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From Thought to Speech: The Psycholinguistics Process of Foreign Language Sentence Production

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Abstract: This study explores the psycholinguistic processes underlying foreign language sentence production, focusing on how EFL learners transform thoughts into spoken language. Using a qualitative phenomenological approach, twelve English Education students from a university in Medan participated in speaking tasks, think-aloud protocols, and semi-structured interviews. Thematic analysis revealed three major processes: cognitive planning and conceptualization, lexical retrieval and formulation, and monitoring and repair in speech. Learners experienced high cognitive load due to limited working memory, leading to pauses, reformulations, and simplifications during speaking. To cope, they employed compensatory strategies such as segmentation, paraphrasing, and self-correction to maintain communication flow. The findings indicate that fluency and accuracy depend on the balance between linguistic knowledge and cognitive capacity. This study contributes to psycholinguistic understanding by illustrating how thought, language, and cognition interact in real-time sentence production and provides pedagogical implications for promoting automaticity and cognitive awareness in EFL speaking instruction.

Keywords: psycholinguistics, sentence production, working memory, EFL learners, cognitive load, speech processing

INTRODUCTION

Psycholinguistics is the study of the mental processes involved in language perception, encompassing speaking, listening, reading, and even the acquisition of language, whether native or foreign, during the early stages of life (Malyk, 2024). Then, language acquisition refers to the stage during which an individual naturally develops the ability to understand and use a new language, including its vocabulary (Eskawati et al., 2023). The study from Muhassin et al. (2019) state vocabulary is the important thing to produce sentences in a foreign language, even is not a purely linguistic task but a complex cognitive operation that requires the activation, coordination, and regulation of multiple mental processes (Liu, 2024). When individuals attempt to express thoughts in a second or foreign language, they must simultaneously conceptualize ideas, retrieve appropriate lexical items, construct syntactic structures, and articulate speech in real time. This process demands substantial cognitive resources, particularly within the working memory system, which temporarily stores and manipulates linguistic information during communication (Okur & Aksoy, 2025). As such, sentence production represents a dynamic interplay between linguistic knowledge and cognitive capacity, where the efficiency of working memory largely determines fluency, grammatical accuracy, and overall communicative success (Hwang, 2025).

Producing speech in a foreign language is not a straightforward linguistic act but a complex cognitive process that bridges thought and expression (Ishizuka, 2024). When language learners attempt to communicate, they must transform abstract ideas into verbal utterances by accessing vocabulary, constructing grammatical structures, and articulating sentences in real time (Malyk, 2024). However, in the case of foreign language learners, these processes are often slowed or disrupted due to limited linguistic automaticity, interference from the first language, and increased cognitive load. Understanding how these mental stages operate in foreign language sentence production is essential to uncovering the cognitive underpinnings of speech fluency and accuracy.

Psycholinguistic research has long investigated how language is processed in the mind, yet most studies have focused on comprehension rather than production (Nor, 2025). While considerable attention has been given to reading and listening processes, the act of generating sentences in a foreign language remains less explored, particularly in real-time communication contexts (Linck, 2016). Foreign language learners,

especially those in EFL (English as a Foreign Language) settings, often struggle to maintain fluency because they must consciously monitor grammatical structures and lexical choices while speaking. This dual demand underscores a significant research gap regarding how learners mentally plan and execute sentence production when operating under cognitive constraints, as well as the strategies they employ to manage these challenges.

To address this gap, the present study focuses on the psycholinguistic processes involved in foreign language sentence production, particularly how learners move from mental concepts to spoken language. The research aims to identify the cognitive stages learners go through, the difficulties they encounter at each stage, and the strategies they employ to manage those difficulties. The participants of this study were twelve university students majoring in English Education at a higher education institution in Medan, Indonesia, representing advanced EFL learners who regularly use English in academic contexts. They participated in a series of speaking tasks designed to elicit spontaneous sentence production, followed by think-aloud protocols and semi-structured interviews that captured their real-time cognitive processes and reflections on speech formulation.

