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Vocabulary Knowledge, Cognitive Linguistic Skills, and Their Relation with Speaking Proficiency of EFL University Students

A B S T R A C T

Vocabulary knowledge and cognitive linguistic abilities are pivotal elements of oral communicative competence in English as a Foreign Language (Henceforth, EFL) setting. This correlational study aims to examine the interrelationship between vocabulary knowledge assessed through both breadth (the extent of vocabulary size) and depth (the richness and quality of word knowledge)-and cognitive linguistic skills, including working memory, attention control, and metacognitive awareness, in relation to speaking proficiency among Iraqi EFL learners. The study sample consists of 180 second -year undergraduate students from the College of Education for Humanities at the University of Tikrit during the academic year (2024–2025). Stratified random sampling is employed to ensure gender representation in the sample. A comprehensive set of instruments is utilized to measure the target constructs: a vocabulary test (evaluating both breadth and depth), a cognitive skills questionnaire, and a structured speaking interview based on an IELTS-inspired rubric that assessed fluency, accuracy, lexical diversity, and coherence. The findings reveals that vocabulary depth was a significant predictor of speaking proficiency ($r = 0.72$, $p < 0.01$), highlighting the critical role of collocations, word associations, and semantic richness in facilitating oral fluency. Vocabulary breadth was moderately correlated with speaking proficiency ($r = 0.54$, $p < 0.01$), indicating its complementary influence on oral expression. Among the cognitive variables, working memory ($r = 0.65$, $p < 0.01$) and attention control ($r = 0.58$, $p < 0.01$) demonstrated significant correlations with speaking performance, suggesting that cognitive processing efficiency is essential for real-time language production.

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معرفة المفردات و المهارات اللغوية المعرفية، وعلاقتهما بكفاءة التحدث لدى طلبة الجامعات من دارسي اللغة الإنجليزية كلغة أجنبية

آيات حسين أحمد/ جامعة تكريت/ كلية التربية للعلوم الانسانية
نغم قدوري يحيى/ جامعة تكريت/ كلية التربية للعلوم الانسانية

الخلاصة:

تُعدّ معرفة المفردات والقدرات اللغوية المعرفية عنصرين أساسيين في كفاءة التواصل الشفهي في بيئة اللغة الإنجليزية كلغة أجنبية .(EFL) تهدف هذه الدراسة الارتباطية إلى دراسة العلاقة المتبادلة بين معرفة المفردات المُقيّمة من حيث الاتساع (مدى حجم المفردات) والعمق (ثراء وجودة معرفة الكلمات) والمهارات اللغوية المعرفية، بما في ذلك الذاكرة العاملة، والتحكم في الانتباه، والوعي ما وراء المعرفي، وعلاقتها بإتقان التحدث لدى العراقيين متعلمي اللغة الإنجليزية كلغة أجنبية.

تكوّنت عينة الدراسة من 180 طالبًا جامعيًا من المرحلة الثانية في كلية التربية للعلوم الإنسانية بجامعة تكريت خلال العام الدراسي (2024–2025). واستُخدمت العينة العشوائية الطبقية لضمان تمثيل الجنسين في العينة. استُخدمت مجموعة شاملة من الأدوات لقياس التراكيب المستهدفة: اختبار مفردات (يُقيّم كلاً من الاتساع والعمق)، واستبيان مهارات معرفية، ومقابلة محادثة مُهيكلة تستند إلى معيار مُستوحى من اختبار IELTS لتقييم الطلاقة والدقة والتنوع المعجمي والترابط. كشفت النتائج أن عمق المفردات كان مؤشرًا مهمًا لإتقان التحدث($r = 0.72$ ، $p < 0.01$)، مما يُسلط الضوء على الدور الحاسم للتراكيب اللفظية، وارتباطات الكلمات، والثراء الدلالي في تسهيل الطلاقة الشفهية. ارتبط اتساع المفردات ارتباطًا معتدلًا بإتقان التحدث($r = 0.54$ ، $p < 0.01$)، مما يُشير إلى تأثيره التكميلي على التعبير الشفهي. من بين المتغيرات المعرفية، أظهرت الذاكرة العاملة($r = 0.65$ ، $p < 0.01$) والتحكم في الانتباه ($r = 0.58$، $p < 0.01$) ارتباطات مهمة بأداء التحدث، مما يُشير إلى أن كفاءة المعالجة المعرفية ضرورية لإنتاج اللغة في الوقت الفعلي. على الرغم من أن الاستراتيجيات المعرفية أظهرت ارتباطًا إيجابيًا، إلا أنها لم تحقق دلالة إحصائية($r = 0.28$ ، $p = 0.09$)، مما يشير إلى أن التعليم والتدريب الصريحين على التفكير فوق المعرفي قد يكونان ضروريين لتعزيز تأثيرها على نتائج التحدث.

