



Cognitive Processing of Formulaic Sequences in English as a Foreign Language Students (*Proses Kognitif Formulaic Sequences pada Mahasiswa Bahasa Inggris Sebagai Bahasa Asing*)

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Article Info	Abstract
Article history: Received: 20 Agustus 2026 Revised: 1 Oktober 2026 Accepted: 1 Oktober 2026 Keywords: Formulaic Sequence EFL Development Language Proficiency Holistic Processing Kata Kunci: Urutan Formulaik Perkembangan EFL Kemahiran Bahasa Pemrosesan Holistik	Formulaic sequences (FSs) have received considerable attention in second language (L2) research due to their contribution to language fluency and communicative efficiency. However, existing studies have predominantly focused on the frequency and distribution of formulaic sequences in learner output, providing limited insight into how such expressions are cognitively processed during language production. This study employed a qualitative descriptive design. The participants were three Indonesian EFL students enrolled in the English Language Education Study Program (ELESP), Universitas Negeri Gorontalo. Data were collected through Think-Aloud Protocols (TAP), academic writing tasks, and Stimulated Recall Interviews (SRI). The data were analyzed thematically to identify recurring patterns in formulaic sequence processing, challenges, and strategies. The findings revealed three major processing types: complete retrieval, adjusted retrieval, and compositional retrieval. Complete retrieval was evident in discourse-organizing and idiomatic FS, which were frequently retrieved holistically as single units. Adjusted retrieval occurred when learners initially retrieved a FS holistically but subsequently modified it to better suit communicative and rhetorical demands. Compositional retrieval emerged when learners constructed expressions through conscious lexical evaluation, collocational assessment, and grammatical monitoring. In addition, three recurring challenges were identified: topic familiarity constraints, lexical evaluation difficulties, and broader cognitive demands associated with coordinating writing, monitoring, and verbalization simultaneously. The findings also revealed three principal strategies during processing: context-dependent selection, familiarity-based retrieval, and intuition-guided substitution. Overall, the findings suggest that formulaic sequence processing among Indonesian EFL learners involves a dynamic interaction between holistic retrieval and analytical evaluation rather than reliance on a single processing mechanism. Abstrak Urutan formulaik (Formulaic Sequences/FS) telah mendapat perhatian yang cukup besar dalam penelitian bahasa kedua (L2) karena kontribusinya terhadap kelancaran berbahasa dan efisiensi komunikasi. Namun, penelitian yang ada sebagian besar berfokus pada frekuensi dan distribusi urutan formulaik dalam hasil produksi peserta didik, sehingga memberikan

pemahaman yang terbatas mengenai bagaimana ekspresi tersebut diproses secara kognitif selama produksi bahasa. Penelitian ini menggunakan desain deskriptif kualitatif. Partisipan dalam penelitian ini adalah tiga mahasiswa EFL Indonesia yang terdaftar di Program Studi Pendidikan Bahasa Inggris (ELESP), Universitas Negeri Gorontalo. Data dikumpulkan melalui Think-Aloud Protocols (TAP), tugas menulis akademik, dan Stimulated Recall Interviews (SRI). Data dianalisis secara tematik untuk mengidentifikasi pola yang berulang dalam pemrosesan urutan formulaik, tantangan, serta strategi yang digunakan. Temuan penelitian mengungkapkan tiga jenis pemrosesan utama: pengambilan lengkap (*complete retrieval*), pengambilan yang disesuaikan (*adjusted retrieval*), dan pengambilan komposisional (*compositional retrieval*). Pengambilan lengkap sangat tampak pada ekspresi pengorganisasi wacana dan urutan formulaik idiomatis, Pengambilan yang disesuaikan terjadi ketika peserta didik pada awalnya mengambil urutan formulaik secara holistik, namun kemudian memodifikasinya agar lebih sesuai dengan tuntutan komunikatif dan retorik. Pengambilan komposisional muncul ketika peserta didik menyusun ekspresi melalui evaluasi leksikal, penilaian kolokasional, dan pemantauan gramatikal. Selain itu, tiga tantangan juga teridentifikasi: kendala familiar topik, kesulitan evaluasi leksikal, dan tuntutan kognitif yang lebih luas terkait dengan koordinasi penulisan, pemantauan, dan TAP secara bersamaan. Temuan penelitian juga mengungkapkan tiga strategi utama: pemilihan berbasis konteks (*context-dependent selection*), pengambilan berbasis keakraban (*familiarity-based retrieval*), dan substitusi berbasis intuisi (*intuition-guided substitution*). Secara keseluruhan, temuan ini menunjukkan bahwa pemrosesan urutan formulaik di kalangan peserta didik EFL Indonesia melibatkan interaksi yang dinamis antara pengambilan holistik dan evaluasi analitis, bukan bergantung pada satu mekanisme pemrosesan tunggal.