The significance of this study lies in its contribution to understanding the cognitive mechanisms underlying language production from a psycholinguistic perspective. By examining how EFL learners plan, formulate, and articulate sentences, this research provides insight into the mental architecture supporting speech production in a non-native language. The findings are expected to help language educators design instructional methods that align with learners' cognitive capacities, particularly by fostering automaticity and reducing cognitive overload during speech. Moreover, the study advances psycholinguistic theory by contextualizing Levelt's speech production model within an EFL environment, highlighting how working memory limitations and language proficiency interact in shaping spoken output. Such insights are vital for developing pedagogical interventions that enhance fluency, accuracy, and confidence in second language communication.

Based on these objectives, the study is guided by the following research questions:

1. How do EFL learners cognitively process sentence production when transforming thoughts into spoken language?
2. What psycholinguistic difficulties do learners encounter during the conceptualization, formulation, and articulation stages of speech production?
3. What strategies do learners use to manage cognitive challenges and maintain fluency during sentence production?

By addressing these questions, this study seeks to reveal the intricate relationship between cognition and language in foreign language speech, offering both theoretical and practical implications for psycholinguistics and language education.

Language production is a fundamental aspect of human communication that bridges cognitive intention and linguistic expression. In psycholinguistics, sentence production is viewed as a multi-stage process involving the transformation of conceptual thought into articulated speech through mental encoding mechanisms (Marzona, 2017). Theories of language production, such as Levelt's (1989) model, outline three major stages conceptualization, formulation, and articulation each relying on distinct but interconnected cognitive systems (Bot, 1992). In foreign language contexts, these processes are further complicated by limited automaticity, interference from the first language, and restricted access to lexical or syntactic knowledge, all of which increase cognitive demands on learners. Understanding these mechanisms provides valuable insight into how thought is converted into spoken language and how cognitive limitations influence communicative performance.

Psycholinguistic studies have increasingly examined how working memory capacity and cognitive load affect sentence production in second language learners (Malyk, 2024). Working memory serves as a temporary storage and processing system that allows speakers to maintain and manipulate linguistic information while formulating sentences. Learners with greater working memory capacity are generally more fluent and accurate, as they can manage multiple linguistic units simultaneously during speech (Pezzulo, 2007). However, when cognitive resources are overburdened such as during complex sentence construction or under time pressure speech production becomes slower, fragmented, and prone to errors. This perspective highlights the importance of investigating sentence production not only from a linguistic standpoint but also from a cognitive and psychological dimension, where the mind's architecture directly shapes linguistic output (Asma & Dallel, 2020).

Psycholinguistic Models of Sentence Production

Psycholinguistic models have provided a theoretical foundation for understanding how humans transform thoughts into speech. Psycholinguistics is a fascinating interdisciplinary field that explores how humans process, acquire, and use language through the lens of psychology and cognitive science (Yusupova, 2025). While Levelt's model was originally developed for first-language production, subsequent research has adapted it to second-language (L2) contexts. In foreign language production, learners often experience

interruptions in the smooth flow between these stages, primarily due to limited lexical access or uncertainty in syntactic construction (Wang, 2019). While Levelt's model was originally developed for first-language production, subsequent research has adapted it to second-language (L2) contexts. In foreign language production, learners often experience interruptions in the smooth flow between these stages, primarily due to limited lexical access or uncertainty in syntactic construction. For instance, learners may spend more time searching for appropriate vocabulary or rearranging sentence elements to fit target language norms. These disruptions reveal the additional cognitive effort required when producing sentences in a non-native language, highlighting how linguistic and cognitive systems must cooperate under increased mental demand.

Furthermore, researchers have proposed that L2 production involves greater reliance on controlled processing compared to L1 production, which is largely automatic. This means that foreign language speakers must consciously monitor their utterances, leading to slower and less fluent speech. Studies on speech disfluency, self-repair, and hesitation have shown that these behaviors are not merely linguistic limitations but indicators of active cognitive regulation during the sentence production process. Consequently, psycholinguistic models provide a foundation for exploring how thought transitions into speech and how cognitive mechanisms influence the efficiency and accuracy of this transformation in foreign language learners.

The Role of Working Memory in Sentence Production

Working memory plays a pivotal role in supporting language production because it enables speakers to hold, process, and organize linguistic information while speaking. According to Demir (2021), working memory consists of multiple subsystems, including the phonological loop for verbal information, the visuospatial sketchpad for imagery, and the central executive that regulates attention and cognitive control. During sentence production, the central executive coordinates the retrieval of lexical items, maintains syntactic structures, and monitors speech output, all of which are essential for fluent communication. The efficiency of these processes largely determines a learner's ability to produce grammatically correct and coherent sentences.

