Cognitive Load and Sentence Processing: How EFL Learners Comprehend Complex Clauses in Academic Texts

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Abstract: This study examines how cognitive load influences sentence processing in the comprehension of complex clauses among English as a Foreign Language (EFL) learners. It aims to explore learners' perceptions of sentence complexity, their strategies in managing comprehension difficulties, and their awareness of the cognitive effort involved in reading academic texts. Using a qualitative phenomenological approach, ten English Education students from a university in Medan, Indonesia, participated in reading tasks containing complex academic sentences. Data were collected through think-aloud protocols and in-depth semi-structured interviews, then analyzed using discourse and thematic analysis to identify linguistic and cognitive patterns. The results indicate that complex sentence structures impose high cognitive demands, especially when multiple clauses and dense syntactic constructions are present. Learners with limited working memory capacity experienced slower reading, repeated rereading, and fragmented comprehension. To cope with these challenges, they employed strategies such as segmentation, rereading, translation, and note-taking, which helped reduce processing strain but did not fully enhance efficiency. The study concludes that comprehension difficulties arise from the interaction between cognitive load, sentence complexity, and working memory limitations, emphasizing the importance of instructional approaches that align linguistic input with learners' cognitive capacities.

Keywords: cognitive load, sentence processing, complex clauses, working memory, EFL learners

INTRODUCTION

Understanding complex sentence structures is one of the most demanding aspects of academic reading for EFL learners. Academic texts are often characterized by dense information, embedded clauses, and syntactically complex constructions that challenge readers' cognitive capacity. While vocabulary knowledge and grammatical competence contribute to comprehension, recent psycholinguistic research emphasizes that language processing is also constrained by cognitive factors such as working memory and cognitive load. When readers encounter long or nested clauses, their processing system must simultaneously maintain syntactic structure, interpret meaning, and integrate new information, often leading to comprehension difficulties. Previous studies have shown that the level of cognitive complexity within a linguistic task significantly affects learners' performance and processing efficiency. Moghaddam et al. (2022) examined how the cognitive complexity of writing tasks influenced EFL learners' accuracy, fluency, and syntactic complexity in both individual and collaborative contexts. Their findings indicated that tasks with higher cognitive demands tend to increase the processing load on learners, resulting in greater syntactic complexity but reduced fluency. The novelty of this study lies in its integration of Cognitive Load Theory with real-time sentence processing among EFL learners in higher education, an area that remains underexplored in psycholinguistic research. Unlike previous studies that primarily focused on linguistic or instructional aspects, this research emphasizes the cognitive mechanisms underlying how learners mentally manage complex clauses in authentic academic reading contexts. By employing a qualitative phenomenological approach, the study provides an in-depth account of learners' lived cognitive experiences, offering practical insights for designing reading instruction that aligns syntactic complexity with learners' cognitive capacities.

Cognitive Load Theory in Language Processing

The process of comprehending complex sentences in a second language fundamentally relies on the limited capacity of working memory, a core tenet of Cognitive Load Theory (CLT). When EFL learners encounter complex academic structures, the simultaneous need to parse grammatical features (syntactic construction) and derive meaning from unknown vocabulary (semantic construction) imposes a high cognitive load. Research indicates that EFL learners often prioritize semantic construction to grasp the main proposition, while the less frequent application of syntactical construction confirms that complex grammar increases the extraneous load, overwhelming their ability to process all elements simultaneously (Sibarani & Pandia, 2024). Brunken et al. (2010) the central purpose of Cognitive Load Theory (CLT) is to explain and predict learning outcomes by considering the strengths and limitations of the human cognitive system. This theory can be implemented across various learning contexts because it connects the design of instructional materials with the principles of how information is processed by the human mind. Fundamentally, CLT is grounded in the notion that effective instructional design should be informed by an understanding of cognitive architecture and the ways in which learners process, store, and retrieve information. This indicates that the failure to fully process complex clauses is not merely a linguistic deficiency, but a direct consequence of the over-taxing of cognitive resources required to manage multiple streams of information structural, lexical, and contextual within the confines of a limited working memory space

