CONCEPTUALISING THE MULTIDIMENSIONAL ROLES OF MORPHOLOGICAL AWARENESS, SYNTACTIC AWARENESS, AND LEXICAL KNOWLEDGE IN ACADEMIC READING COMPREHENSION AMONG ESL UNDERGRADUATES

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ABSTRACT

This paper advances a theoretically integrated framework examining the multidimensional relationships between morphological awareness, syntactic awareness, and lexical knowledge in academic reading comprehension among ESL undergraduates. Through systematic synthesis of three theoretical paradigms, the Reading Systems Framework (Perfetti & Stafura 2014), the Vocabulary Knowledge-Reading Comprehension Model (Qian 1998), and the Automaticity Reading Theory (LaBerge & Samuels 1974), this study proposes that the automaticity of linguistic processing mechanisms significantly mediates reading comprehension. The proposed framework presents both direct and indirect pathways through which morphological and syntactic awareness influence academic reading comprehension, with particular attention to the mediating role of lexical knowledge. This conceptualisation extends existing theoretical models by explicating how the dimensional aspects of these linguistic competencies, including relational, syntactic, and distributional morphological awareness; syntactic word order, syntactic judgment, and sentence completion in syntactic awareness; and breadth and depth dimensions of lexical knowledge, interact systematically in academic reading comprehension. Drawing upon empirical evidence from literacy development and second language learning research, this study hypothesises that the automatisation of these linguistic mechanisms significantly influences reading comprehension outcomes among adult readers. The framework interrogates the metalinguistic challenges confronting ESL undergraduates within a tertiary education context characterised by systematic transitions in language policy and pedagogical approaches, which have fundamentally altered patterns of academic literacy development. This theoretical synthesis yields significant implications for pedagogical practice, curriculum design, and future empirical investigation and provides a foundation for developing targeted interventions and assessment protocols that address the specific linguistic challenges faced by ESL learners in academic contexts.

Keywords: Morphological awareness; Syntactic awareness; Lexical knowledge; Academic reading comprehension; Conceptual framework

INTRODUCTION

Reading comprehension is a complex, multi-componential cognitive process that encompasses the interaction of many linguistic skills and knowledge sources (Nassaji 2013; Grabe & Stoller

2013). This crucial skill has been extensively studied in relation to several contributing factors, including linguistic and cognitive abilities, cultural opportunities, engagement in literacy activities, teaching methods, motivation to read, and exposure to reading materials (Protopapas et al. 2011). Among the linguistic skills that play an instrumental role in facilitating reading comprehension, metalinguistic awareness has garnered significant attention from researchers in the field of language acquisition and literacy development (Richards & Rodgers 2014).

The conception of metalinguistic awareness is defined as an explicit or conscious grasp of language structures in a way that one is able to reflect upon and manipulate these structures (Nagy & Anderson 1998; Roehr-Brackin 2018). This awareness comprises various aspects of language, including morphology, syntax, phonology, phonemics, lexis, graphology, semantics, and pragmatics (Nagy & Anderson 1998; Roehr & Gánem-Gutiérrez 2009). There is a growing literature that shows how different aspects of metalinguistic awareness support second language (L2) literacy skills, especially reading comprehension. Metalinguistic skills, which allow individuals to analyse and reflect on language components, have been identified as key factors in reading acquisition (Gombert 1992) and reading comprehension performance (Tighe & Schatschneider 2016; Koda 2005). These findings emphasise the necessity of developing metalinguistic awareness in L2 learners to improve their reading ability and, therefore, overall language development. In reading comprehension studies, morphological awareness, syntactic awareness, and lexical knowledge have been recognised as significantly associated with successful reading comprehension, particularly in academic contexts (Kieffer & Lesaux 2012; Zhang, 2012). Nevertheless, the complexity of these predictors and their intersection with reading comprehension remain underexplored, particularly within tertiary ESL learners.

In Malaysia, the introduction of the communicative language teaching (CLT) approach in primary to secondary education has challenged long-standing traditions that emphasize the teaching of syntax and grammar rules, commonly referred to as the structural approach. With the shift to the CLT approach, grammar instruction has become a low priority in language pedagogy. Grabe and Yamashita (2022) assert that "In L1 instructional contexts, grammar instruction had not been emphasized for at least the past thirty years. In L2 contexts, grammar was not emphasized in L2 communicative methods" (p. 292). They further argue that the belief that teaching grammar might turn a reading course into a covert grammar class may be the reason for the disconnect between structural teaching approach and reading pedagogy. Consequently, many university students in Malaysia have enrolled in higher education without a fully developed understanding of grammatical competence necessary for advanced reading demands (Li et al. 2021; Qrqez & Ab Rashid 2017; Park 2004). The limitation in their linguistic knowledge leaves them inadequately prepared to engage effectively with more advanced academic reading materials, such as scientific texts that demand precision in meaning and necessitate a firm understanding of structural grammar for thorough comprehension and accuracy.