Empirical studies have consistently demonstrated a strong link between working memory capacity and second language performance. Learners with higher working memory capacity tend to exhibit greater sentence complexity, better fluency, and improved error correction during speech. In contrast, those with lower capacity struggle to maintain syntactic integrity and often simplify their utterances to reduce cognitive strain (Mota, 2003). For example, Martin & Ellis (2012) found that L2 speakers with limited working memory frequently relied on shorter, less complex structures to maintain fluency. These findings reinforce the view that working memory functions as the cognitive backbone of sentence planning and formulation.

However, working memory in L2 production is not only a capacity issue but also a matter of cognitive efficiency. Factors such as anxiety, time pressure, and task complexity can diminish available cognitive resources, thereby constraining sentence planning and articulation. In EFL contexts, where learners often have restricted exposure to spontaneous speech, these cognitive limitations become even more pronounced (Li, 2023). Therefore, understanding how working memory interacts with linguistic processing provides crucial insight into why some learners achieve greater fluency while others remain hesitant or disfluent during sentence production (Mota, 2003).

Cognitive Constraints in Foreign Language Speech Production

Foreign language sentence production occurs under various cognitive constraints that shape how learners plan, formulate, and articulate their utterances. One of the primary challenges is managing cognitive load the mental effort required to process information while performing multiple linguistic tasks simultaneously (Steinberg & Sciarini, 2006). When learners construct sentences, they must retrieve vocabulary, apply grammar rules, and monitor speech accuracy, all within limited working memory capacity. As cognitive load increases, learners tend to produce shorter, simpler sentences or pause more frequently to regain control over their utterances. This behavior illustrates the trade-off between fluency, accuracy, and complexity observed in L2 speech performance (Asma & Dallel, 2020).

Another critical constraint is cross-linguistic interference from the first language. Learners often unconsciously transfer syntactic or lexical patterns from their L1 into L2 production, resulting in errors or ungrammatical structures. Such interference not only reflects linguistic transfer but also the cognitive challenge of inhibiting dominant language patterns while activating the less automatic L2 system. Psycholinguistic studies suggest that this dual activation demands greater cognitive control, as speakers must continuously suppress L1 structures during real-time speech production (Blumenfeld & Marian, 2013). Consequently, managing interference becomes an integral part of the mental workload in foreign language speaking.

Additionally, affective factors such as anxiety and self-monitoring contribute to cognitive strain in sentence production. High levels of anxiety can disrupt working memory functioning by diverting attentional resources toward negative self-evaluation rather than linguistic encoding. Learners who excessively monitor

their speech often experience hesitation, repetition, and loss of fluency. These constraints emphasize that sentence production is not merely a linguistic exercise but a cognitively loaded process influenced by internal and external factors. Understanding these limitations is crucial for developing pedagogical strategies that promote automaticity, reduce processing load, and support fluent language use in EFL learners.

RESEARCH METHODS

This study employed a qualitative research design using a phenomenological approach to explore the underlying cognitive processes that occur when EFL learners produce sentences in a foreign language. A qualitative design was selected because it allows for an in-depth understanding of learners' lived experiences and mental activities during language production elements that cannot be fully captured through quantitative measurement (Rustamana et al., 2024). The phenomenological approach was particularly appropriate, as it focuses on how individuals perceive, experience, and make sense of a specific phenomenon in this case, the process of transforming thoughts into spoken sentences (Badil et al., 2023). This method enables the researcher to uncover rich, descriptive insights into the psycholinguistic mechanisms that shape speech production. As Creswell & Creswell (2017) note, qualitative inquiry helps reveal the meaning behind human experiences by examining participants' perspectives in their natural contexts. Therefore, this approach was best suited to uncover the intricate relationship between thought, cognition, and linguistic expression in foreign language speaking.

Data Collection

The participants of this study were twelve university students majoring in English Education at a higher education institution in Medan, Indonesia. They were selected purposively to represent advanced EFL learners who actively use English in academic settings and are familiar with both written and spoken English discourse. All participants had completed at least five semesters of study, ensuring adequate language proficiency for spontaneous sentence production tasks.

