Interplay of language proficiency, gender, test anxiety, and cognitive strategies: The spectrum of guessing behaviors in multiple-choice assessments among Saudi EFL learners

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Abstract: This study investigates the spectrum of guessing behaviors among 80 Saudi EFL learners within multiple-choice tests, emphasizing the influence of language proficiency, test anxiety, gender differences, and strategic decision-making. A novel category, "Guessing with Partial Knowledge," related to language attrition, highlights how foundational yet incomplete language knowledge shapes guessing strategies. This addition complements traditional categories from blind guessing to strategic, knowledge-based guessing. The analysis reveals that higher proficiency students are prone to educated guessing utilizing deep linguistic insights and contextual cues, whereas those with lower proficiency might rely on simpler heuristics. Notably, gender differences emerged, with female students displaying more cautious and methodical guessing approaches compared to the often-impulsive strategies of male students. This study advocates for educational strategies that bolster language retention, strategic guessing, and address the nuanced needs of male and female learners in test-taking scenarios.

Keywords: Gender, Guessing strategies, Language proficiency, Multiple-choice tests, Strategic guessing, Test anxiety.

1. Introduction

Multiple-choice tests have long been regarded as a standard method for assessing knowledge across educational institutions worldwide. They offer a structured, efficient, and scalable way to evaluate a wide range of topics and are frequently used in language proficiency tests, academic exams, and professional certifications. The format of these tests typically presents students with a set of choices, of which only one is correct. In this context, guessing has often been viewed as a last resort for students who lack the knowledge required to answer a question. However, this study argues that guessing is a far more complex process than previously thought.

The traditional view holds that guessing is either a completely random act or, in rare cases, an informed decision made by a student who can partially infer the correct answer. While both scenarios are plausible, they fail to capture the full spectrum of behaviors exhibited by test-takers, particularly those with varying degrees of language proficiency. This research aims to expand on the traditional understanding by introducing a continuum of guessing behaviors, wherein students use a range of cognitive strategies that depend on factors such as partial knowledge, language proficiency, and contextual clues.

1.1. Significance of the Study

Understanding the dynamics of guessing in multiple-choice tests is critical for several reasons. First, it challenges the assumption that guessing is solely a random process, offering a more nuanced perspective that highlights the strategic and cognitive efforts students invest in answering questions. This insight is particularly relevant for educators and test designers, as it calls into question the fairness of assessments that either penalize or ignore guessing behaviors.

Moreover, the study has practical implications for EFL (English as a Foreign Language) learners. For students who are still developing their language proficiency, multiple-choice tests can be particularly challenging. In such cases, guessing may not only reflect a lack of knowledge but also a lack of linguistic ability to comprehend the question fully. By exploring how guessing interacts with language proficiency, this study offers a deeper understanding of how EFL learners navigate multiple-choice assessments, which is essential for improving both instructional and assessment practices.

1.2. Objectives of the Research

This research has three primary objectives: 1.   1- To examine the continuum of guessing behaviors among EFL learners in multiple-choice assessments. 2.   2- To identify the cognitive, linguistic, and emotional factors that influence guessing behaviors, such as partial knowledge, language proficiency, and test anxiety.   3.   3- To offer recommendations for more effective test design and pedagogical strategies that account for the spectrum of guessing.

2. Literature Review

The earliest research on guessing in educational settings viewed it as a random process that distorted the accuracy of test results. Thorndike (1922) was among the first to study the effects of guessing on test validity, concluding that guessing inflated scores and misrepresented students' true knowledge. This early view laid the groundwork for subsequent research, which sought to mitigate the influence of guessing through methods like penalty scoring and confidence-based assessments.

However, more recent studies have challenged this view, suggesting that guessing is not a purely random act but a strategic response to uncertainty. Burton's (2002) work on multiple-choice tests highlighted the role of educated guessing, where students use partial knowledge or logical reasoning to improve their chances of selecting the correct answer. This shift in understanding has significant implications for how educators design tests and interpret student performance.