Therefore, this conceptual paper seeks to present a framework that provides insight into how morphological awareness, syntactic awareness and lexical knowledge interact with reading comprehension, and then explain the predictive powers each independent variable may have on academic reading comprehension of ESL undergraduates. The conceptual framework is rooted in three main theoretical perspectives: the Reading Systems Framework (Perfetti & Stafura 2014), the Vocabulary Knowledge–Reading Comprehension Model (Qian 1998), and the Automaticity Reading Theory (LaBerge & Samuels 1974). Largely, this conceptual paper argues that increased automaticity of these linguistic skills can contribute to better reading comprehension performance.

The proposed conceptualisation is especially relevant and significant in the Malaysian context. For decades, the shift towards the CLT approach for more than half a century (Selvaraj 2010) has led to a de-emphasis on grammar instruction in English language classrooms in Malaysia. This has impacted students' readiness for engaging with advanced academic texts at the tertiary level and beyond. By looking at the multifaceted nature of morphological awareness, syntactic awareness, and lexical knowledge, and the contributions they may have in reading comprehension, this framework seeks to address the metalinguistic challenges faced by Malaysian undergraduates in their pursuit of academic literacy. As such, this conceptualisation reflects an attempt to contribute new insights into the relationship of L2 reading and linguistic skills as a guide for both pedagogy and research in L2 reading in higher education.

LITERATURE REVIEW

Contemporary perspectives on reading comprehension emphasize its nature as a complex, multi-componential cognitive process that demands the synchronized operation of various linguistic competencies. This complexity is particularly pronounced in academic contexts, where readers must process sophisticated texts that often contain discipline-specific vocabulary and complex syntactic structures. According to Grabe and Stoller (2013), reading comprehension is a complex cognitive process that require the interplay of different kinds of competences, knowledge bases and strategies. Of the various factors that underlie reading comprehension, it is recognised that linguistic skills are core components including morphological awareness, syntactic awareness and lexical knowledge (Jeon & Yamashita 2014; Kieffer & Lesaux 2012; Zhang 2012). These skills are particularly important for L2 learners, who often face challenges in processing and understanding texts due to limited linguistic knowledge and processing efficiency (Koda 2005).

Although the role of morphological awareness, syntactic awareness, and lexical knowledge in reading comprehension is well-established, less attention has been paid to these linguistic skills as a dimensional construct or their interrelationships especially among university ESL learners. As such, this review of the literature will summarise what is currently understood about morphological awareness, syntactic awareness and lexical knowledge as they relate to L2 reading comprehension. The review will concentrate on the following key areas:

1) Role of morphological awareness in reading comprehension.
2) Role of syntactic awareness in reading comprehension.
3) Role of lexical knowledge in reading comprehension.
4) Mediating role of lexical knowledge in the relationship between morphological awareness, syntactic awareness, and reading comprehension

The following review synthesises current theoretical understanding and empirical evidence regarding the roles and dimensions of morphological awareness, syntactic awareness, and lexical knowledge in academic reading comprehension.

Role of Morphological Awareness in Reading Comprehension

Morphological awareness is defined as the ability to recognize, understand, and use the smallest meaningful units of language, such as prefixes, suffixes, and roots (Carlisle 2000). Research has demonstrated that morphological awareness is a robust predictor of reading comprehension in both first language (L1) and L2 contexts, particularly in academic contexts where learners

encounter morphologically complex vocabulary (Carlisle 2000; Deacon & Kirby 2004; Kirby et al. 2012; Kieffer & Lesaux 2012). There has been consistent evidence from numerous studies that morphological awareness plays an important role in reading comprehension development across various L1 and L2 contexts (Kieffer & Lesaux 2012; Zhang 2016). The relationship appears to be particularly significant in academic reading, where understanding of morphological structures facilitates the processing of specialized terminology and abstract concepts. Kieffer and Lesaux (2012) reported similar results for morphological awareness among Spanish-speaking English language learners (ELLs) in upper elementary school as a significant predictor of reading comprehension. Likewise, Zhang (2016) found that morphological awareness had a direct effect on reading comprehension of Chinese EFL students at the university level. Some studies have also examined the dimensional quality of morphological awareness and its association with reading comprehension. Kuo and Anderson (2006) conceptualised morphological awareness as a set of constructs whose core dimensions included: (a) identification of morphemes, (b) morphological structure awareness, (c) morphological problem-solving, and (d) morphological inference-making. Tighe and Schatschneider (2016) found that these dimensions differentially predicted reading comprehension among adult learners. Moreover, Goodwin et al. (2013) demonstrated that both inflectional and derivational morphological awareness contributed unique variance in reading comprehension among fifth-grade students.