Data were collected through a combination of speaking tasks, think-aloud protocols, and semi-structured interviews designed to capture real-time cognitive and linguistic processes during sentence production. In the speaking task, participants were asked to describe visual prompts and respond to situational questions requiring spontaneous sentence formation. During these tasks, they verbalized their thought processes using a think-aloud protocol, allowing the researcher to trace how they conceptualized ideas and transformed them into spoken language. After the speaking session, each participant took part in an in-depth semi-structured interview, which explored their perceptions of speech difficulty, awareness of cognitive effort, and strategies for managing language production challenges. Each interview lasted approximately 30–45 minutes and was conducted in a quiet, comfortable setting to ensure focus and authenticity. All sessions were audio-recorded and transcribed verbatim for analysis.

Data Analysis

The collected data including think-aloud transcripts and interview responses were analyzed using thematic analysis, which enables the identification and interpretation of recurring patterns within qualitative data. Thematic analysis was chosen because it provides flexibility in examining both linguistic and cognitive dimensions of participants' experiences (Braun & Clarke, 2019). Through this method, the researcher systematically examined participants' verbal reflections to uncover themes related to conceptualization, formulation, and articulation the key stages of the psycholinguistic production process.

Themes were developed by carefully interpreting the meanings behind participants' statements, focusing on how they described mental planning, language retrieval, and challenges in sentence construction. This analytical process emphasized the coherence between learners' perceived experiences and the theoretical framework of speech production. The analysis also considered how working memory limitations, language interference, and self-monitoring affected participants' fluency and accuracy during speech. The thematic approach thus allowed the researcher to construct a comprehensive understanding of how thought transitions into speech in foreign language contexts, offering insights that align with both psycholinguistic theory and real-world language learning.

RESULTS AND DISCUSSION

The analysis of think-aloud protocols and interview transcripts revealed several recurring patterns that describe how EFL learners transform thoughts into spoken language. The process of foreign language sentence production emerged as a highly dynamic cognitive activity involving continuous interaction between conceptual planning, linguistic formulation, and self-monitoring. Participants demonstrated that producing speech in a second language requires constant mental negotiation between meaning and form. While some learners managed this process relatively smoothly, others experienced frequent pauses, hesitations, and reformulations, suggesting that their working memory resources were taxed during complex

linguistic encoding. These variations underscore how language proficiency interacts with cognitive capacity to shape the fluency and coherence of speech.

Findings also indicated that learners' experiences of speech production were strongly influenced by the psycholinguistic constraints described in Levelt's model (1989). Participants reported that they could often think of ideas clearly but struggled to find appropriate words or grammatical structures to express them, reflecting a breakdown between the conceptualization and formulation stages. Additionally, several learners mentioned that while they could mentally plan what to say in their first language, translating those ideas into English required more conscious attention and time. This mental shift increased cognitive load, often leading to fragmented sentences or simplified grammar. These results suggest that the gap between thought and speech in foreign language use is largely determined by the efficiency of working memory and the automaticity of language retrieval.

Cognitive Planning and Conceptualization

The first theme centers on how learners mentally plan and conceptualize their ideas before speaking. Participants described the initial stage of speech as an internal "thinking phase," during which they decide what to say and how to structure their message. However, unlike native speakers, EFL learners often experienced a time gap between idea formation and verbal expression due to limited linguistic automaticity. Several participants mentioned that their thoughts appeared in their first language first, forcing them to mentally translate before speaking. This additional step increased cognitive load and sometimes caused them to lose track of the original message. These findings support Levelt's conceptualization stage and show that foreign language learners invest more mental effort in planning content than fluent speakers do.

Moreover, participants frequently expressed frustration when the ideas they wished to convey were more complex than their linguistic resources allowed. This mismatch between conceptual richness and linguistic capability often resulted in message simplification. For example, learners tended to reduce clause complexity or omit details to maintain fluency. Such adjustments indicate that cognitive planning in L2 contexts is a balancing act between communicative intention and linguistic manageability. Consistent with (Li, 2023), this study reinforces that conceptualization in L2 production is influenced by both cognitive limitations and linguistic constraints, leading learners to prioritize meaning clarity over syntactic accuracy. Participants demonstrated adaptive planning behaviors, such as mentally rehearsing sentence beginnings or visualizing structures before speaking. These behaviors suggest an emerging metacognitive awareness of how to regulate cognitive load during speech planning. Learners who employed such strategies reported greater confidence and smoother transitions into articulation, highlighting the importance of cognitive control in successful sentence production.