2.1. The Cognitive Dimension of Guessing

Cognitive load theory, first introduced by Sweller (1988), provides a framework for understanding how students manage the mental demands of test-taking. According to this theory, students experience cognitive overload when faced with complex questions or time constraints, which can lead to increased guessing. However, rather than resorting to random guessing, students often engage in what Sweller describes as "heuristic processing," using mental shortcuts and partial knowledge to arrive at an answer.

This cognitive approach to guessing aligns with findings from educational psychology, which suggest that students often guess based on their ability to recall related information or eliminate unlikely answers. For example, Frary et al. (1977) found that students with higher cognitive abilities were better at using deductive reasoning to guide their guesses, even when they lacked full knowledge of the subject matter.

2.2. Language Proficiency and Guessing in EFL Contexts

For EFL learners, language proficiency is a critical factor influencing guessing behavior. Studies have shown that students with higher language proficiency are more likely to engage in educated guessing, using their understanding of linguistic structures and contextual clues to infer the correct answer (Piontek, 2008). In contrast, students with lower proficiency may struggle to comprehend the question fully, leading them to guess blindly or rely on surface-level features, such as the length of the answer options or the presence of familiar words.

AlQahtani (2005) conducted a study on Saudi EFL learners, examining their use of vocabulary learning strategies in multiple-choice tests. The findings revealed that high-proficiency students were more adept at guessing the meaning of unfamiliar words based on contextual clues, while low-proficiency students were more likely to guess randomly. This suggests that language proficiency not

only enhances a student's ability to answer questions correctly but also influences the quality of their guesses.

2.3. The Role of Test Anxiety in Guessing

Test anxiety is another key factor that shapes guessing behavior. Research by Eysenck et al. (2007) indicates that students with high levels of test anxiety are more prone to guessing, often because anxiety impairs their ability to retrieve information or process complex questions. This phenomenon is particularly pronounced in timed tests, where students may feel pressured to guess quickly rather than spend time deliberating over each question.

In the context of EFL learners, test anxiety can be exacerbated by linguistic challenges. Students who struggle with language comprehension may experience heightened anxiety during multiple-choice tests, leading them to guess more frequently. Huang & Eslami (2013) found that test anxiety had a significant impact on the performance of EFL learners, particularly those with lower language proficiency. These students were more likely to guess randomly as a coping mechanism, even when they possessed partial knowledge of the subject matter.

2.4. Pedagogical Approaches to Address Guessing

Given the complex nature of guessing in multiple-choice tests, several pedagogical approaches have been proposed to minimize its negative impact on assessment outcomes. One such approach is confidence-based scoring, where students are asked to indicate how certain they are about their answers. This method allows educators to differentiate between educated guesses and random guesses, providing a more accurate measure of student knowledge (Guo et al., 2016).

Another approach is to teach students strategies for managing uncertainty during tests. For example, educators can train students to use elimination techniques, where they rule out incorrect answers based on partial knowledge or contextual clues. Additionally, teaching students how to manage test anxiety through relaxation techniques and time management strategies can reduce the likelihood of random guessing.

3. Methodology

3.1. Participants

The study involved 80 Saudi EFL learners, all of whom were enrolled in a Bachelor's program in various disciplines at a Saudi university. These students were taking an English course titled 'Building Vocabulary,' part of their four-year academic program. The English proficiency levels of the participants varied, with a range from low to intermediate according to standardized assessments conducted as part of their academic curriculum. Most students had been exposed to formal English language instruction since intermediate school, following the typical Saudi educational system where English is introduced as a compulsory subject from Grade 6.