الكلمات المفتاحية :معرفة المفردات ,المهارات اللغوية المعرفية ,اتقان التحدث .

1. Introduction

1.1 Statement of the Problem

Speaking proficiency is widely recognized as one of the most challenging language skills for university-level EFL learners to acquire and refine. Despite prolonged exposure to formal language instruction, many students continue to struggle with achieving fluency and accuracy in spoken English (Derakhshan et al., 2021). This difficulty cannot be solely attributed to limited vocabulary knowledge; rather, it arises from a complex interplay of multiple factors particularly cognitive and

linguistic components that collectively shape learners' oral performance(Nation, 2013; Pawlak, 2018).

According to the majority, vocabulary is the cornerstone of language and it is claimed that it is also the most crucial component in language fluency and communicative competence. When students have to struggle to recollect the words or to frame the sentences in the way they want them to, their inability of memory retrieval and sentence formulation stops them from fully communicating ideas (Schmitt, 2010). These cognitive dimensions are largely untapped in conventional language instruction which tends to lean heavily toward the issues of grammar and writing. In most EFL programs at universities, especially those located in countries where English is not the mother tongue, the examination of students' knowledge and practices in the English language is in reading and writing skills, the performance on speaking tests is much less than their writing skills (Boo et al., 2015). The understanding of the influence caused by the mutual connection between vocabulary knowledge and cognitive linguistic abilities during the speaking interaction situation stills presents itself as an unresolved question; and therefore, without the relevant scientific data, the educators and the curriculum developers have to be careful to avoid directing the paths of the vast majority of people toward the desired goal of being capable of the effective conveyance of their thoughts and information through the spoken language.

Therefore, the problem addressed in this study is the insufficient understanding of the relationship between vocabulary knowledge, cognitive linguistic skills, and speaking proficiency among EFL university students. Without clear insights into these relationships, it becomes difficult to design pedagogical strategies that effectively support the development of oral competence. This research seeks to fill this gap by investigating how these components interrelate and contribute to students' speaking abilities, thereby offering evidence-based recommendations for EFL instruction and assessment

1.2 Aims of the Study

The present study aims to:

1. Explore the extent to which the breadth and depth of vocabulary knowledge contribute to the development of speaking proficiency among EFL university students.
2. Analyze the predictive relationship between key cognitive linguistic skills namely working memory, attentional control, and metacognitive awareness and the speaking proficiency of learners in an EFL context.
3. Determine the extent to which the interaction between vocabulary knowledge and cognitive linguistic skills influences speaking proficiency among university students in an EFL learning context.

1.3Research Questions

This study aims to investigate the relationship between vocabulary knowledge, cognitive linguistic skills, and speaking proficiency among EFL university students. Specifically, it seeks to answer the following research questions:

1 To what extent does vocabulary knowledge, encompassing both its breadth and depth, correlate with speaking proficiency among EFL learners?
2. In what ways do core cognitive linguistic skills specifically working memory, attentional control, and metacognitive awareness relate to the speaking proficiency of Iraqi university students learning English as a foreign language?
3. How does the interaction between vocabulary knowledge and cognitive linguistic skills influence the speaking proficiency of Iraqi EFL university students?