Emotion and cognition are both considered influential factors in language learning (Azamnouri et al., 2020). Psychological processes involved in language learning and production operate through a series of cognitive mechanisms that connect brain activity with language use. These mechanisms enable learners to process linguistic information by activating functions such as noticing, monitoring, storing, and retrieving input during comprehension. In the context of reading complex sentences, these mental operations determine how efficiently information is processed and integrated. When these processes are overloaded due to the syntactic complexity or density of academic texts learners may experience cognitive strain that interferes with understanding (Moghaddam et al., 2022). Cognitive Load Theory (CLT), posits that learning efficiency depends on the balance between the mental effort required to process information and the limitations of working memory (Asma & Dallel, 2020).

Because language processing is not yet fully automatic, EFL learners must allocate more conscious attention to grammatical structures, which reduces the cognitive resources available for understanding meaning. This often leads to slower reading, repeated rereading, and lower comprehension accuracy. Learners with higher working memory capacity can manage complex syntactic information more effectively, while those with lower capacity are more prone to cognitive overload when processing dense academic sentences (Stella & Engelhardt, 2019). Building upon this understanding, it becomes evident that the interaction between cognitive load and syntactic complexity significantly influences reading comprehension in academic contexts. Complex clauses demand that learners retain multiple linguistic elements in working memory while simultaneously constructing meaning. This dual demand often results in processing delays, particularly when the reader must interpret embedded or hierarchically structured sentences. In such cases, comprehension may depend not only on linguistic knowledge but also on the learner's capacity to allocate cognitive resources efficiently (Mlakar, 2020).

Working Memory and Sentence Comprehension

A major question in psycholinguistic research concerns the nature of the working memory (WM) resources used in language processing (Caplan & Waters, 1999). Based on Sana & Fenesi (2025) Working memory (WM) is a cognitive system with limited capacity that enables individuals to focus on goal-relevant information while filtering distractions and integrating new knowledge. During sentence processing, this system allows readers to hold earlier parts of a sentence in mind while integrating them with incoming words or clauses. When dealing with simple sentences, this process occurs relatively effortlessly; however, as sentence complexity increases through the addition of embedded clauses, long noun phrases, or noncanonical word orders the demands on working memory also increase (Fiebach, 1998).

Based on Silva et al. (2024) reading and writing in a foreign language are highly demanding activities that heavily engage a learner's working memory (WM), which is essential for the temporary storage and manipulation of information required for complex cognitive tasks. As posited by the Cognitive Load Theory, WM operates with a finite capacity; consequently, when this memory is overloaded, a student's attention to the task is reduced. Conversely, learning and performance improve when attentional resources are successfully freed up. In the context of writing, the inherent complexity of the composition process which includes juggling planning, translating, and reviewing can easily overwhelm cognitive capacity, thereby impeding the allocation of sufficient mental resources needed for specific text aspects, such as vocabulary selection or complex grammar use. Second-language learners are particularly susceptible to this kind of overload, especially when they are under time pressure or have not yet reached a certain proficiency level.

The cognitive strain is further intensified when learners are required to perform simultaneous secondary tasks, such as incorporating a glossary of target words, which forces a constant shift between tasks and creates competition for limited verbal and visual WM resources, ultimately hindering performance in both reading and writing.

Research in second language performance has also demonstrated that individual differences in working memory capacity significantly affect learners' ability to handle complex linguistic processing. The limited duration and capacity of working memory explain the difficulty in simultaneously processing novel content and new linguistic information, which often leads to an excessive cognitive burden on EFL learner (Roussel et al., 2022). Mota (2003) found that learners with higher working memory capacity produced language that was more fluent, accurate, and syntactically complex, suggesting that working memory supports the real-time coordination of multiple linguistic operations. The study further emphasized that language processing involves controlled attention and resource allocation; when these resources are limited, learners may sacrifice one aspect of performance, such as lexical richness, to maintain fluency or accuracy.

