1 Tier 1: Core Psycholinguistic Processing System

Tier 1 represents the internal psycholinguistic processing capacity that forms the cognitive foundation for early reading development. Children must activate working memory, phonological processing, vocabulary retrieval, and attentional control to efficiently decode written symbols. These four processing mechanisms function together as the underlying substrate that supports the construction of meaning in the mind. Research confirms that phonological and working memory capacity directly influence decoding fluency and the development of orthographic mapping (Swanson, 2021; Hogan et al., 2021). Studies also show that vocabulary retrieval and attention regulation shape semantic integration and reading

comprehension outcomes in the early grades (Perfetti, 2020; Read & Peterson, 2022). Therefore, Tier 1 establishes the core cognitive system that must operate efficiently before Scarborough's Reading Rope strands can weave into skilled reading.

4.2 *Tier 2: Instructional Mediation and School Literacy Practice*

Tier 2 refers to instructional mediation inside schools that can either reduce or increase psycholinguistic processing demands during literacy learning. Teaching design, scaffolding strategies, task pacing, and text structure influence the cognitive burden children must manage while reading. When these instructional elements align with cognitive readiness, reading processing becomes less exhausting and more developmentally supportive. Studies show that phonological-focused scaffolding, guided reading routines, and oral vocabulary enrichment reduce processing load and accelerate decoding fluency (Hogan et al., 2021; Ehri, 2020). National literacy directions under AKM also emphasize meaning-based reading outcomes to shape instructional priorities beyond mechanical decoding drills (Kemdikbudristek, 2021). Therefore, Tier 2 functions as the mediating system that aligns cognitive processing capacity with literacy instruction to support more stable reading development.

4.3 *Tier 3: Coastal Sociocultural and Linguistic Ecology*

Tier 3 represents the sociocultural and linguistic environment that shapes literacy input, exposure, and opportunity in Teluk Tomini coastal schools. Children in this region grow up in a multilingual daily environment that involves the Gorontalo language, Indonesian, and coastal fishing speech variations. Linguistic mobility and inter-desa migration also create fluid code-mixing patterns that influence the development of phonological representation and lexical storage. Studies show that multilingual coastal ecologies increase linguistic variation, which affects literacy learning dynamics among early-grade students. Coastal research also confirms that print-poor environments limit incidental vocabulary growth and reduce opportunities for orthographic mapping in rural literacy contexts. Therefore, Tier 3 increases cognitive processing demands faster than children's internal capacity can adapt, and amplifies the psycholinguistic barriers described in Tier 1, which are mediated through Tier 2.

The three tiers interact vertically to form an integrated developmental model of early reading literacy in coastal elementary contexts. Tier 3 creates the sociocultural literacy exposure environment that shapes the quantity and quality of linguistic input children receive daily. Tier 2 functions as the school's mediation system, adjusting instruction and scaffolding to reduce processing demands and support meaning-making. National literacy studies show that instructional alignment with environmental context improves literacy development outcomes in marginal regions. International research also confirms that literacy success depends on the interplay between environment, instruction, and cognitive system rather than single-factor

interventions (UNESCO, 2023). Therefore, reading literacy outcomes emerge from the interaction between cognitive capacity, instructional mediation, and coastal ecological conditions, making literacy both a cognitive event and a cultural-ecological event.

5. Conclusion

The most important finding of this conceptual paper is that early reading literacy barriers in Teluk Tomini coastal contexts are strongly shaped by internal psycholinguistic processing conditions rather than merely by instructional weakness. Children struggle because their cognitive systems are forced to manage a high processing load from multilingual exposure and a limited print environment. These conditions increase the mental cost of reading before fluency can develop naturally. Studies in coastal Indonesia show that reading challenges often arise from ecological linguistic pressures rather than from inadequate curriculum implementation. International research also confirms that reading difficulty is triggered when cognitive processing demand exceeds processing capacity. Therefore, literacy development should be understood as a cognitive-linguistic developmental challenge rather than a simple classroom performance issue.

Scientifically, this paper contributes a new conceptual synthesis that integrates Scarborough's Reading Rope with the AKM literacy construct to explain early reading literacy in coastal multilingual environments. The Rope framework clarifies where specific decoding and language comprehension breakdowns occur within the cognitive system. Meanwhile, AKM clarifies that literacy outcomes must reflect the meaning-making and reasoning demands expected in national standards. Existing literacy research rarely combines both frameworks to examine literacy failure in rural and peripheral coastal regions of Indonesia. This conceptual synthesis therefore expands psycholinguistics into a more context-sensitive explanatory model, thereby strengthening its theoretical and policy relevance. Therefore, this scientific contribution serves as a conceptual bridge, underscoring the need to articulate research limitations and to articulate a new research direction.

This conceptual paper has limitations because it does not include empirical field data validation from Teluk Tomini coastal classrooms. The arguments are theoretically grounded and literature-based, but direct measurement of processing barriers still needs to be tested on real students in authentic learning environments. Future research must therefore employ mixed-methods to capture behavioural indicators from real reading events. Studies with experimental phonological intervention, memory load manipulation, and attention regulation support will provide stronger evidence about causal mechanisms. Coastal comparative studies across different desa clusters can also explain how multilingual variation uniquely shapes reading development. Therefore, the next stage of research must convert this conceptual model

into empirical testing and a psycholinguistically informed intervention design for coastal Indonesian elementary schools.

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