1.4 Limits of the Study

- **Population:** The study targets second -year undergraduate students enrolled in the English as a Foreign Language (EFL) program at Tikrit University during the academic year 2024–2025.
- **Sample:** A total of 180 participants were selected using stratified random sampling based on gender to ensure representative distribution.
- **Research Focus:** The investigation centers on examining students' vocabulary knowledge, cognitive skill development, and proficiency in spoken English.

2. Theoretical Background

2.1 Vocabulary Knowledge

It is a fundamental component of language proficiency and plays a critical role in learners' ability to comprehend and produce language effectively. It is commonly conceptualized through two interrelated dimensions: breadth and depth (Nation, 2013; Qian, 2002).

- **Breadth:** is defined as the number of words a learner possesses, including both receptive (recognition) and productive (use) knowledge. With a wider breadth, learners can read more texts, speak on a broader range of topics (or join in conversations), and understand spoken and written discourse better. Learners find themselves needing (2,000–3,000) word families in order to manage everyday interactions (Nation 2001), yet to perform academically in an English-medium world, learners may require knowledge of at least (8,000–9,000) word families. Breadth is therefore also essential for general understanding and for accessing content across domains.
- **Depth:** it refers to how well a learner knows a word, including its multiple meanings, connotations, collocations, morphological structure, syntactic behavior, and associations with other words (Read, 2000). Depth enables learners not only to recognize a word but also to use it appropriately and flexibly in various linguistic and pragmatic contexts.

2.2 Cognitive Linguistic Skills

Cognitive linguistic skills are central to successful language acquisition and performance, especially in foreign language learning contexts where learners must simultaneously process, store, and produce unfamiliar linguistic structures. Among the most critical components of these skills are working memory, attention control, and metacognition, which together form the cognitive foundation for language comprehension, production, and learning (Baddeley, 2003; Miyake & Friedman, 2012).

2.2.1. Working memory: refers to the limited-capacity system responsible for the temporary storage and manipulation of information necessary for complex cognitive tasks, including language processing (Baddeley, 2003). In the context of second language (L2) acquisition, working memory plays a crucial role in sentence

comprehension, vocabulary retention, and oral fluency (Daneman & Carpenter, 1980; Juffs & Harrington, 2011).

2.2.2. Attention control: involves the ability to focus on relevant stimuli while inhibiting distractions, shifting attention flexibly, and sustaining focus over time (Engle & Kane, 2004). This skill is essential in language learning, where learners must selectively attend to linguistic input (e.g., grammar, pronunciation, context) and ignore extraneous information.

2.2.3. Metacognition: defined as the awareness and regulation of one's cognitive processes, enables learners to plan, monitor, and evaluate their language use and learning strategies (Flavell, 1979; Wenden, 1999). Metacognitive strategies such as self-monitoring, error correction, goal setting, and reflection enhance language learning outcomes by promoting learner autonomy and strategic thinking.

These three components working memory, attention control, and metacognition interact dynamically in language learning. For instance, working memory supports metacognitive monitoring by holding multiple linguistic representations, while attention control enables learners to focus on task-relevant aspects of language use. Enhancing these cognitive linguistic skills through explicit instruction and targeted activities can significantly improve learners' linguistic performance, particularly in demanding tasks such as speaking and listening in real-time (Wen, 2016; Kormos & Sáfár, 2008).

2.3 Speaking Proficiency

It is a central component of communicative competence and is often considered one of the most complex and demanding skills to develop in English as a Foreign Language (EFL) context. Unlike receptive skills such as reading and listening, speaking is a productive and interactive process that requires the integration of various linguistic, cognitive, and socio-pragmatic abilities in real time (Bygate, 2009; Goh & Burns, 2012).

At its core, speaking proficiency involves the accurate, fluent, and appropriate use of language in diverse communicative situations. It encompasses several dimensions, including fluency (the ease and flow of speech), accuracy (grammatical and phonological correctness), complexity (the range and sophistication of language used), and appropriateness (contextual and pragmatic

relevance) (Skehan, 2009). Proficient speakers can effectively manage turn-taking, repair breakdowns in communication, and adjust their speech based on the interlocutor and setting.

One of the primary challenges in acquiring speaking proficiency lies in the cognitive load associated with real-time language production. Learners must retrieve vocabulary, apply grammar rules, and organize their thoughts while maintaining coherence and fluency (Levelt, 1993).