Furthermore, the interaction between working memory and cognitive load determines how efficiently EFL learners can process sentences of varying complexity. When working memory is overloaded, learners may rely on superficial reading strategies, focusing only on lexical cues instead of integrating structural information across clauses (Liu, 2024). Working memory capacity functions to sustain goal-relevant information processing in the face of competing response tendencies or distractions (Schmeichel et al., 2008). It is specifically defined as the ability to maintain the processing of goal-relevant information despite the presence of alternative goals or other distractions. The present research confirmed the central role of working memory in cognitive control. This limits their ability to extract accurate or nuanced meanings from the text. In academic reading, where dense syntax and information-heavy content are common, these constraints become a major source of comprehension difficulty. Thus, sentence processing in a second language is not merely a matter of linguistic knowledge, but also of managing limited cognitive resources efficiently. Understanding this interplay provides insight into why some learners excel at comprehending complex academic texts while others experience persistent difficulties despite having sufficient grammatical knowledge.

Sentence Complexity in EFL Reading Contexts

Sentence complexity is one of the key linguistic factors influencing the difficulty of reading comprehension, particularly in English as a Foreign Language (EFL) contexts (Mlakar, 2020). Recent research emphasizes that syntactic complexity plays a crucial role in determining the readability and accessibility of texts for EFL learners. Li et al. (2025) found that variations in clause structures, such as the number of dependent and embedded clauses, significantly affect how easily learners can process and comprehend texts. Their study showed that as syntactic complexity increases, text readability decreases, which in turn raises the cognitive demands placed on readers. Complex sentences often contain multiple clauses, subordinate structures, and embedded information that increase the cognitive demands on the reader. Such sentences require the integration of grammatical relationships across clause boundaries, which places a heavier burden on working memory and processing capacity (Candrasius & Maharani, 2024).

Recent psycholinguistic findings further suggest that sentence comprehension is not solely determined by sentence length or grammatical complexity, but also by how information is segmented and processed in real time. Cislaru et al. (2024) argue that language processing operates through smaller cognitive units rather than entire sentences, meaning that readers interpret meaning incrementally as linguistic input unfolds. When these processing units become overloaded due to increased syntactic embedding or high information density comprehension efficiency decreases, and readers must exert more effort to integrate each segment into a coherent representation. This indicates that the difficulty of complex sentences arises not only from their grammatical structure but also from the cognitive segmentation and integration processes required during reading.

Morever, academic writing is an essential skill for success in higher education, than a vital sign of academic writing skill is the ability to write complex and grammatically correct sentences. In EFL pedagogy, understanding how sentence complexity affects comprehension is crucial for designing instructional materials that match learners' cognitive and linguistic capacities. Simplifying sentence structures, providing explicit syntactic instruction, and guiding learners through sentence parsing strategies can significantly reduce cognitive load during reading. Therefore, sentence complexity should not be viewed merely as a grammatical challenge but as a cognitive factor that directly interacts with working memory, attention, and comprehension processes in second language reading.(Jaya, 2025).

Based on the issues outlined above, this study seeks to explore how EFL learners comprehend complex clauses in academic texts by examining their cognitive and linguistic processing. Specifically, the research aims to uncover how learners perceive sentence complexity, what strategies they employ to manage

comprehension difficulties, and how they become aware of the mental effort required when processing syntactically dense structures. These questions are intended to provide a deeper psycholinguistic understanding of the interaction between working memory, cognitive load, and sentence comprehension in the context of English academic reading.