Beyond these dimensions, contemporary research conceptualises morphological awareness as a tripartite construct encompassing relational, derivational and distributional dimensions (Nagy et al. 2014; Levesque et al. 2017). The relational dimension represents the foundational level, concerning learners' ability to recognise and operate relationships between base morphemes and their derivatives (Kuo & Anderson 2006). This aspect involves identifying semantic relationships between morphologically related words while distinguishing these from superficially similar but unrelated forms. Evidence suggests that relational awareness emerges as the primary developmental stage in morphological competence. The derivational dimension operates at the interface of morphology and syntax, where learners must grasp how derivational suffixes (e.g., '-ive', '-tion') transform both word class and meaning. According to Mahony (1994), "one of the chief functions of the derivational process is to form a new word with a category different from the base" (p. 21). The complexity of derivational awareness is evidenced in its developmental trajectory, with mastery typically emerging later than relational awareness (Mahony 1994). The distributional dimension, on the other hand, encompasses the knowledge of the constraints on the use of derivations in different environments (Kuo & Anderson 2006). The distributional dimension represents the most sophisticated level, encompassing knowledge of morphological constraints and combinatorial rules. This aspect requires learners to understand how syntactic categories constrain morpheme combinations, showing the interface between morphological and syntactic knowledge systems.

Notably, the developmental sequence for acquisition of derivational morphology has been shown to be such that learners first master the relational dimension before they acquire a full set of syntactic and distributional properties (Mahony 1994; Tyler & Nagy 1989; Kieffer & Lesaux 2012). This developmental trajectory has been supported by numerous studies, which have consistently found that children acquire the relational aspect before mastering the syntactic and distributional aspects (Ku & Anderson 2003; McCutchen et al. 2008; Nagy et al. 2006; Tyler & Nagy 1989; Mahony 1994). Research indicates that distributional awareness develops later than both relational and derivational aspects, suggesting a hierarchical acquisition pattern in morphological awareness development. These findings indicate that

morphological awareness may be best conceptualized as a multidimensional construct and should therefore not be treated as unidimensional when exploring its nature for reading comprehension.

Role of Syntactic Awareness in Reading Comprehension

Syntactic awareness, on the other hand, involves the ability to understand and reflect on the grammatical structures of language (Nagy & Scott 2000). Syntactic awareness has also been linked to reading comprehension (Cain 2007; Mokhtari & Thompson 2006). Studies have shown that grammatical sensitivity is a major determinant of reading understanding, especially in the case of more complex and academic texts (Mokhtari & Thompson 2006; Nation & Snowling 2000). In a study conducted by Cain (2007), syntactic awareness was found to be a strong predictor of reading comprehension above and beyond vocabulary knowledge and working memory among 8-to10-year-old children. Similarly, Mokhtari and Thompson (2006) found that grade 5 students' syntactic awareness explained a noteworthy amount of variance in children's reading comprehension. There are also studies done on the multidimensionality of syntactic awareness and its relationship to reading comprehension. Tong et al. (2014) identified three dimensions of syntactic awareness: (a) syntactic parsing, (b) syntactic judgment, and (c) syntactic correction. They found that these dimensions differentially predicted reading comprehension among Chinese-speaking children in early elementary school. Further, Deacon and Kieffer (2018) demonstrated that both oral and written syntactic awareness accounted for unique variance in reading comprehension among fourth-grade students. According to Gombert (1992), the development of syntactic awareness may be conceptualised as a four-stage process. First, individuals implicitly internalise the syntactic and grammatical rules governing word order and sentence structure. The second stage involves the ability to manipulate the grammatical organisation within a sentence. In the third stage, individuals can formulate syntactic rules and identify their inherent characteristics. The final stage is characterised by the ability to consciously manipulate and reflect on one's understanding of syntactic rules and performance on tasks assessing syntactic knowledge (Brimo et al. 2018; Layton et al. 1998).

Within the adult population, and specifically among college-aged learners, complex sentence structures have been utilised to measure syntactic awareness (Scott 1988; Brimo et al. 2017). Nonetheless, capturing the entire construct of syntactic awareness is challenging due to its multidimensional nature, the variety of syntactic structures, individual language experiences, and the role of cognitive development in metalinguistic skills (Gombert 1992; Tunmer et al. 1984). While a comprehensive taxonomy of syntactic awareness categories is an ongoing endeavor in language development and metalinguistic research, studies can focus on a range of syntactic functions to assess students' abilities (Brimo et al. 2017; Urquhart & Weir 1998). To evaluate syntactic abilities, researchers often use tests that target one or more dimensions, such as syntactic judgment, word order, and sentence completion (Brimo et al. 2018; Tong et al. 2014).