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1. RESEARCH BACKGROUND

Language development in English as a Foreign Language (EFL) context has long been a central concern in applied linguistics (Ellis, 2008; Larsen-Freeman & Long, 2014; Ortega, 2009). In this field, language development refers to the gradual process through which learners become increasingly proficient users of the target language, expanding their linguistic abilities through various forms of learning and exposure (Ariyanti, 2020; Abdullayeva, 2023; Wind, 2018; Sarsenbaeva, 2021). In line with this understanding, researchers and educators have traditionally relied on indicators such as vocabulary mastery, grammatical competence, and English proficiency test scores to measure this development. While these tools provide observable evidence of learners' abilities, they share a common limitation: they assess language development only after learning has already accumulated, capturing proficiency at its endpoint rather than illuminating the ongoing cognitive processes that underlie it.

In light of this limitation, it is argued that a more process-oriented approach to measuring language development is warranted. One promising alternative in this regard lies in formulaic sequences (FS) expressions that are stored and retrieved as prefabricated units rather than assembled word by word (Wray, 2002, 2008). Common examples include expressions such as *on the other hand*, *you are all set*, and *suffice it to say*. Kecskes (2007) describes such expressions as appearing "glued together" in usage, reflecting their status as unified chunks in the mind. The relevance of FS to EFL development is well-supported empirically. Assassi and Benyelles (2016) found that FS mastery strongly correlates with communicative competence and improves both writing and speaking skills toward more native-like proficiency. Along the same lines, Schenck and Choi (2014) demonstrated that formulaic language reveals learners' understanding of discourse and cultural conventions, while also exposing specific gaps in content elaboration. In a controlled experimental study, Boers et al. (2006) showed that learners explicitly taught to notice formulaic sequences

outperformed control groups on oral proficiency measures, providing compelling evidence that FS serves as a meaningful indicator of language development.

Notwithstanding these contributions, the current research landscape on formulaic sequence reveals a significant imbalance. On one hand, corpus-based studies have productively documented the frequency and distribution of FS in both native and learner language (Sinclair, 1991; Arnon & Snider, 2010; Tremblay et al., 2011). On the other hand, the cognitive mechanisms through which these sequences are actually processed, stored, and retrieved in the mental lexicon have received far less attention. In this respect, Erman et al. (2016) acknowledge that psycholinguistic factors influencing FS processing in EFL learners remain insufficiently examined in the existing literature, despite their importance for understanding how formulaic language is genuinely internalized.

This gap is particularly evident in the Indonesian EFL context. Studies conducted in Indonesia on multiword sequences have largely relied on corpus-based approaches, focusing on the frequency, structural patterns, and discourse functions of lexical bundles in learner or academic corpora (Budiwiyanto & Suhardijanto, 2020; Yuliawati et al., 2021; Oktavianti & Prayogi, 2022). Within the English Language Education Study Program (ELESP), the institutional context of the present study, existing research has similarly prioritized lexical bundle patterns in written production (Mahading, 2024; Kadir, 2024). While these studies make valuable contributions, simply documenting that learners use multiword sequences reveals only part of the developmental picture. Of far greater importance is understanding how these expressions are cognitively processed specifically, through what psycholinguistic mechanisms they are accessed, interpreted, and deployed by learners. It is against this backdrop that the present study is situated. Consequently, two research formulated in this study. First, how Indonesian EFL students cognitively process formulaic sequences. Second, identifying the challenges and strategies during the processing of formulaic sequence.