RESEARCH METHODS

This study employed a qualitative research design with a phenomenological approach to explore how EFL learners comprehend complex sentence structures in academic texts. The phenomenological approach was chosen because it allows for an in-depth understanding of learners' lived experiences and cognitive processes as they engage with syntactically complex language (Safrodin et al., 2024). Rather than measuring comprehension quantitative, this approach focuses on describing how learners perceive, process, and make sense of challenging linguistic structures. It is particularly appropriate for psycholinguistic inquiry in educational settings, where individual perceptions and mental efforts are central to understanding cognitive phenomena such as cognitive load and sentence processing.

Data Collection

The participants of this study were higher education students majoring in English Education at one university in Medan, Indonesia. They were selected purposively based on their academic background and experience in reading English academic texts. A total of 10 participants were involved, representing students from the sixth to eighth semesters who had previously taken courses in reading comprehension and academic writing. These students were considered capable of articulating their experiences and cognitive challenges in processing complex sentences during academic reading tasks. Ethical considerations were maintained by obtaining informed consent from all participants, ensuring confidentiality, and allowing voluntary withdrawal from the study at any time.

Data were collected through in-depth semi-structured interviews and reading tasks involving complex academic sentences. During the reading sessions, participants were given selected academic passages containing complex clauses, such as embedded relative clauses, conditionals, and long nominal phrases. They were asked to read and verbalize their thought processes through a think-aloud protocol, followed by individual interviews to further explore their comprehension strategies and perceived cognitive challenges. The interviews focused on exploring (1) how students perceived sentence complexity, (2) the strategies they used to manage comprehension difficulties, and (3) their awareness of the mental effort involved. Each interview lasted approximately 30–45 minutes and was conducted in a quiet setting to ensure focus and comfort. All sessions were audio-recorded and transcribed verbatim for analysis.

Data Analysis

The data were analyzed using discourse analysis, specifically focusing on the linguistic and cognitive indicators revealed in participants' verbal responses and interview transcripts. The analysis involved several stages. First, the transcripts were coded thematically to identify recurring patterns related to comprehension strategies, cognitive load, and syntactic awareness. Codes such as sentence parsing difficulties, working memory effort, and reading strategies were developed inductively from the data. Second, each participant's discourse was analyzed to observe how cognitive load manifested in language, such as pauses, repetitions, or reformulations during sentence processing. Third, the researcher examined the linguistic features of participants' responses to identify links between syntactic complexity and processing behavior.

To ensure analytical rigor, NVivo 14 software was used for coding and data organization, while inter-coder reliability was established through peer review of selected transcripts. The combination of thematic and discourse analysis allowed for a comprehensive understanding of how cognitive mechanisms and linguistic complexity interact during EFL learners' reading processes.

RESULTS AND DISCUSSION

The data obtained from the think-aloud protocols and in-depth interviews revealed that EFL learners experienced significant cognitive strain when processing academic sentences containing complex syntactic structures. Many participants reported that they could understand the meaning of individual words but struggled to connect them into a coherent sentence when faced with embedded or multi-clausal constructions. This indicates that comprehension difficulties stem not only from limited linguistic knowledge but also from processing limitations in working memory. The think-aloud data showed frequent pauses and rereading behavior, suggesting high cognitive load and the need for additional time to decode grammatical relationships. These findings confirm that sentence comprehension involves a balance between linguistic decoding and cognitive resource management.

Another major finding is that participants tended to rely heavily on surface-level reading strategies when confronted with syntactically complex clauses. Instead of parsing sentence structures deeply, they focused on identifying key words or phrases that could help infer meaning. While this approach occasionally led to partial understanding, it often resulted in misinterpretation of the overall message of the text. This behavior aligns with previous psycholinguistic studies that highlight how limited working memory capacity leads learners to prioritize lexical recognition over syntactic integration. Such a pattern demonstrates that EFL learners often compensate for cognitive overload by simplifying their comprehension strategies, even if it compromises accuracy.

several participants described feeling mentally fatigued or losing concentration after reading a few paragraphs of dense academic text. This self-reported sense of effort suggests that sentence processing in EFL contexts imposes a substantial cognitive burden, particularly when sentences include embedded clauses or extended nominal phrases. These findings support Cognitive Load Theory, which posits that excessive processing demands can hinder information retention and reduce learning efficiency. Participants also expressed that their difficulty was not only linguistic but also psychological they felt less confident when encountering long, complex sentences, which further influenced their motivation and persistence in reading tasks.