Lexical Retrieval and Formulation Challenges

The second theme focuses on the difficulties learners faced during the formulation stage where linguistic encoding and syntactic structuring occur. Many participants reported frequent word-searching pauses or lexical retrieval delays, particularly when trying to express abstract or academic ideas. This stage required simultaneous access to vocabulary, grammatical rules, and syntax, all of which placed heavy demands on working memory. Learners often filled gaps with hesitation markers such as "uh" or "like," reflecting real-time cognitive struggle. These findings align with research by In'nami et al. (2021), who noted that limited lexical retrieval speed is a key indicator of cognitive load in second language production.

Participants also revealed that sentence formulation became more difficult when dealing with long or embedded clauses. They described a tendency to "lose" the beginning of a sentence while constructing the end, indicating strain on working memory's temporary storage capacity. To cope, learners sometimes switched to simpler structures or rephrased sentences mid-speech. This behavior supports the trade-off hypothesis in psycholinguistics, suggesting that maintaining fluency often requires sacrificing grammatical complexity under cognitive pressure. Interestingly, the data showed that familiarity with syntactic patterns mitigated formulation challenges. Participants who had been exposed to similar sentence types during classroom instruction could more easily retrieve and assemble structures. This finding demonstrates that linguistic exposure and procedural memory development reduce intrinsic cognitive load, allowing learners to allocate more attention to meaning rather than structure.

Monitoring and Repair Strategies in Speech Production

The final theme highlights how learners monitor and repair their speech during articulation. Almost all participants engaged in some form of self-monitoring pausing, repeating, or correcting themselves when they noticed errors. This aligns with Levelt's (1989) concept of the "monitoring loop," where speakers constantly evaluate their output to ensure communicative accuracy. However, learners reported that over-monitoring sometimes hindered fluency, as excessive attention to correctness disrupted the flow of speech. monitoring at the expense of real-time communication. In addition to self-repair, learners demonstrated compensatory strategies to maintain message flow. Common strategies included using fillers to gain time, substituting simpler vocabulary, and restructuring sentences mid-utterance. These behaviors reflect adaptive responses to

cognitive overload, allowing learners to preserve communication despite linguistic limitations. Several participants mentioned that they were aware of these behaviors and consciously used them to manage speaking anxiety and maintain listener engagement.

Finally, the presence of self-reflective comments in interviews suggests growing metacognitive awareness among learners about their speech processes. They acknowledged when cognitive fatigue occurred or when their "mind went blank" due to working memory overload. This awareness indicates that learners are not passive language users but active cognitive managers, continuously adjusting their strategies to balance accuracy, fluency, and cognitive effort. Such insights reinforce the psycholinguistic understanding of speech as a cyclical process of planning, execution, and regulation.

CONCLUSION

This study investigated how EFL learners transform thoughts into spoken language by examining the psycholinguistic processes involved in sentence production. The findings revealed that producing sentences in a foreign language is a cognitively demanding process that requires the coordination of conceptualization, formulation, and articulation under limited working memory capacity. Learners experienced frequent pauses, hesitations, and reformulations, indicating the high mental effort involved in generating linguistic structures while maintaining message coherence.

The thematic analysis identified three main processes underlying foreign language speech production: cognitive planning and conceptualization, lexical retrieval and formulation challenges, and monitoring and repair strategies. These findings demonstrate that learners rely on adaptive cognitive strategies to manage linguistic complexity and cognitive load. While some were able to plan and regulate their utterances effectively, others faced difficulties due to limited automaticity and high self-monitoring, which disrupted fluency. The study highlights that fluency, accuracy, and complexity are interdependent outcomes shaped by the interaction between cognitive efficiency and linguistic knowledge.

The results provide important implications for language teaching and psycholinguistic theory. From a pedagogical perspective, instruction should emphasize gradual development of automaticity and strategy awareness to help learners manage cognitive load during speaking. From a theoretical standpoint, the findings reinforce the view that foreign language sentence production is not merely a linguistic process but a reflection of cognitive architecture in action. Understanding how learners bridge thought and speech contributes to a deeper appreciation of the mental foundations of communication and offers practical insights for enhancing fluency in second language contexts.

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