2. METHODOLOGY

This study employs a qualitative research design to examine two objectives: (1) the cognitive mechanisms underlying Indonesian EFL learners' production of formulaic sequences (FS), and (2) the challenges and strategies they employ during processing. In line with Sandelowski (2010) as cited in Hall and Liebenberg (2024), qualitative description foregrounds the "who, what, and how" of experience rather than theoretical generation, making it appropriate for this phenomenon-centered inquiry. The study was conducted at the English Language Education Study Program (ELESP), Faculty of Letters and Culture, Universitas Negeri Gorontalo, a context where English functions as the primary medium of instruction and students operate as EFL speakers in a predominantly non-English environment. Three participants were selected through purposive sampling, targeting Indonesian EFL learners with experience in academic writing, specifically those who had completed the Writing for Academic Context course (Bell et al., 2022). Participant selection prioritized depth of insight over numerical representation, with data collection continuing until saturation was reached — the point at which no new themes emerged (Saunders et al., 2018; Guest et al., 2006). Data were collected through three complementary instruments. The Think-Aloud Protocol (TAP) required participants to verbalize their cognitive processes in real time during writing (Ericsson, 2017; Woo et al., 2024), providing direct access to mechanisms of FS retrieval, evaluation, and production. The Writing Task consisted of two argumentative essays of approximately 200–250 words, with prompts adapted from TOEFL and IELTS materials and selected based on participants' familiarity ratings on a seven-point Likert scale. The Stimulated Recall Interview (SRI) then invited participants to revisit recorded TAP sessions, elaborating on moments of hesitation, uncertainty, or revision that remained insufficiently verbalized during the original task (Bloom, 1953; Lyle, 2003). Data collection proceeded across three stages: an introductory session familiarizing participants with FS concepts and procedures; the concurrent writing and TAP session conducted individually in distraction-free settings; and the SRI conducted subsequently. Data analysis followed Tesch's (1990) eight-step systematic coding framework. TAP transcripts were analyzed to identify processing patterns mapped against the theoretical distinction between Chomsky's (1965) single-construction principle and Sinclair's (1987) open-choice and idiom principles alongside Wray's (2002) dual system model. SRI transcripts were subsequently subjected to thematic coding, targeting recurring challenges and strategies, with findings directly addressing the second research question.

3. RESULTS AND DISCUSSION

3.1 EFL Students Processing Types of Formulaic Sequences

Three processing patterns were identified. The first, complete holistic retrieval, was the most consistently observed across all participants. Discourse-organizing expressions such as *first and foremost*, *in addition*, and *in conclusion*, alongside idiomatic units including *adds fuel to the fire*, *pave the way*, and *down the line*, were produced as unified wholes without deliberate word-by-word construction. Critically, retrieval was concept-driven: participants worked outward from communicative intent toward linguistic form,

indicating these sequences are stored as integrated conceptual-linguistic units (Wray, 2002). P1's verbalization during the production of adds fuel to the fire illustrates this process:

"Peer pressure and family expectations worsen this... what's the word... like when they all pile up? Ah, adds fuel to the fire."

The participant did not search through language but arrived at the expression through conceptual refinement the phrase "like when they all pile up" constituting their own definition of the idiom, which then triggered its retrieval. A structurally similar process was observed in P2's production of down the line, where the temporal-causal meaning the participant sought to express mapped directly onto the conventional meaning of the retrieved expression. The second pattern, adjusted retrieval, occurred when a successfully retrieved FS underwent subsequent post-retrieval evaluation. P1's deliberation between widely acknowledged and widely known is the clearest instance:

"I think widely acknowledged is more fitting in this context because it is acknowledged, not just known... I feel like it carries a proper meaning than just known which in my opinion is more light."