The data also showed variation among participants in how they managed syntactic complexity, which appeared to be linked to their working memory capacity. Learners with stronger working memory tended to articulate their comprehension process more coherently during interviews, indicating better control over parsing and integrating information. Conversely, those with lower capacity displayed fragmented explanations and required longer pauses to make sense of sentence meaning. This difference suggests that individual cognitive capacity plays a crucial role in determining how efficiently learners process complex linguistic input. Such findings echo Mota (2003) conclusions that working memory constraints directly affect fluency, accuracy, and syntactic processing ability in language comprehension.

Furthermore, the analysis of interview transcripts revealed that comprehension was also influenced by the degree of syntactic familiarity. Participants reported finding sentences with familiar grammatical patterns such as relative clauses or conditionals they had previously learned easier to process compared to unfamiliar structures or academic nominalizations. This indicates that linguistic exposure and previous instruction reduce intrinsic cognitive load by allowing learners to retrieve existing syntactic schemas more efficiently. However, when confronted with less familiar constructions, their processing became slower and more effortful, highlighting the interdependence between language knowledge and cognitive resources in academic reading.

Learners' Perception of Sentence Complexity

The findings revealed that most participants perceived complex sentences as one of the most challenging aspects of reading academic English. They often associated sentence complexity with sentence length, the number of clauses, and the presence of unfamiliar grammatical patterns. Several students mentioned that when a sentence contained multiple ideas within one structure, it became "hard to see where the meaning starts and ends." This perception shows that EFL learners tend to interpret complexity primarily in structural rather than semantic terms, focusing on the visible surface features of syntax. Such perceptions align with the notion that second-language readers rely heavily on overt grammatical cues to construct meaning.

Zhao et al. (2024) explained the cognitive challenges inherent in processing complex academic texts directly impact the linguistic structures EFL learners produce and attempt to comprehend, a phenomenon supported by task-based research. Specifically, studies have found that as cognitive demands increase for instance, when tasks require learners to process, retrieve, and synthesize multiple concepts simultaneously writers demonstrate enhancements in syntactic complexity, which supports Robinson's Cognition Hypothesis. This enhanced complexity is empirically visible through measures such as longer mean lengths of T-units (MLT) and more complex nominals per T-unit (CNT). This suggests that when faced with a high cognitive burden, learners tend to employ more complex sentence structures, such as longer sentences with subordinate clauses and embedded phrases, in an effort to convey arguments that require the clear and persuasive integration of complex ideas. This aligns with the perception that structural features (length and clausal density) are the primary indicators of complexity because they represent the observable linguistic manifestation of increased cognitive workload.

Moreover, the participants' understanding of sentence complexity was influenced by their previous linguistic exposure and learning experiences. Those who had received explicit instruction on sentence combining or parsing reported feeling more confident when facing longer sentences. In contrast, learners who primarily encountered simplified English texts expressed a sense of anxiety and confusion when reading authentic academic materials. This suggests that prior experience with syntactically dense input helps reduce perceived difficulty by strengthening learners' syntactic awareness and schema recognition. Hence,

instructional background plays a crucial role in shaping how learners perceive and respond to complex structures.

Interestingly, several participants viewed sentence complexity as both a challenge and an opportunity for learning. While they admitted that such structures slowed down their reading speed, some described complex sentences as "interesting puzzles" that stimulated their attention and critical thinking. This dual perception suggests that learners' motivation and cognitive engagement can mediate their reaction to syntactic difficulty. When learners perceive complexity as an opportunity rather than a barrier, they tend to persist longer in decoding meaning, which enhances comprehension. Therefore, fostering positive attitudes toward linguistic complexity could mitigate cognitive strain and encourage deeper processing.