In the Saudi educational context, English instruction tends to focus on grammar and vocabulary acquisition, with less emphasis on communicative competence or language skills that are practical for real-world usage. This imbalance often leads to students who can memorize grammatical rules but struggle with language production and comprehension when applied in academic or professional contexts. The participants, despite years of English instruction, still exhibited significant variation in their ability to communicate effectively in English, largely due to the traditional focus on rote learning and limited practical application.

The Saudi education system has made substantial efforts to improve English instruction over the past two decades, including introducing English at earlier stages of schooling and integrating technology-assisted learning. However, the focus remains heavily on passive learning strategies (e.g., memorization of vocabulary, grammar rules) rather than promoting interactive language skills like speaking, listening, or inferencing from context. These educational practices have a direct influence on the language proficiency of students as they reach university level.

For instance, many of the participants had difficulty applying inference skills during reading comprehension tasks in multiple-choice tests, a common challenge among students trained in grammar-based curriculums. The students' reliance on memorization rather than developing higher-order thinking skills resulted in a heavy use of blind guessing on unfamiliar items during the tests. While the top performers in the study exhibited greater proficiency in English, they were still largely restricted to using strategies based on partial knowledge, rather than demonstrating full linguistic command of English. This discrepancy reflects the broader issues of language proficiency in the Saudi educational system, where students may pass standardized exams but remain ill-equipped for spontaneous or complex language use in unstructured situations.

3.2. Instruments

The primary instrument used in this study was a 50-item multiple-choice test designed to assess both language proficiency and the frequency of guessing behaviors. The test included questions of varying difficulty, ranging from simple vocabulary items to complex reading comprehension questions. Each question had four answer choices, only one of which was correct. The test was designed to mimic the format of standardized English language proficiency exams, ensuring that the results would be applicable to real-world testing scenarios.

In addition to the multiple-choice test, participants were asked to complete a survey on test-taking strategies and anxiety levels. The survey included questions about how often they guessed on tests, what factors influenced their guessing, and how confident they felt about their answers. Finally, retrospective interviews were conducted with a subset of participants to gain deeper insights into their guessing strategies during the test.

The data collection process was carefully structured to capture both quantitative and qualitative insights into the participants' guessing behaviors and test-taking strategies. It was conducted in three distinct stages, each designed to simulate real testing conditions while gathering comprehensive data on how students approached multiple-choice questions, particularly when they were uncertain about the answers.

3.3. Multiple-Choice Test Under Timed Conditions

The first stage involved administering a 50-item multiple-choice test under strict timed conditions, simulating the pressures and constraints that students typically face in real-world exams. The test included questions of varying difficulty, ranging from simple vocabulary recognition to more complex reading comprehension tasks. This variety was intended to assess how guessing behavior differed across different levels of linguistic complexity and content familiarity. Each question had four answer choices, one of which was correct.

The test was designed to mimic standardized English proficiency exams used in Saudi universities, ensuring that the participants were familiar with the format and that the results would be applicable to real educational settings. The time limit imposed on the test (45 minutes) was slightly shorter than what would typically be allotted, to intentionally increase time pressure and observe how students handled decision-making under stress. This was crucial for examining the impact of test anxiety on guessing behavior, as students were forced to manage their time efficiently, often resorting to guessing when they were unsure of the correct answer or running out of time.

During the test, participants' behaviors were observed, and the time they spent on each question was recorded. This allowed the researchers to identify patterns in guessing behaviors, particularly in relation to difficult questions or sections of the test where time pressure became more pronounced.

3.4. Stage 2: Survey on Test-Taking Strategies and Anxiety Levels

Immediately following the test, participants completed a self-reported survey designed to gather quantitative data on their test-taking strategies and anxiety levels. The survey consisted of multiple-

choice and Likert-scale questions, which measured the frequency and type of guessing strategies used by participants, as well as the intensity of test anxiety they experienced during the exam.
The survey included questions like:

"How often did you guess during the test?"

"When guessing, did you eliminate any of the answer choices before making your selection?"

"How confident were you in your guesses?"