This demonstrates that holistic retrieval does not automatically resolve processing — retrieved expressions remain subject to analytic monitoring against register and semantic precision demands before final incorporation into text. The third pattern, compositional processing, emerged when participants engaged in deliberate word-level evaluation rather than chunk-based retrieval. Rather than accessing pre-formed units, participants were observed constructing language incrementally, comparing alternatives and assessing their suitability against perceived academic register norms before committing to a final form. This pattern was evident across all three participants. P1's hesitations during writing reflect a continuous process of internal comparison:

"College students, encounter... yeah, encounter is more fitting."

"Students often find themselves under pressure, under stress. I think I'll just use under pressure."

In both instances, the participant did not retrieve a fixed expression but rather evaluated competing candidates, ultimately selecting the one perceived as more contextually and collocationally appropriate. P2's deliberation further illustrates the rhetorical dimension of this process:

"Continue to contribute. Do I wanna use the word contribute... or should I use stimulate, contribute or stimulate the economy? I'll use contribute. I feel like I could have done that better, phrased that better."

Unlike P1, whose hesitation centered on collocational fit, P2's evaluation extended to rhetorical effectiveness not merely whether the word was correct, but whether it was sufficiently precise for academic argumentation. P3's data introduce a further dimension, in which lexical choices were explicitly assessed against academic register norms:

"Should I say pressure or stress. Pressure... because it sounds more simple and academic enough."

"The next is probably money problems or financial problems? Financial problems sounds formal so I choose that."

"Can unhappy be used in academic writing? Is that acceptable?"

Across these examples, lexical selection involved direct comparison between alternatives that conveyed similar meanings, with decisions guided by perceived formality and audience appropriateness rather than semantic content alone. A distinct sub-pattern involved spelling uncertainty, wherein participants experienced difficulty not at the semantic level but at the point of orthographic encoding, having already identified the intended word both semantically and phonologically. P1 paused mid-production when attempting to write accessible, while P3 reported comparable difficulty with independently:

"I already knew the word I wanted to use, but suddenly I became unsure about the spelling. I could hear the word in my head, but I couldn't confidently write it."

Taken together, compositional processing is characterized by a high degree of deliberate, analytic engagement, one in which language was consciously examined, compared, and refined before being incorporated into written text.

3.2 Challenges in Formulaic Sequence Processing

Three recurring challenges were identified across participants. The first concerned topic unfamiliarity and its constraining effect on FS retrieval. When participants possessed sufficient conceptual knowledge of the writing topic, a broader range of formulaic sequences became available during production. However, when topical knowledge was limited, retrieval narrowed considerably with participants reporting that only the most deeply entrenched category of discourse-organizing markers remained accessible, while other types of FS became more difficult to activate. Crucially, the difficulty was not simply a matter of reduced vocabulary; rather, unfamiliarity with the topic generated a form of cognitive competition in which attentional resources were redirected toward content evaluation and self-monitoring. As a result, the cognitive space ordinarily available for FS retrieval became occupied by the demands of argumentation itself,

effectively suppressing formulaic output. This finding suggests that FS deployment is not independent of content knowledge but is directly conditioned by it.

The second challenge involved lexical evaluation difficulties, which manifested in two analytically distinct sub-forms. The first concerned appropriateness judgment the process by which participants assessed whether a retrieved or candidate lexical item was suitable for the academic register of the writing task. All three participants demonstrated a heightened sensitivity to register expectations, frequently pausing to compare near-synonymous options not on the basis of meaning alone but according to their perceived level of formality, precision, and alignment with academic writing conventions. What is significant is that this evaluative process had not yet been automatized it remained a consciously effortful activity, indicating that register sensitivity, while present, had not been fully internalized as a proceduralized judgment. The second sub-form involved spelling uncertainty, which emerged as a distinct and analytically separable difficulty. In these instances, participants had already resolved which word to use and were not experiencing semantic or lexical uncertainty. The difficulty arose instead during orthographic encoding the stage at which a mentally accessible word needed to be rendered in written form. Participants were aware of the word's meaning and could perceive it phonologically, yet remained uncertain about the correct arrangement of its letters, suggesting a gap between lexical access and written production that imposed additional cognitive effort.