From a pedagogical perspective, enhancing speaking proficiency requires a comprehensive and scaffolded approach that integrates meaningful interaction, task-based activities, and feedback.

Technological tools, such as speech recognition software, video conferencing platforms, and mobile applications, have also emerged as valuable resources for developing speaking skills, particularly in contexts with limited access to native speakers. These tools offer learners opportunities for authentic communication, immediate feedback, and repeated practice (Derakhshan et al., 2021; Walker & White, 2013).

2.4 Interrelations:

The advancement of speaking proficiency in English as a Foreign Language (EFL) learners is a multifaceted process that arises from the dynamic interaction of various linguistic and cognitive elements. Specifically, the relationships between vocabulary acquisition, cognitive linguistic abilities, and speaking proficiency constitute an intricate system where each element simultaneously exerts influence on and is shaped by the others. Understanding these interconnections is essential for effective language instruction and learner development (Segalowitz, 2010; Nation, 2013).

Vocabulary knowledge, encompassing both breadth (number of known words) and depth (richness of word knowledge), serves as a foundational linguistic resource for spoken communication. A larger and more nuanced vocabulary enhances fluency, lexical diversity, and the ability to convey precise meaning in oral discourse (Qian, 2002; Webb, 2008).

Working memory facilitates the temporary storage and manipulation of lexical and syntactic information during speech production. Learners must hold partially formed utterances in mind while integrating new vocabulary and adjusting syntax in real time (Juffs & Harrington, 2011). Simultaneously, attention control enables learners to focus on relevant linguistic features (e.g., pronunciation or grammar) and inhibit distractions, a skill that becomes crucial during spontaneous conversations (Robinson, 2003).

The relationship between cognitive processes and vocabulary knowledge establishes the cognitive-linguistic framework essential for speaking proficiency. For instance, limited working memory capacity may hinder learners' ability to retrieve the appropriate vocabulary or utilize complex syntactic structures, leading to fragmented or hesitant speech (Skehan, 2014). On the other hand, a richer vocabulary depth facilitates better conceptual access, aiding in the retrieval of collocations and idiomatic expressions, which, in turn, enhances fluency and the richness of communication (Schmitt, 2014).

3. Procedures

3.1 Population and Sampling:

In the context of empirical research within applied linguistics and EFL (English as a Foreign Language) instruction, the selection of a representative population and a methodologically sound sampling strategy are fundamental to ensuring the reliability, validity, and generalizability of the study's findings (Creswell, 2012; Dörnyei, 2007).

- **The population**: targeted in this study comprises second -year undergraduate students enrolled in the English Department at the College of Education, Tikrit University, during the academic year 2024–2025. This population was purposefully selected due to their intermediate to advanced proficiency in English, and their exposure to a broad range of linguistic courses—including vocabulary development, speaking skills, and language learning strategies—which are relevant to the constructs being investigated in this study. Furthermore, these students represent a critical stage in their academic and linguistic development, making them ideal participants for

examining the interrelations among vocabulary knowledge, cognitive linguistic skills, and speaking proficiency (Goh & Burns, 2012).

- **Sample**: 180 students were drawn using a stratified random sampling technique based on gender. Stratified sampling was employed to ensure the inclusion of both male and female students in proportions reflective of the actual population distribution, thereby enhancing the representativeness of the sample and reducing potential sampling bias (Fraenkel, Wallen, & Hyun, 2012). This method also allows for more accurate subgroup comparisons and facilitates deeper analysis of gender-related patterns in speaking proficiency and cognitive linguistic skill use, which have been noted in previous research as relevant moderating variables (MacIntyre & Noels, 1996; Oxford, 1990).

Participants were selected from different academic sections to ensure diversity in learning experiences and instructional contexts. Ethical considerations were taken into account by obtaining informed consent from all participants, and the study was conducted in alignment with the ethical guidelines of educational research (BERA, 2018).

Overall, the combination of purposeful population targeting and stratified random sampling enhances the internal and external validity of the research, thereby providing a robust foundation for interpreting the relationships among the key constructs of interest.