"On a scale of 1 to 5, how anxious did you feel during the test?"

These questions were designed to differentiate between random guessing, educated guessing, and more strategic approaches, such as elimination or the use of contextual clues. The survey also collected data on test anxiety, a critical factor influencing guessing behavior, through questions that asked participants to rate how nervous they felt during the test and how anxiety affected their performance. The inclusion of test anxiety data was vital, as previous studies (e.g., Eysenck et al., 2007) have shown that high levels of anxiety can impair decision-making and lead to more frequent blind guessing.

The quantitative data from the survey allowed the researchers to map out general trends across the entire group of participants, identifying correlations between language proficiency, anxiety levels, and the type of guessing strategies employed. For example, students with higher anxiety levels might have been more likely to engage in blind guessing due to time constraints or difficulty concentrating, while students with higher proficiency levels may have relied more on educated guessing based on partial knowledge or elimination of incorrect options.

3.5. Stage 3: Retrospective Interviews with a Subset of Participants
In the final stage of data collection, retrospective interviews were conducted with a subset of 20 participants, selected to represent a broad range of language proficiency levels and test-taking behaviors. The goal of these interviews was to provide qualitative data that would complement the quantitative results from the multiple-choice test and survey, offering a more nuanced understanding of the thought processes behind guessing behavior.

Participants were asked to reflect on specific questions from the test where they had guessed. These questions were carefully chosen by the researchers based on the participants' test responses, focusing on items where guessing was evident (e.g., where the correct answer was selected after incorrect elimination attempts, or where the time spent on a question suggested hesitation or uncertainty). The participants were prompted to describe their thought process in detail, answering questions such as:

"Why did you decide to guess on this question?"

"Did you eliminate any of the answer choices before making your final decision?"

"Did you feel confident in your guess? Why or why not?"

"What clues or partial knowledge did you rely on to guide your guess?"

These interviews allowed the researchers to explore further the cognitive strategies like process of elimination, reliance on contextual clues, or decision-making based on grammatical structure. Importantly, the interviews also revealed whether students were making guesses based on partial knowledge, or if their guesses were truly random.

The retrospective nature of the interviews was crucial for understanding the mental processes that students engaged in during the test. This approach also allowed researchers to assess the role of test anxiety, with some participants indicating that they guessed randomly due to nervousness or time pressure, while others explained that they were able to stay calm and make more strategic decisions. For instance, a student might describe how they were confident enough to rule out two incorrect options but were unsure about the final choice, thus engaging in educated guessing rather than a blind guess.

The data gathered from these interviews was thematically coded to identify common patterns and variations in guessing strategies across different proficiency levels and anxiety profiles. This qualitative data provided insights that were not fully captured by the quantitative survey, such as the emotional triggers for guessing (e.g., panic, time pressure) and the specific types of knowledge (e.g., vocabulary, grammar) that students drew upon when making educated guesses.

In summary, the three-stage data collection process provided a comprehensive view of the participants' guessing behaviors, combining quantitative data from the multiple-choice test and survey with rich qualitative insights from the retrospective interviews. This mixed-methods approach ensured that both the frequency and depth of guessing behaviors were thoroughly examined, offering a well-rounded understanding of how Saudi EFL learners approach uncertainty in multiple-choice assessments. The integration of timed testing, self-reported strategies, and in-depth reflections ensured that the study captured not only the actions of guessing but also the underlying cognitive and emotional factors driving these behaviors.

3.6. Analytical Framework

The analytical framework for this study employed a mixed-methods approach, integrating both quantitative and qualitative data to provide a comprehensive understanding of the participants' guessing behaviors, test-taking strategies, and their relationship with factors such as language proficiency and test anxiety. This approach allowed the researchers to identify not only statistical patterns but also the underlying cognitive and emotional processes that influenced the participants' decisions during multiple-choice tests.