Syntactic word order awareness represents a fundamental component of linguistic competence, particularly in academic reading contexts. This dimension refers to the structure based on which words and phrases in a sentence can arrange according to specific rules of grammar (Cain 2007). Research indicates that proficiency in syntactic word order correlates significantly with reading comprehension outcomes, particularly in processing complex academic texts. The syntactic judgment dimension encompasses the linguistic judgment of grammaticality and well-formedness of sentences (Nassaji 2003; Brimo, 2011). This aspect

manifests through learners' capacity to identify syntactic violations and assess grammatical well-formedness across varying levels of structural complexity. Empirical evidence demonstrates that syntactic judgment capabilities account for unique variance in reading comprehension outcomes, even when controlling for vocabulary knowledge and phonological awareness. The sentence completion dimension represents the interface between syntactic knowledge and productive language use, operationalized through learners' ability to generate contextually appropriate syntactic structures (Tong & McBride 2016). This construct encompasses both implicit and explicit grammatical knowledge, manifesting through learners' capacity to manipulate syntactic elements within constrained contexts. These tests incorporate various syntactic functions to measure students' ability to judge syntactic word order, identify syntactically correct sentences, and demonstrate grammatical knowledge.

Role of Lexical Knowledge in Reading Comprehension

Lexical knowledge, which encompasses both vocabulary breadth (size) and depth (richness), has also been widely recognized as a key predictor in reading comprehension (Qian 2002; Stahl & Nagy 2006). Vocabulary breadth refers to the number of words a learner knows, while vocabulary depth involves a more comprehensive understanding of word meanings, including their semantic, syntactic, and collocational properties (Nation 2001). Lexical knowledge, including both vocabulary breadth (size) and depth (richness), has been consistently linked to reading comprehension (Ouellette 2006; Proctor et al. 2012). Ouellette (2006) reported that vocabulary breadth and depth independently accounted for unique variance in reading comprehension skills amongst children at the fourth grade level. Similarly, Proctor et al. (2012) found that vocabulary depth predicts reading comprehension among Spanish-English bilingual students in upper elementary school. Other studies have also investigated the multidimensional nature of lexical knowledge and its relation to reading comprehension. Qian (1999) concluded that vocabulary depth consists of four dimensions: (a) synonymy, (b) polysemy, (c) collocation, and (d) morphological knowledge. Qian (2002) also found these dimensions were significantly correlated with reading comprehension among adult ESL learners. Moreover, Li and Kirby (2015) proved that both vocabulary breadth and depth explained a unique variance in reading among Chinese EFL high school students.

The construct of vocabulary knowledge can be considered multifaceted and it consists of at least two key dimensions: breadth and depth (Anderson & Freebody 1981; Schmitt, 2014). Breadth refers to the number of words an individual knows, while depth pertains to the richness and quality of an individual's understanding of those words (Read 2000; Schmitt 2014). The breadth dimension establishes critical thresholds for academic reading comprehension. Empirical investigations have established that successful academic text processing requires knowledge of approximately 8,000-9,000 word families for 98% text coverage (Nation 2006). This metric provides crucial benchmarks for assessing L2 learners' readiness for academic discourse engagement. On the other hand, depth of vocabulary knowledge is concerned with the extent to which learners are able to encode words into their mental lexicon and make connections between a word and other related words (Read 1988, 1993; Wilks & Meara 2002; Schmitt 2014). The depth dimension encompasses qualitative aspects of word knowledge, manifesting through three primary categories identified by Read (2004): (1) syntagmatic

relations encompassing collocational knowledge and contextual usage patterns; (2) paradigmatic relations including semantic networks and hierarchical relationships; and (3) analytic properties comprising core meaning components and definitional attributes. This multidimensional conceptualization aligns with Qian's (1998) theoretical framework, which posits that both vocabulary breadth and depth function as critical determinants of reading comprehension.

Given the interactive and interdependent nature of these dimensions, researchers argue that equal attention should be given to both aspects when examining the role of vocabulary knowledge in reading comprehension (Schmitt 2014; Uchihara & Harada 2018). Other studies have also provided further evidence for the distinct contributions of vocabulary breadth and depth to reading comprehension across various age groups and language backgrounds (Uchihara & Harada 2018; Harkio & Pietilä 2016). Such findings highlight the need for a comprehensive approach to vocabulary assessment that addresses both the breadth and depth of word knowledge necessary for progressing in reading comprehension development. This multifaceted conceptualisation provides a more nuanced understanding of vocabulary knowledge, particularly relevant in academic contexts where sophisticated lexical knowledge is required for effective comprehension.