However, the perception of complexity also reflected broader cognitive limitations. Many participants noted that they "lost track" of sentence meaning midway when multiple clauses appeared, indicating working memory overload. They reported difficulty recalling earlier parts of the sentence while reading the latter segments, especially in cases of embedded clauses or long noun phrases. This finding reinforces the psycholinguistic view that sentence comprehension is constrained by cognitive capacity rather than grammatical competence alone. The more syntactically layered the sentence, the greater the demand on short-term storage and integration, which directly influences learners' perception of complexity.

Strategies Used to Manage Comprehension Difficulties

The study found that participants employed a range of strategies to cope with comprehension difficulties caused by complex sentence structures. One of the most common strategies was rereading, where learners would revisit a sentence several times until they could identify its main clause. This behavior was often accompanied by segmentation breaking long sentences into smaller, manageable parts to process meaning incrementally. Some learners mentioned using punctuation marks as visual cues to divide the sentence into logical sections. These strategies illustrate how readers attempt to regulate cognitive load by restructuring the linguistic input into smaller processing units.

Another strategy identified was the use of translation and paraphrasing. When encountering syntactic patterns that were unfamiliar, participants often translated sections of the text into their first language to reconstruct meaning. Others paraphrased the sentence in simpler English before proceeding with the next clause. While these strategies helped maintain comprehension, they also slowed down the reading process significantly. Translating and paraphrasing require additional cognitive effort, which may temporarily reduce efficiency but increase overall accuracy. This reflects a trade-off between cognitive load and comprehension depth that is typical in non-native language processing.

Participants also relied on contextual and lexical cues to infer meaning when they were unable to parse sentence structures accurately. They searched for key content words such as verbs or nouns to identify the central idea of the sentence. However, this surface-level approach sometimes led to incomplete or incorrect interpretations, especially when the sentence contained non-linear syntactic relationships. Despite its limitations, this strategy indicates that learners are aware of their cognitive constraints and attempt to optimize comprehension through selective attention. Such behavior aligns with previous psycholinguistic findings that EFL learners adapt their reading strategies to reduce mental effort under high cognitive load.

Finally, some students reported using external aids such as highlighting, note-taking, or drawing sentence diagrams to visualize grammatical relationships. These strategies served as compensatory tools to support working memory during reading. By externalizing syntactic structure through visual representation, learners could reduce the cognitive burden of mentally holding and integrating multiple clauses. The effectiveness of these strategies underscores the importance of visual and metacognitive support in EFL instruction. Encouraging students to actively annotate or map sentence relationships may help internalize complex syntactic patterns and foster independent comprehension skills.

Awareness of Cognitive Effort in Reading Complex Sentences

The analysis of interview transcripts revealed that participants were highly conscious of the mental effort involved in reading complex academic sentences. Many described their experience using terms such as "mentally exhausting," "heavy to read," or "requiring full concentration." This awareness reflects an internal monitoring process in which learners recognize their cognitive limitations and effort expenditure. Such metacognitive awareness is an essential component of reading development, as it allows learners to evaluate when and why comprehension breaks down. The students' self-reported fatigue and difficulty maintaining focus provide direct evidence of cognitive load during sentence processing.

Interestingly, the degree of awareness varied among participants, corresponding to differences in language proficiency and cognitive control. Higher-proficiency learners were more articulate in explaining how they allocated mental effort during reading. They could describe specific moments of strain, such as when integrating subordinate clauses or interpreting abstract academic terms. Lower-proficiency learners, on

the other hand, expressed a more general sense of confusion or mental "block," indicating less precise metacognitive monitoring. This finding suggests that awareness of cognitive effort develops alongside linguistic competence and may contribute to improved self-regulation during reading tasks.