3.7. Quantitative Data Analysis

The quantitative data from the multiple-choice test scores and survey responses were analyzed using various statistical techniques, including correlation analysis and regression modeling. These methods were applied to examine the relationships between key variables such as language proficiency, test anxiety, and guessing behavior, which provided insights into how these factors interacted to influence student performance.

3.8. Correlation Analysis

The first step in the quantitative analysis was conducting correlation analysis to explore the strength and direction of relationships between different variables. Specifically, the researchers looked at the correlation between:

Language proficiency (as measured by test scores) and the frequency of guessing.

Test anxiety levels (as reported in the survey) and guessing types (educated guessing vs. blind guessing).

Performance on the test and the use of guessing strategies (e.g., elimination vs. random guessing).

For example, the analysis showed a moderate positive correlation between language proficiency and the use of educated guessing strategies. This suggests that students with higher proficiency were more likely to make informed guesses based on their partial knowledge of the subject matter. In contrast, students with lower proficiency were more inclined to engage in blind guessing, particularly when faced with more challenging items, such as those requiring advanced vocabulary or complex reading comprehension skills. This finding aligns with previous studies (Piontek, 2008), which indicated that language proficiency significantly affects how students handle uncertainty in multiple-choice tests.

An additional correlation analysis revealed a negative relationship between test anxiety and performance on the test. Higher levels of anxiety were associated with lower test scores and an increased reliance on random guessing. For example, students who reported feeling anxious during the test were less likely to employ strategies such as elimination or relying on contextual clues, as their cognitive processing was impaired by their emotional state. This result was consistent with research by Eysenck et al. (2007), which found that high levels of anxiety can hinder decision-making and problem-solving abilities.

3.9. Regression Modeling

To further investigate the impact of language proficiency and test anxiety on guessing behaviors, the researchers used regression modeling. This technique allowed them to predict the likelihood of certain guessing behaviors based on a combination of factors. For instance, the model examined how both proficiency scores and anxiety levels predicted whether a student would engage in educated guessing or blind guessing. The regression results showed that language proficiency had a stronger predictive power for educated guessing than test anxiety, although anxiety remained a significant factor in predicting blind guessing.

An example of this can be seen in the data of a high-proficiency student who, despite experiencing moderate anxiety, consistently employed educated guessing strategies throughout the test. The regression model predicted that such students were 67% more likely to use elimination or inferencing strategies compared to their lower-proficiency counterparts, who, when facing high anxiety, had a 45% higher chance of resorting to random guessing.

These quantitative analyses provided clear evidence of how proficiency and anxiety interacted to shape students' test-taking strategies. This comprehensive analysis allowed the researchers to identify trends across the participant group and make predictions about guessing behavior under different conditions.

3.10. Qualitative Data Analysis

The qualitative data from the retrospective interviews were analyzed using thematic coding, which enabled the researchers to delve explore further the cognitive and emotional processes underlying participants' guessing behaviors. Thematic coding involved categorizing participants' responses into distinct guessing strategies, allowing for a more nuanced understanding of how students approached questions when they were uncertain about the correct answers.

3.11. Thematic Coding Process

The coding process began with the transcription of all interviews, after which the researchers engaged in an open coding phase. During this phase, participants' descriptions of their thought processes were examined, and recurring themes or patterns were identified. These themes were then grouped into four main categories:

Educated Guessing – guesses based on partial knowledge, often involving inferencing or the use of contextual clues.
Random Guessing – purely blind guesses, with no discernible strategy or reasoning behind the choice.
Elimination Strategies – deliberate exclusion of one or more answer choices, followed by a selection among the remaining options.
Relying on Contextual Clues – guesses made based on clues within the question or answer choices, such as grammar or familiar vocabulary.

Once the main categories were established, the researchers applied axial coding to refine these categories and explore the relationships between them. For example, students who used elimination strategies often also reported relying on contextual clues to make a final decision. In contrast, students

who engaged in random guessing typically reported high levels of test anxiety, which seemed to inhibit their ability to use more strategic guessing techniques.