The third challenge concerned the cognitive demands arising from the simultaneous management of multiple competing processes during academic writing. Participants were required to coordinate idea generation, lexical retrieval, sentence formulation, self-monitoring of linguistic accuracy, and continuous verbalization for the think-aloud procedure all concurrently. The cumulative effect of these overlapping demands was a substantial increase in cognitive load that, at various points during the task, appeared to exceed available processing capacity. When this occurred, one or more processes were temporarily disrupted. Verbalization sometimes broke down as participants prioritized the maintenance of writing momentum, while on other occasions, writing production stalled as participants attended to monitoring and self-correction. These moments reveal that academic writing, particularly under think-aloud conditions, involves a cognitive environment of considerable complexity in which the management of competing operations is itself a significant source of difficulty.

3.3 Strategies in Formulaic Sequence Processing

Three interrelated strategies were identified in the data. The first, context-dependent selection, emerged as the organizing principle governing FS deployment across all participants. In this strategy, the communicative demands of the writing context including genre expectations, rhetorical purpose, and the specific argumentative moment within the essay functioned as the primary trigger for FS retrieval. Participants did not select a formulaic expression and then locate a suitable context for it; rather, the context generated a specific communicative need, and the appropriate FS was retrieved as the most fitting linguistic response to that need. This pattern was observed consistently, whether participants were selecting discourse-organizing markers to signal a new argumentative point, choosing stance markers to introduce a claim, or retrieving idiomatic expressions to capture a conceptual meaning with greater economy and precision than compositional language could provide. The strategy reflects a purposive, meaning-driven mode of FS deployment in which genre awareness actively guides lexical decision-making.

The second strategy, familiarity-based retrieval, describes the mechanism through which prior exposure enabled fluent and, in some cases, automatized access to formulaic sequences at the moment of need. Participants who reported habitual engagement with academic reading and writing demonstrated a noticeably greater ease of FS production, retrieving expressions with little apparent effort and without the need for deliberate reconstruction. This pattern is consistent with Ellis's (2001) usage-based account, which holds that frequency of exposure is the primary determinant of the degree to which a multiword unit becomes mentally stored as a holistically retrievable form. Familiarity operated not only as a mechanism for making forms available but also as a basis for collocational judgment participants were able to evaluate competing candidates partly on the grounds of which felt more familiar, treating relative exposure as an implicit indicator of correctness and contextual appropriateness. In this respect, familiarity functioned as both a retrieval resource and an evaluative criterion.

The third strategy, intuition-guided substitution, was activated at moments of formal indeterminacy — specifically, when two or more candidate forms were available and deliberate reasoning was insufficient to yield a clear resolution. In these instances, participants appealed to an internal sense of what "sounded right" or "sounded more appropriate" rather than to an explicitly articulable rule. This form of implicit linguistic judgment, while difficult for participants to explain, was not arbitrary; it was grounded in the accumulated collocational and register experience built through sustained exposure to academic texts. When participants revised an expression because it "just didn't sound right," or selected one candidate over another because it "sounded more formal," they were drawing on tacit probabilistic knowledge of how words and

phrases pattern together in academic discourse knowledge held not as a set of rules but as a set of internalized associations.

The three strategies are hierarchically integrated rather than parallel. Familiarity populates the repertoire; context selects from it; and substitution adjudicates between competing candidates when deliberative reasoning fails to yield resolution. Together, the findings reveal that FS processing among Indonesian EFL learners is neither exclusively automatic nor exclusively analytic, but involves a dynamic, context-sensitive interplay between stored linguistic knowledge and real-time communicative decision-making, shaped by exposure, genre awareness, and register sensitivity.