Moreover, participants reported that recognizing their own mental fatigue sometimes prompted them to adjust their reading strategies. For example, they took short breaks, slowed down their pace, or restructured sentences mentally to ease processing. Such adaptive behaviors demonstrate that awareness of cognitive effort can serve as a self-regulatory mechanism for managing overload. Learners who consciously monitor their comprehension are better able to maintain persistence and accuracy despite cognitive strain. This connection between awareness and adaptive strategy use supports psycholinguistic models emphasizing the interplay between cognition and metacognition in language processing.

Several learners reflected on the emotional impact of experiencing cognitive overload, noting that frustration and anxiety often accompanied their mental fatigue. Some felt discouraged when unable to grasp the meaning of long academic sentences, while others described a sense of satisfaction when they successfully decoded a difficult passage. These emotional responses highlight the affective dimension of cognitive effort how mental strain and motivation interact during sentence comprehension. Recognizing and addressing these emotional factors in EFL instruction could help learners maintain engagement and resilience when facing cognitively demanding academic reading materials.

CONCLUSION

The present study set out to explore how EFL learners comprehend complex clauses in academic texts through a psycholinguistic lens, focusing on the interaction between sentence complexity, cognitive load, and working memory capacity. The findings revealed that reading comprehension among EFL learners is not only a matter of linguistic knowledge but also a function of cognitive efficiency and resource management. Learners demonstrated considerable cognitive strain when processing sentences that contained multiple clauses, embedded structures, or extended noun phrases. These complex grammatical forms imposed a heavy burden on working memory, causing learners to lose track of meaning and rely on compensatory strategies such as rereading or focusing on individual keywords. The evidence gathered from think-aloud protocols and interviews clearly indicated that comprehension difficulties arise when the cognitive demands of processing exceed the learner's available mental resources. This confirms that language processing involves both automatic and controlled components where insufficient automaticity forces learners to allocate conscious effort to form recognition, leaving limited capacity for meaning integration.

Moreover, the study highlights that individual differences in working memory capacity significantly influence how efficiently learners process syntactic complexity. Participants with stronger working memory demonstrated better control over linguistic integration, using more coherent strategies to maintain sentence meaning despite structural difficulty. Conversely, those with lower capacity displayed fragmented coprehension patterns and frequent breakdowns in understanding, particularly when faced with information-dense academic sentences. This variation underscores the psycholinguistic principle that cognitive constraints shape language processing outcomes. Importantly, learners' awareness of their own cognitive limitations also played a central role. Many participants were able to articulate when they felt mentally overloaded or when comprehension required more effort, suggesting an emerging metacognitive sensitivity to the demands of reading. Such awareness is essential for developing adaptive strategies such as segmentation, note-taking, and selective attention that help manage cognitive load effectively. The study thus contributes to a deeper understanding of how EFL readers regulate their mental resources when interacting with complex textual input.

From a pedagogical perspective, the findings have several implications for EFL teaching and curriculum design. Given that sentence complexity imposes cognitive challenges that can hinder comprehension, language instruction should aim not merely to simplify input but to scaffold learners' ability to process syntactic structures efficiently. Teachers can incorporate activities that gradually increase syntactic complexity, allowing students to develop familiarity with embedded and subordinate clauses in manageable stages. Explicit instruction in parsing strategies, sentence diagramming, and awareness of clause boundaries can help students internalize grammatical relationships and reduce intrinsic cognitive load during reading. Furthermore, integrating metacognitive training into reading instruction encouraging learners to recognize signs of overload and apply compensatory strategies may enhance reading autonomy and resilience. For material developers, it is crucial to balance linguistic richness with cognitive accessibility in academic reading texts. Future research may extend this study by combining qualitative methods with cognitive measurement tools, such as eye-tracking or brain-imaging techniques, to examine real-time sentence processing. In conclusion, the study reaffirms that understanding sentence complexity in EFL contexts requires a holistic view that integrates linguistic structure, cognitive capacity, and learner awareness.

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Addressing these dimensions concurrently offers a promising pathway to fostering deeper comprehension and more effective academic reading proficiency among EFL learners.

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