3.2 Instruments

1. Vocabulary Test:

In this study, a vocabulary test was employed to assess participants' lexical knowledge, targeting two key dimensions: breadth and depth.

- **Breadth** refers to the extent of a learner's vocabulary, encompassing both receptive (recognition) and productive (use) knowledge. A broader vocabulary breadth enables learners to engage with a wider variety of texts, participate in conversations on diverse topics, and better understand both spoken and written discourse. According to Nation (2001), learners require knowledge of approximately (2,000–3,000) word families to effectively manage everyday communication. However, to function academically in an

English-medium environment, learners may need to command a vocabulary of at least (8,000 _ 9,000) word families. As such, breadth is crucial not only for general comprehension but also for accessing content across various fields and disciplines.

- **Depth,** on the other hand, pertains to the learner's comprehensive understanding of a word, including its multiple meanings, connotations, collocations, morphological structure, syntactic behavior, and associations with other words (Read, 2000). Depth allows learners not only to recognize a word but also to apply it appropriately and flexibly across diverse linguistic and contextual settings. The interaction between breadth and depth is crucial for successful language use. While breadth provides the fundamental building blocks of a learner's vocabulary, depth refines and enriches its usage. Research has demonstrated that students with both extensive and profound vocabulary knowledge are better equipped to interpret implied meanings, infer unfamiliar words from context, and produce more sophisticated spoken and written texts (Schmitt, 2014; Webb, 2008).

2. Cognitive Skills Questionnaire:

To assess the cognitive capabilities of participants related to language production and speaking proficiency, a meticulously crafted questionnaire was developed, targeting three core components: working memory, attention control, and metacognitive awareness. These constructs are widely acknowledged within the field of second language acquisition (SLA) research as critical to learners' ability to process, plan, and self-regulate language use in real-time (Miyake & Friedman, 2012; Goh, 2007; Wen, 2016).

❖ **Working Memory:**

Working memory was evaluated using the widely recognized Digit Span Task, adapted from the Wechsler Adult Intelligence Scale (WAIS-IV). This task consists of two parts: the Digit Span Forward, which assesses basic attention and short-term memory, and the Digit Span Backward, which measures the executive aspect of working memory by requiring mental manipulation and sequencing of numerical information (Baddeley, 2003; Engle & Kane, 2004).

Participants were presented with digit sequences read aloud at a rate of one per second and were required to repeat the sequence in either forward or reverse order. The task becomes progressively more difficult as the number of digits increases. The total score, derived from both parts of the task, serves as an indicator of the participant's ability to hold and manipulate information-critical for real-time language production and speech formulation (Juffs & Harrington, 2011).

- **Attention Control:**

Attention control was assessed using a computerized version of the Stroop Color-Word Task, a well-established test for evaluating selective attention, response inhibition, and cognitive flexibility (Stroop, 1935). In this task, participants were presented with color words (e.g., "red," "blue") printed in incongruent ink colors and were instructed to name the color of the ink rather than read the word.

The response time to accurately identify the ink color in incongruent versus congruent conditions (where the word and ink color match) reflects the participant's ability to suppress automatic responses and focus on task-relevant stimuli-skills crucial for maintaining fluency and coherence in spoken interactions (Robinson, 2003; Linck et al., 2014).

- **Metacognition:**

To evaluate metacognitive awareness, a self-report questionnaire was developed based on the Metacognitive Awareness Inventory (MAI) and adapted for the speaking context (Schraw & Dennison, 1994; Goh & Burns, 2012). The tool consists of 10 statements rated on a 5-point Likert scale (ranging from 1 = Strongly Disagree to 5 = Strongly Agree).

This instrument aims to capture learners' metacognitive behaviors, such as planning, monitoring, and self-evaluation-strategies shown to enhance speaking fluency, reduce anxiety, and improve communicative effectiveness (Wenden, 1999; Vandergrift & Goh, 2012).

The reliability of the questionnaire was confirmed through Cronbach's alpha analysis, which produced coefficients exceeding 0.80 for all three subscales. This result demonstrates strong internal consistency and supports the construct validity of the instrument (Dörnyei, 2007).