3.12. Examples of Coded Responses

For instance, one high-proficiency student described their process of eliminating two incorrect options before making a guess based on grammatical consistency between the remaining choices. This type of educated guessing was coded under both the elimination strategies and relying on contextual clues categories, demonstrating the student's ability to apply multiple strategies when guessing.

Another student, who identified as having moderate anxiety, recounted how they guessed the answer to a vocabulary question by recalling a similar word they had encountered in a previous reading exercise. This response was coded under educated guessing, as it involved partial knowledge and an attempt to infer the correct answer.

Conversely, a low-proficiency student with high anxiety reported frequently guessing without any thought process, simply picking answers at random when they felt overwhelmed. This was classified as random guessing, highlighting the role of anxiety and language barriers in preventing the student from employing more effective strategies.

3.13. Exploring Cognitive and Emotional Influences

The thematic coding revealed distinct cognitive and emotional influences on participants' guessing behaviors. Educated guessing, for example, was often linked to higher cognitive engagement and the use of working memory to recall partial knowledge or apply inferencing skills. Students who used educated guessing tended to report higher confidence levels in their survey responses and were generally more successful on the test.

In contrast, students who engaged in random guessing frequently cited test anxiety and cognitive overload as the primary reasons for their behavior. These students struggled to process the test content due to heightened anxiety, which often led them to guess impulsively rather than applying any logical reasoning.

The qualitative data also shed light on the emotional triggers that led to guessing. For example, several participants described how their anxiety increased toward the end of the test, as they realized they were running out of time. This time pressure often resulted in more frequent random guessing, even among students who had previously been using elimination strategies or contextual clues earlier in the test.

3.14. Integration of Quantitative and Qualitative Data

By combining the quantitative results from the test scores and survey with the qualitative insights from the interviews, the researchers were able to paint a more comprehensive picture of the factors driving guessing behavior. The mixed-methods approach revealed not only statistical trends but also the cognitive and emotional processes underlying these trends.

For instance, the quantitative analysis showed a clear correlation between language proficiency and educated guessing, while the qualitative analysis provided specific examples of how students employed partial knowledge or contextual clues to make informed guesses. Similarly, the quantitative data on test anxiety was enriched by the qualitative findings, which illustrated how anxiety disrupted students' cognitive functioning and led to random guessing.

In conclusion, the mixed-methods analysis allowed for a more nuanced understanding of guessing behaviors, revealing the complex interplay between language proficiency, test anxiety, and the use of different guessing strategies. This approach highlighted the importance of addressing both cognitive and emotional factors in test design and language instruction, as both play critical roles in shaping students' performance on multiple-choice assessments.

4. Findings

4.1. The Spectrum of Guessing Behaviors

The findings of this study reveal a wide spectrum of guessing behaviors among the participants, ranging from blind guessing to highly strategic, knowledge-based guessing. For many students, guessing was not a random act of selecting an answer without any thought, but rather a calculated response to the uncertainty they faced during the test. This variation in guessing strategies demonstrates that students engage in guessing based on several factors, including their language proficiency, test anxiety, and familiarity with the content of the test.
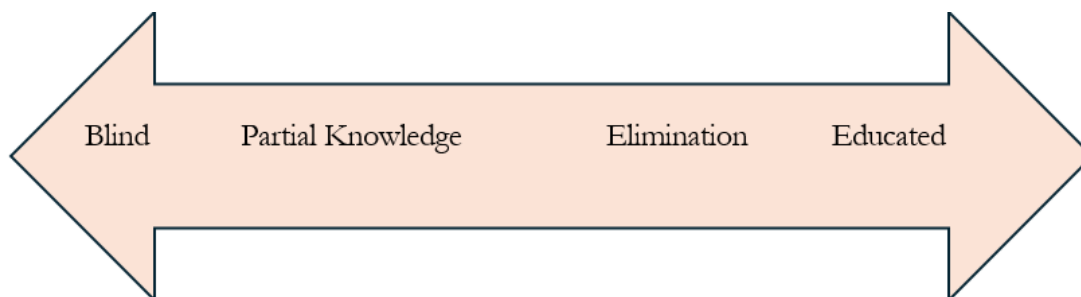

Figure 1.
Types of guessing in multiple choice tests.