Mediating Roles of Lexical Knowledge in the Relationship Between Morphological Awareness, Syntactic Awareness, and Reading Comprehension

The dynamic interplay between linguistic subsystems in L2 reading comprehension has emerged as a critical area of investigation, particularly regarding the mediating role of lexical knowledge in morphosyntactic processing. Contemporary research has revealed sophisticated patterns of mediation that transcend simple linear relationships, suggesting complex interfaces between morphological awareness, syntactic awareness, and vocabulary knowledge in academic reading processes.

Past studies have systematically documented the mediating mechanisms through which lexical knowledge facilitates reading comprehension. For instance, a study conducted by Zhang and Koda (2012) documented significant partial mediation effects of vocabulary knowledge in the relationship between morphological awareness and reading comprehension among university level Chinese EFL learners. Their findings revealed that lexical knowledge accounted for approximately 42% of the total effect between morphological awareness and reading comprehension outcomes, suggesting a robust mediational pathway. Similarly, when it comes to syntactic awareness and reading comprehension, Choi (2015) demonstrated complete mediation of the relationship between syntactic awareness and reading comprehension through vocabulary knowledge among Korean EFL learners at middle school level. These findings align with theoretical postulations regarding the centrality of lexical representations in reading comprehension processes, while extending our understanding of how different linguistic competencies interact in L2 reading contexts.

The current results extend this line of research by showing that morphological awareness and syntactic awareness may impact reading comprehension not only directly, but also through their influence on vocabulary knowledge. Nagy et al. (2014) posit that morphological awareness may facilitate vocabulary acquisition through multiple cognitive mechanisms: facilitation of semantic network development, activation of morphological problem-solving strategies, and enhancement of word-learning efficiency. In the same vein,

syntactic awareness may support vocabulary depth by helping learners understand the development of sophisticated lexical representations through enhancement of grammatical sensitivity and refinement of collocational knowledge (Proctor et al. 2012). This expanded and deepened vocabulary knowledge, in turn, may enhance reading comprehension through its assistance in word recognition and meaning construction (Perfetti & Hart 2002).

METHODOLOGY

Drawing upon systematic document analysis, this investigation examined the multidimensional relationships across morphological awareness, syntactic awareness, lexical knowledge, and academic reading comprehension in ESL undergraduates. The analytical framework emerged from careful consideration of theoretical developments spanning five decades (1974-2022), incorporating multiple paradigmatic perspectives on L2 acquisition and reading processes.

This investigation employed a tripartite methodological approach that systematically integrated theoretical perspectives with empirical analysis. In Phase 1 (Theorization), we critically examined foundational theoretical constructs that have shaped our understanding of second language reading processes. This entailed an in-depth analysis of the Reading Systems Framework (Perfetti & Stafura, 2014), Vocabulary Knowledge Reading Model (Qian, 1999), and Automaticity Reading Theory (LaBerge & Samuels, 1974). The integration of these theoretical perspectives facilitated the identification of critical convergence points and theoretical distinctions that informed our analytical framework.

Phase 2 (Literature Search) involved a comprehensive review of relevant empirical studies published between 1974 and 2022. The selection process adhered to rigorous inclusion criteria focused on theoretical significance, methodological quality, and ESL context relevance. Four primary databases, i.e., Web of Science Core Collection, Scopus, ERIC, and Google Scholar, were systematically searched using predetermined keywords and Boolean operators to ensure comprehensive coverage of the literature. We prioritized empirical studies, theoretical papers, and meta-analyses from leading journals in applied linguistics and language education.

In Phase 3 (Analytical Integration), we conducted a multifaceted examination of the relationships between metalinguistic predictors and reading comprehension. This involved theoretical proposition examination through systematic screening and content analysis, dimensional framework evaluation through framework mapping and construct relationship analysis, and mediating pathway analysis that identified theoretical integration points and traced key pathways between variables. This integrative analytical approach enabled us to construct a coherent theoretical model that accounts for the complex interrelationships between morphological awareness, syntactic awareness, lexical knowledge, and reading comprehension in ESL contexts.