3. Speaking Assessment:

To assess participants' speaking proficiency, a structured interview was conducted utilizing a scoring rubric adapted from the International English Language Testing System (IELTS) speaking band descriptors. The structured interview format was chosen due to its reliability, flexibility, and ability to elicit natural spoken responses in a semi-formal, communicative context (Luoma, 2004; Taylor & Falvey, 2007).

The interview comprised three sequential tasks designed to simulate real-world communicative scenarios, aligning with the structure of the IELTS speaking test:

1. Personal introduction and familiar topics (e.g., daily routine, hobbies)
2. Individual long turn (a brief speech based on a visual prompt or card)
3. Discussion of abstract topics (e.g., education, technology, culture)

Each interview lasted approximately 10–12 minutes and was audio-recorded for subsequent analysis and scoring. This format not only provides a well-rounded assessment of linguistic output but also helps mitigate anxiety by progressively increasing task complexity (Brown & Abeywickrama, 2019).

Participants' performances were assessed using a rubric that included four primary criteria derived from the IELTS descriptors (IELTS, 2020):

❖ Fluency and Coherence: The ability to produce speech smoothly, with logically sequenced ideas and appropriate discourse markers.

❖ Lexical Resource: The range and precision of vocabulary used to convey meaning, including the ability to paraphrase and utilize fewer common expressions.

❖ Grammatical Range and Accuracy: The diversity and correctness of sentence structures, verb tenses, and morphological features.

❖ Pronunciation: The clarity and intelligibility of speech, including stress, rhythm, and intonation.

Two trained raters independently evaluated the recordings to ensure inter-rater reliability. Any discrepancies between raters were addressed through discussion

and reference to benchmark samples. The final score was determined by averaging the two ratings. The inter-rater reliability coefficient (Cohen's kappa) exceeded 0.80, signifying a high level of agreement (McNamara, 2000).

This IELTS-based rubric was selected for its validity, as it is rooted in communicative competence theory and widely used in both academic and professional language assessments (Fulcher, 2010). Additionally, it permits both holistic and analytical evaluation of speaking proficiency, providing detailed insights into each learner's strengths and areas for improvement.

The speaking assessment served as a critical tool in this study, facilitating the correlation of speaking performance with cognitive skills and vocabulary knowledge. By aligning the tasks with authentic communicative demands and employing a standardized rubric, the procedure ensured ecological validity and reliable data collection (Bachman & Palmer, 2010).

3.3 Validity and Reliability:

Ensuring the validity and reliability of research instruments is crucial for establishing the accuracy, credibility, and interpretability of the study's findings. In this study, three instruments were employed to assess vocabulary knowledge, cognitive skills, and speaking proficiency. Each instrument underwent a meticulous validation and reliability analysis to confirm its suitability for the target population.

❖ Face and Content Validity:

To establish face and content validity, all research instruments—vocabulary tests (both breadth and depth), the cognitive skills questionnaire, and the structured speaking interview rubric-were subjected to review by a panel of five experts in the fields of applied linguistics and language assessment. These experts were selected based on their academic qualifications, research experience, and expertise in test development and evaluation within the domain of second language acquisition (SLA) (Fraenkel et al., 2012; Hughes, 2003).

Each expert was provided with the instruments and a validation checklist, which they used to evaluate the relevance, clarity, comprehensiveness, and alignment of the items with the intended constructs. Feedback was systematically gathered, analyzed, and incorporated to revise or refine specific items to better represent the

constructs and ensure cultural appropriateness. For example, some vocabulary items were modified to better align with the participants' educational backgrounds, and the Likert-scale statements in the cognitive skills questionnaire were reworded to enhance clarity.