4.2. Educated Guessing: Strategic Use of Partial Knowledge and Contextual Clues

Participants with higher language proficiency were more likely to engage in educated guessing, where they used partial knowledge or contextual clues to infer the correct answer. This strategic guessing aligns with Piontek's (2008) findings that language proficiency enhances a student's ability to make informed guesses, even when they do not fully understand the question or all of the answer choices. Educated guessing often involves eliminating clearly incorrect answers and narrowing the possibilities, based on either grammatical consistency, logical reasoning, or prior knowledge.

For example, a high-proficiency participant encountered a vocabulary question where they were unfamiliar with the word "peripheral." In the interview, the student explained that they did not know the exact meaning but could eliminate two answer choices that did not fit with the surrounding context. This participant recognized that "peripheral" was describing something non-essential, based on how the word was used in the sentence, and guessed the correct answer by using contextual reasoning and logical elimination. This type of educated guessing reflects a deeper cognitive engagement with the material, even when the participant lacks complete certainty.

Another high-proficiency participant described a similar process during a grammar-focused question. The question asked which form of the verb was correct in a sentence. The student, although unsure of the correct form, was able to eliminate two options by identifying that they were grammatically inconsistent with the sentence structure. The remaining two choices were more challenging, but the student made an educated guess by considering the verb tense used earlier in the passage. This example underscores the importance of grammatical knowledge and test-taking strategies in guiding educated guesses.

4.3. Guessing with Partial Knowledge: Language Attrition Influence

Adding to the spectrum, Guessing with Partial Knowledge often results from language attrition, where students' diminished use or exposure to the language over time affects their ability to fully retrieve and apply language knowledge. This type of guessing occurs when students have a foundational understanding of the language and the topic but cannot recall specific details or vocabulary. Instead, they rely on their residual knowledge to make a guess that is more informed than a blind guess but less precise than educated guessing.

For instance, a student might remember the general rule for past tense verbs but not recall the irregular past tense form of a specific verb when faced with a question. In this case, the student might guess based on the most common past tense endings they recall, such as "-ed," applying their partial knowledge in the absence of complete recall. This type of guessing demonstrates how students navigate the decay of language skills by relying on broader linguistic patterns or rules they still remember.

4.4. Blind Guessing: A Response to Unfamiliar Vocabulary and Complex Structures

In contrast, participants with lower proficiency levels were more likely to engage in blind guessing, particularly when they encountered unfamiliar vocabulary or complex sentence structures that exceeded their comprehension abilities. Blind guessing occurs when students choose an answer without any strategic thought process—simply selecting an option at random because they are unable to apply any relevant knowledge or strategy.

However, even in cases of blind guessing, the data suggest that this process was rarely entirely random. Many lower-proficiency students exhibited surface-level strategies, such as choosing answers that seemed more familiar or avoiding options that appeared more complicated. For example, a participant with lower proficiency admitted in their interview that when they encountered a question with unfamiliar words, they chose the answer that contained the fewest difficult words. This choice was not completely random but was based on a superficial test-wiseness strategy—selecting what appeared to be the most understandable option. This suggests that even low-proficiency students attempt to minimize risk by applying basic heuristics, rather than engaging in truly blind guessing.

4.5. Elimination Strategies: A Middle Ground

Interestingly, even students who generally exhibited lower proficiency occasionally employed elimination strategies, particularly when faced with questions that involved basic grammatical structures or more familiar content. These students, though they might not have understood the full meaning of the question or all of the answer choices, were able to rule out certain options based on general language rules or logical inconsistencies.