The methodological framework depicted in Figure 1 provides a robust foundation for examining the complex cognitive and linguistic processes that underlie reading comprehension in second language learners, while simultaneously addressing methodological limitations identified in previous research.
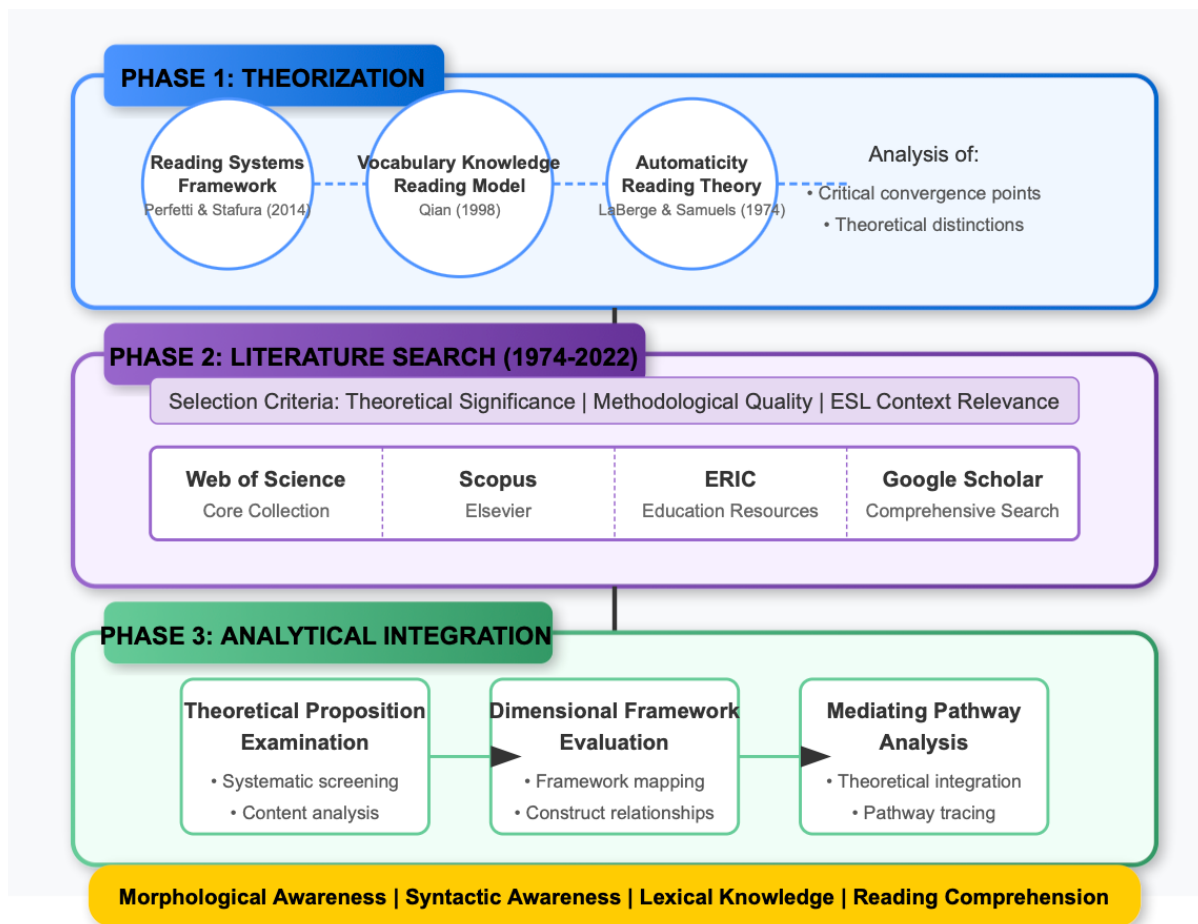
Figure 1: Three-Sequential Methodological Framework

CONCEPTUAL FRAMEWORK

This conceptual paper proposes a theoretically integrated framework that systematically examines the complex interplay between morphological awareness, syntactic awareness, and lexical knowledge in L2 academic reading comprehension. The framework synthesises three fundamental theoretical paradigms: the Reading Systems Framework (Perfetti & Stafura 2014), the Vocabulary Knowledge-Reading Comprehension Model (Qian 1998), and the Automaticity Reading Theory (LaBerge & Samuels 1974). Through this synthesis, the paper aims to explain the mechanisms through which these linguistic components interact to facilitate academic reading comprehension among Malaysian ESL undergraduates.

Theoretical Foundations and Integration

The Reading Systems Framework (Perfetti & Stafura 2014) provides the architectural foundation for understanding how multiple linguistic subsystems, which include orthographic, phonological, morphological, lexico-semantic, and syntactic systems, operate in synchronised fashion during reading comprehension. This framework posits that efficient word identification

processes, underpinned by robust linguistic knowledge, facilitate higher-order comprehension processes (Perfetti & Hart 2002). The systematic interaction between these subsystems is particularly salient in L2 academic contexts, where readers must simultaneously manage multiple linguistic processes while engaging with sophisticated academic discourse. In the context of the present study, the Reading Systems Framework provides a framework for investigating the roles of morphological awareness, syntactic awareness, and lexical knowledge as critical linguistic components that are relevant to their roles in academic reading comprehension.