❖ **Reliability:**

To assess the reliability of the instruments, internal consistency was evaluated using Cronbach's alpha coefficient (α), a widely recognized statistical measure for determining the reliability of scale-based assessments (Dörnyei, 2007; Tavakol & Dennick, 2011). The reliability analysis results were as follows:

- Vocabulary Knowledge Test: $\alpha = 0.87$
- Cognitive Skills Questionnaire: $\alpha = 0.81$
- Speaking Assessment Rubric: $\alpha = 0.83$

These coefficients indicate a high level of internal consistency, as values exceeding 0.80 are generally regarded as acceptable to good in educational and psychological research contexts (George & Mallery, 2003). The relatively high alpha values suggest that the items within each instrument consistently measure the same underlying construct, thus providing assurance in the stability and replicability of the results.

4. Results:

This section outlines the findings of the statistical analysis performed to explore the relationships between vocabulary knowledge, cognitive skills, and speaking proficiency among second-year EFL undergraduates. Pearson correlation coefficients (r) were calculated to assess the strength and statistical significance of the associations between the variables under investigation. A significance level of $p < 0.05$ was adopted as the criterion for determining statistical significance.

4.1 Vocabulary Knowledge and Speaking Proficiency:

The analysis demonstrated a positive and statistically significant correlation between both dimensions of vocabulary knowledge breadth and depth and speaking proficiency. These findings suggest that an increase in either the breadth

or depth of vocabulary knowledge is associated with enhanced speaking performance among the participants. (Zubaida and Nagham ,2024)

- **Vocabulary Breadth** showed a moderate positive correlation with speaking proficiency ($r = 0.54$, $p < 0.01$), indicating that learners with a broader vocabulary range tended to demonstrate higher levels of fluency, lexical diversity, and grammatical accuracy in oral communication. This aligns with prior research emphasizing the importance of lexical range in supporting fluent and coherent spoken discourse (Nation, 2001; Qian, 2002).
- **Vocabulary Depth**, in contrast, was strongly correlated with speaking proficiency ($r = 0.72$, $p < 0.01$), suggesting that deeper word knowledge—including awareness of collocations, word usage, and multiple meanings—plays a more substantial role in oral performance. This finding supports earlier studies that associate depth of lexical knowledge with the ability to use language more accurately, express nuanced meanings, and maintain communicative effectiveness (Read, 2000; Schmitt, 2014).

These results confirm that while both breadth and depth are essential, depth of vocabulary knowledge may be a more robust predictor of successful spoken language production in EFL contexts.

4.2 Cognitive Skills and Speaking Proficiency:

The analysis further examined the relationship between cognitive skills specifically working memory, attention control, and metacognitive awareness and speaking proficiency.

- **Working Memory** exhibited a moderately strong correlation with speaking proficiency ($r = 0.65$, $p < 0.01$). This finding indicates that learners with higher working memory capacity were more adept at managing linguistic structures and retrieving vocabulary during speech production. This aligns with established theories that associate working memory with language processing efficiency (Baddeley, 2003; Wen, 2016).
- **Attention Control** demonstrated a moderate yet statistically significant correlation with speaking proficiency ($r = 0.58$, $p < 0.01$). This suggests that the ability to selectively focus and exercise inhibitory control is crucial for

managing real-time communication, preventing performance breakdowns, and maintaining fluency during speech (Robinson, 2003; Linck et al., 2014).

- **Metacognitive Awareness**, though positively correlated with speaking proficiency ($r = 0.28$), did not achieve statistical significance ($p = 0.09$). This implies that while some learners reported employing metacognitive strategies, such as planning and self-monitoring, these strategies may not directly lead to measurable improvements in speaking performance. Alternatively, their impact might be mediated by other cognitive or affective factors, necessitating further exploration or targeted instructional interventions (Vandergrift & Goh, 2012; Wenden, 1999).

In sum, the results indicate that working memory and attention control are significant cognitive predictors of speaking proficiency in EFL learners. While metacognitive awareness appears to have a positive association, its role in directly enhancing speaking performance may require additional investigation or instructional support to manifest tangible effects.

5. Conclusions:

The results of this study provide significant contributions to understanding the complex roles of vocabulary knowledge and cognitive skills in shaping speaking proficiency among EFL learners. These findings not only advance theoretical perspectives in second language acquisition (SLA) but also offer practical implications for the design of curricula, instructional strategies, and learner development.