3.4 Interpretation of Findings

The holistic retrieval of discourse-organizing expressions indicates entrenchment in participants' mental lexicons as genre-specific organizational acts, reflecting the functional centrality of discourse organization that Hyland (2008) demonstrates. Chen and Baker (2010) confirm this is a broader feature of EFL academic discourse rather than an idiosyncratic one. Idioms were retrieved holistically because no compositional alternative captures the same meaning. Socolof et al. (2025) show that idioms carry a processing advantage due to lower surprisal, making successive words highly predictable once initiated. Crucially, idioms emerged when participants needed to articulate abstract conceptual relationships resisting compositional expression, suggesting holistic retrieval is meaning-driven rather than form-driven. The adjusted retrieval pattern, where holistically retrieved expressions were subsequently modified, shows learners treat stored units as modifiable material. Myles et al. (1998, 1999) documented this trajectory, observing that learners begin with unanalyzed wholes and gradually unpack them into reusable components. Holistic FS retrieval throughout writing redirects cognitive load away from lexical construction toward idea development, consistent with Conklin and Schmitt (2008, 2012) and Wood (2002). This challenges Wray's (2002) characterization of L2 learners as word-centered. Evidence from Durrant and Schmitt (2010), Webb et al. (2013), Ellis et al. (2008), Wolter and Gyllstad (2013), and Öksüz et al. (2020) increasingly supports that learners store and activate multiword units holistically. Boers and Lindstromberg (2009) and Hatami (2014) further suggest that analyzing form-meaning relationships enhances long-term FS retention.

Topic unfamiliarity hindered retrieval through two mechanisms. The first concerns vocabulary readiness, where Gavin (2014), Yang and Kim (2020), and Forsberg and Fant (2010) establish that learners master FSs tied to familiar domains considerably better than unfamiliar ones. The second concerns attentional availability, where Skehan's (1998) Limited Capacity Hypothesis predicts that unfamiliar tasks consume more cognitive resources, a finding confirmed empirically by He and Shi (2012) and Yang and Kim (2020), who found that familiar-topic writers made more expression-upgrading attempts. Topic unfamiliarity thus simultaneously shrinks the accessible FS repertoire and depletes the attentional resources needed to use it. Lexical evaluation challenges reveal formulaic competence as multidimensional, spanning meaning, collocation, register, and spelling, with learners controlling some dimensions while struggling with others. The tendency to compare expressions such as widely acknowledged versus widely known illustrates that participants recognized functional differences but selection remained effortful, consistent with Paquot (2018). Granger's (1998) notion of a "weak sense of salience" explains persistent uncertainty over naturalness, while Dechert's (1983) concept of "islands of reliability" captures how participants questioned even familiar expressions, signaling emerging rhetorical awareness beyond mere memorization. Spelling difficulties further confirm that semantic and orthographic knowledge develop unevenly, as Nation (2001) argues. The cognitive demands of simultaneous writing and think-aloud additionally align with Robinson's (2001) resource-depleting task complexity dimension, and Wood (2006) observed directly comparable effects in narrative retelling, where dual-task pressure produced gaps and substitutions in formulaic sequences.

With respect to strategies, context-dependent retrieval reflects learners matching FSs to immediate communicative demands, where the need to conclude an argument triggered expressions such as in conclusion and the need to introduce a new point prompted in addition. This is consistent with Qi and Ding's (2011) functional taxonomy and Pawley and Syder's (1983) notion of native-like selection, and Wood (2006) found that contextualized formula use increased with proficiency, suggesting this strategy develops over time. Familiarity-based retrieval demonstrates that repeated exposure strengthens particular sequences under real-time writing pressure, a pattern documented by Qi and Ding (2011), Boers and Lindstromberg (2012), Durrant and Schmitt (2009), Serrano et al. (2014), and Granger (1998), all of whom characterize reliance on such safe expressions as a fluency-preserving strategy when processing resources are constrained. Intuition-guided substitution reflects implicit knowledge operating beyond explicit rules, as participants judged whether expressions sounded right rather than applying metalinguistic reasoning. Wood (2006) documented non-target-like sequences such as thanks God attributable to misperceived storage, theorized by Wray (2002), while Rafieyan (2018) frames this as the gap between recognition width and deployment depth, and Xu (2016) links it to L1 transfer and word-isolation pedagogy. Taken together, the three challenges interact synergistically, as topic unfamiliarity reduces available FSs, forces heavier lexical evaluation, and depletes

cognitive resources simultaneously, consistent with Robinson's (2001) predictions. The three strategies form a continuum from the most sophisticated, context-dependent retrieval, to the more conservative familiarity-based retrieval, to the most creative but error-prone substitution. As Wood (2002) summarizes, formulaic sequences lighten processing burdens and enable fluid communication, and the present findings illuminate precisely how this process unfolds under real-time EFL writing conditions.