The Vocabulary Knowledge–Reading Comprehension Model, developed by Qian (1998), identifies that vocabulary knowledge is the core of reading comprehension. The model proposes that both the breadth (size) and depth (richness) of vocabulary knowledge function as critical determinants of text comprehension (Ouellette 2006). In addition, the model posits that the relationship between vocabulary knowledge and reading comprehension is reciprocal, with growth in one domain facilitating growth in the other (Stanovich 1986). In the present study, the Vocabulary Knowledge–Reading Comprehension Model (Qian 1998) elucidates lexical knowledge as a two-dimensional construct that involves both vocabulary breadth and depth dimensions because different aspects of vocabulary knowledge affect reading comprehension at either word level or passage level.

The Automaticity Reading Theory, proposed by LaBerge and Samuels (1974), emphasises the importance of automaticity in lower-level reading processes, such as word recognition and syntactic parsing, for efficient reading comprehension. The development of these foundational skills will then result in a more automatic reading process for the reader which, according to this theory, frees cognitive resources that can be allocated toward higher-level comprehension processes such as meaning construction and inference generation (Samuels 1994). This theoretical perspective emphasizes how automaticity in lower-level processes, particularly word recognition and syntactic parsing, liberates cognitive resources for higher-order comprehension processes. This automaticity principle is especially relevant for L2 readers, who must develop efficient processing mechanisms across multiple linguistic domains.

Mediating Mechanisms and Dimensional Interactions

The conceptual framework of this study extends beyond linear relationships to examine the complex mediating pathways through which these linguistic components interact. Of particular significance is the mediating role of lexical knowledge in the relationship between morphological awareness, syntactic awareness, and reading comprehension. As illustrated in Figure 1, the framework proposes that morphological awareness may contribute to reading comprehension not only directly but also indirectly through its influence on lexical knowledge, a proposition supported by research indicating that morphological awareness facilitates vocabulary acquisition and development (Kieffer & Lesaux 2012; Zhang & Koda 2012). The framework also posits that morphological awareness facilitates vocabulary acquisition through enhanced understanding of morphemic structures and combinatorial rules (Nagy et al. 2014), which, in turn, can potentially benefit reading comprehension (Perfetti & Hart 2002).

Similarly, while syntactic awareness has been shown to contribute directly to reading comprehension by enabling readers to parse and interpret complex sentence structures accurately (Mokhtari & Thompson 2006; Nation & Snowling 2000), the relationship between syntactic awareness and reading comprehension may also be mediated by lexical knowledge, particularly vocabulary depth. The latter pathway operates through enhanced understanding of grammatical structures and collocational properties (Schmitt 2014). As learners develop a greater understanding of grammatical structures, they may acquire a more nuanced understanding of how words function within these structures, leading to deeper vocabulary knowledge (Proctor et al. 2012). Consequently, this enhanced lexical knowledge may contribute to improved reading comprehension by facilitating accurate sentence parsing and interpretation (Perfetti & Hart 2002).

In this regard, the present study adopts a conceptual framework integrating these three theoretical perspectives in order to provide insight into linguistic factors that contribute to L2 academic reading comprehension. Collectively, these theories establish a strong basis for exploring the roles of morphological awareness, syntactic awareness, and vocabulary knowledge dimensions in academic reading comprehension among ESL undergraduates. The conceptual framework of the study is presented in Figure 2 below.
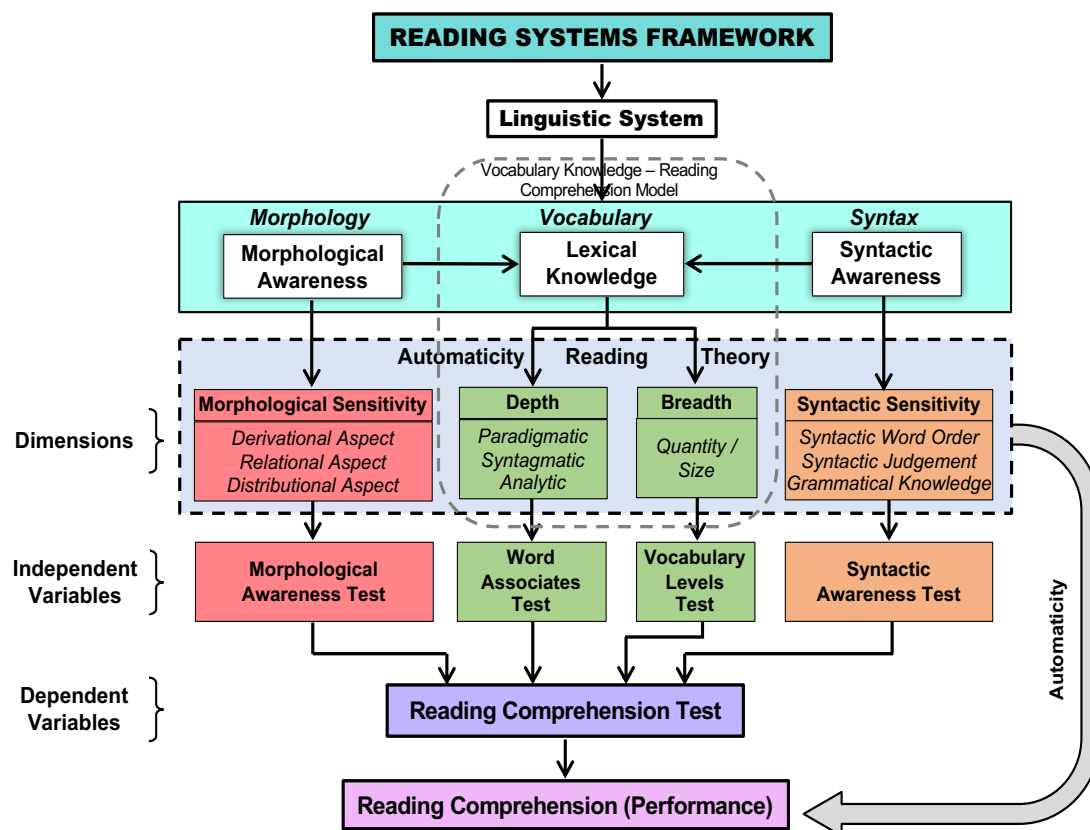