- **Vocabulary Depth as a Stronger Predictor of Speaking Proficiency:**

This study found that while both the breadth and depth of vocabulary knowledge correlate positively with speaking proficiency, vocabulary depth especially knowledge of collocations, word families, and semantic relationships emerges as a more influential predictor ($r = 0.72$, $p < 0.01$). Learners with a more profound and interconnected lexical understanding were found to express themselves with greater fluency and accuracy in spoken communication. Depth of vocabulary knowledge facilitates faster lexical access, enhances contextual appropriateness, and provides flexibility in language use (Qian, 2002; Read, 2000; Schmitt, 2014).

These results align with Nation's (2013) assertion that depth is crucial for producing speech that is both nuanced and coherent.

- **Cognitive Mechanisms as Key to Speaking Proficiency: Working Memory and Attention Control:**

The study also highlights the vital role of cognitive processes particularly working memory ($r = 0.65$, $p < 0.01$) and attention control ($r = 0.58$, $p < 0.01$) in supporting spontaneous speech production. Effective speaking in real-time requires learners to concurrently retrieve vocabulary, organize grammar, and maintain coherence, all of which place considerable cognitive demands on them (Baddeley, 2003; Wen, 2016). Learners with greater working memory capacity are better equipped to manage these demands, while efficient attention control helps them focus on relevant linguistic cues while suppressing distractions (Robinson, 2003). These cognitive abilities enable learners to sustain fluency and avoid breakdowns in communication, especially in dynamic, interactive speaking contexts.

- **The Potential, Yet Limited, Role of Metacognition:**

Although metacognitive awareness showed a positive but statistically non-significant correlation with speaking proficiency ($r = 0.28$, $p = 0.09$), the results suggest that metacognitive strategies, such as planning, self-monitoring, and performance evaluation, may not directly lead to noticeable improvements in speaking unless explicitly taught and practiced. This indicates that learners often lack the autonomy to apply these strategies effectively without guided instruction (Goh, 2007; Vandergrift & Goh, 2012). This finding is in line with previous research advocating for the integration of metacognitive strategy training as a fundamental component of language education (Wenden, 1999; Chamot, 2005).

In conclusion, this study emphasizes that speaking proficiency arises from the interplay between in-depth lexical knowledge and key cognitive mechanisms. To foster effective oral language development in EFL learners, curricula should emphasize vocabulary instruction that focuses on depth—such as understanding collocations, semantic associations, and lexical networks—while simultaneously promoting cognitive skills through structured activities that enhance memory and attention control.

Recommendations:

- Incorporate Collocation Exercises and Cognitive Strategy Training: Curricula should include activities focused on collocations and cognitive strategies to enhance learners' vocabulary depth and cognitive skills for effective language production.
- Utilize Role-Plays and Debates: To mirror real-world speaking scenarios, educators should integrate role-playing activities and debates that simulate the challenges of real-time spoken communication.
- Encourage Reflective Speaking Journals: Students should be prompted to maintain reflective speaking journals, where they transcribe and analyze their responses to brief speaking tasks, fostering self-awareness and continuous improvement.
- Design Integrated Vocabulary-Cognition Tasks: Speaking tasks should be crafted to simultaneously address vocabulary depth and engage cognitive processes, enhancing both lexical knowledge and cognitive control during communication.
- Leverage Technology for Independent Speaking Practice: Digital tools such as AI-based speaking assistants, voice recorders, and pronunciation apps should be employed to facilitate independent speaking practice, offering learners immediate feedback and opportunities for self-correction and repetition, thus building confidence.
- Implement Peer Feedback Protocols: Structured peer feedback sessions should be incorporated into the learning process to promote collaborative learning, allowing students to gain insights into their speaking performance and identify areas for improvement.
- Differentiate Instruction According to Cognitive Profiles: Instruction should be tailored to individual cognitive profiles, ensuring that students receive personalized strategies to support their unique learning needs, particularly regarding memory, attention, and metacognition.
- Embed Speaking Opportunities Across the Curriculum: Speaking tasks should be integrated throughout various subjects, ensuring that learners have consistent opportunities to practice and refine their speaking skills in diverse contexts.

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