4. CONCLUSION AND SUGGESTIONS/RECOMMENDATIONS

The findings revealed three major processing types: complete retrieval, adjusted retrieval, and compositional retrieval. Complete retrieval was evident in discourse-organizing and idiomatic expressions retrieved holistically as single units. Adjusted retrieval occurred when learners modified an initially holistic retrieval to better suit communicative demands. Compositional retrieval emerged through conscious lexical evaluation, collocational assessment, and grammatical monitoring. Three recurring challenges were also identified: topic familiarity constraints, lexical evaluation difficulties, and cognitive demands from coordinating writing, monitoring, and verbalization simultaneously. Three principal strategies were likewise identified: context-dependent selection, familiarity-based retrieval, and intuition-guided substitution. Overall, the findings suggest that formulaic sequence processing involves a dynamic interaction between holistic retrieval and analytical evaluation rather than reliance on a single mechanism. Scientifically, the study contributes empirical evidence of real-time cognitive processes underlying FS retrieval, an area previously dominated by corpus analysis and product-oriented evaluation. Through think-aloud verbalizations, the study reveals how learners retrieve, evaluate, modify, and negotiate formulaic expressions while simultaneously constructing meaning and organizing discourse, demonstrating that formulaic retrieval is dynamic and context-sensitive rather than entirely automatic.

The findings support neither a purely rule-based nor a purely formulaic account of language production. They simultaneously support Chomsky's (1965) view that production draws on an internalized linguistic system and Wray's (2002, 2008) proposition that formulaic sequences are stored and retrieved holistically. Their coexistence reinforces Sinclair's (1987) argument that language operates through the complementary interaction of the open-choice and idiom principles, adding empirical support to Wray's (2002) dual-systems perspective. The study also carries several limitations. First, with only three participants from a single university sharing comparable linguistic and educational backgrounds, transferability to other EFL contexts is restricted. Second, the relatively narrow proficiency range may have limited the range of processing patterns observed; future studies would benefit from broader proficiency sampling. Third, think-aloud protocols likely imposed additional cognitive demands, potentially interrupting or altering natural FS retrieval, and may not capture unconscious automatic processes. Finally, the identification and classification of formulaic sequences inevitably involved researcher judgment, and the possibility of researcher bias cannot be entirely eliminated.

The findings carry important implications for academic writing instruction. Formulaic sequences should receive more systematic and explicit attention in EFL classrooms, with instructors integrating FS instruction through repeated contextual exposure, guided practice, and analysis of authentic academic texts. This can strengthen learners' phraseological awareness and improve their ability to retrieve academically appropriate expressions during writing. Beyond this, instruction should move beyond grammar-oriented correction toward developing metalinguistic awareness of lexical appropriateness, collocation, and academic register, as participants' difficulties lay not in grammatical correctness but in judging contextual suitability. The study also extends the literature by contributing evidence from an Indonesian EFL context, which remains underrepresented in psycholinguistic research on formulaic language. Future research should explore FS processing across broader participant groups, proficiency levels, and educational contexts. Comparative studies spanning beginner to advanced learners may clarify how formulaic competence evolves across language development stages. Research across additional academic genres, including research articles, presentations, and classroom discussions, would further enrich understanding. Extending investigation to spoken discourse would also be valuable, as examining formulaic language in oral production could reveal whether similar processing patterns, challenges, and strategies emerge in real-time speaking contexts, ultimately contributing to a more comprehensive account of formulaic language across both written and spoken modalities.

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