Figure 2. Conceptual framework

IMPLICATION OF THE STUDY

The conceptual framework proposed in this study yields significant implications across multiple domains of L2 education, particularly within tertiary academic contexts. For learner development, the framework's explication of multidimensional linguistic processing provides crucial insights into metacognitive strategy formation. ESL undergraduates who understand these complex linguistic interfaces can develop more sophisticated approaches to academic reading. This understanding enables the development of targeted metalinguistic awareness strategies, including systematic analysis of morphological patterns in academic discourse, recognition of discipline-specific syntactic structures, and integration of lexical knowledge across various academic contexts (Nagy et al. 2014; Zhang & Koda 2012). Such awareness promotes autonomous learning behaviors and enhances students' capacity to navigate complex academic texts independently.

Secondly, ESL educators can leverage the insights provided by this framework to integrate explicit instruction on morphology, syntax, and vocabulary into their reading pedagogy. By incorporating targeted strategies that address these linguistic determinants, particularly in the context of discipline-specific texts that are rife with morphologically complex words and sentence structures with multiclausal embeddings, educators can better equip their students to tackle the challenges of university-level academic reading (Proctor et al. 2012). Moreover, the framework emphasises the need for a balanced approach that fosters both breadth and depth of lexical knowledge, as well as the automated morphological and syntactic processing fluencies (Schmitt 2014). This integration should focus particularly on academic genres and disciplinary-specific language features.

Curriculum developers and material designers face significant implications from this theoretical framework. The systematic integration of morphological awareness, syntactic awareness, and lexical knowledge into course materials requires careful consideration of developmental sequences and processing demands (Kieffer & Box 2013). In general, by creating materials that specifically target these linguistic features associated with academic texts across content areas, even more advanced-level L2 readers in an undergraduate program would become better equipped to navigate the challenges and complexity of college reading. Additionally, resources should explicitly target the development of processing automaticity through structured practice activities and systematic exposure to academic language features.

Finally, the present study suggests that future research is required to explore other cross-sectional and longitudinal empirical evidence in order to understand fully how morpho-syntactic awareness intersect within lexical knowledge about predictions of academic reading comprehension, especially in Malaysian higher education. Future scholars can build upon the foundation laid by this conceptual framework to explore the nuances of these linguistic factors and their impact on ESL learners' reading proficiency across different academic disciplines and levels of study (Zhang & Koda 2017). Such research endeavors can contribute to a more comprehensive understanding of the linguistic underpinnings of academic reading success, ultimately informing evidence-based pedagogical practices and curricular design.

CONCLUSION

This conceptual paper advances our theoretical understanding of the complex interfaces between morphological awareness, syntactic awareness, and lexical knowledge in L2 academic reading comprehension. Through systematic integration of three key theoretical frameworks, the Reading Systems Framework, the Vocabulary Knowledge-Reading Comprehension Model, and the Automaticity Reading Theory, this study sheds light on the sophisticated mechanisms

through which these linguistic components interact to facilitate academic reading proficiency among ESL undergraduates.

Ultimately, this paper contributes to a deeper understanding of linguistic underpinnings of academic reading comprehension. The study lays the groundwork for further research and has implications in evidence-based practices within the field of second language literacy at higher education level. In an increasingly global context with academic demands for proficient academic readers on the rise, it is crucial that educators and researchers keep exploring into this complex web of linguistic forces driven to assist ESL undergraduates so that they may navigate university-level disciplinary reading tasks more confidently and effectively.

ACKNOWLEDGEMENTS

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