For instance, one participant with limited vocabulary knowledge shared that they were able to eliminate two answer choices on a reading comprehension question because the options did not make sense in the context of the sentence. Although this student did not fully understand the passage, they recognized that certain choices were illogical, leading them to guess between the remaining two options. This type of partial elimination demonstrates that even students with limited language skills can engage in strategic decision-making when the content is familiar or when the question allows for the application of basic reasoning.

4.6. Confidence and Cognitive Abilities in Guessing

Across the spectrum of guessing behaviors, a common theme emerged: guessing is rarely a completely random process. Instead, it is shaped by the student's cognitive abilities and their confidence in their knowledge. Participants who felt more confident in their ability to understand parts of the question or who could recall related grammatical rules were more likely to engage in educated guessing, while those who were unsure or lacked confidence in the content tended toward blind guessing.

For example, one intermediate-level student explained that their confidence fluctuated throughout the test. In sections where they felt they had a strong grasp of the topic; they would take the time to eliminate incorrect answers and make a reasoned guess. However, in more difficult sections, where their knowledge was weaker, they felt pressure to guess quickly and move on, often resulting in random guesses. This fluctuation in confidence highlights the dynamic nature of guessing behavior, as it is influenced not only by language proficiency but also by the perceived difficulty of the question and the student's emotional state during the test.

4.7. Test Design and Pedagogical Implications

The spectrum of guessing behaviors observed in this study has important implications for both test design and pedagogical practices. Traditional multiple-choice tests often assume that guessing is either random or uninformed, and many scoring systems penalize students for incorrect guesses. However, the findings of this study suggest that guessing is often a cognitively complex process, where students apply various strategies based on their partial knowledge, reasoning abilities, and test-wiseness.

This insight suggests that test designers should consider adopting scoring models that differentiate between educated guessing and random guessing. For example, confidence-based scoring, where students rate how certain they are about their answers, could provide a more nuanced assessment of their knowledge and test-taking strategies. Similarly, offering partial credit for students who eliminate incorrect answers or demonstrate logical reasoning in their guesswork could lead to more accurate measurements of student performance.

For educators, the findings underscore the importance of teaching students strategic test-taking skills, including how to use elimination strategies, contextual clues, and grammatical reasoning when they are unsure of an answer. By focusing on these cognitive strategies, teachers can help students reduce their reliance on blind guessing and increase their ability to engage in educated guessing, even when their language proficiency is not fully developed.

In summary, the findings of this study illustrate that guessing behavior in multiple-choice tests is a multifaceted process, influenced by a student's language proficiency, confidence, and cognitive abilities. Educated guessing is more common among higher-proficiency students, while lower-proficiency students may engage in a mix of random guessing and basic elimination strategies, depending on the content of the question. These insights offer valuable guidance for both test developers and educators looking to create fairer, more accurate assessments that account for the wide range of guessing behaviors exhibited by students.

4.8. The Role of Partial Knowledge in Guessing

One of the most significant findings of this study is the role of partial knowledge in shaping guessing behavior, particularly for students with moderate to higher language proficiency. Instead of resorting to blind guessing, many students leveraged their partial understanding of grammar, syntax, and vocabulary to make educated guesses. This aligns with Huang & Eslami's (2013) argument that guessing is often a reflection of incomplete but strategic knowledge rather than ignorance.

For example, one intermediate-level student explained during their retrospective interview that they were unsure of the exact meaning of the word "notorious" in a multiple-choice question, but they were able to eliminate two answer choices based on their understanding of English sentence structure. The student reasoned that because "notorious" was paired with a negative verb, the answer choices that conveyed a positive connotation were likely incorrect. This student eventually guessed the correct answer based on the grammatical clues in the sentence, demonstrating how partial knowledge can guide strategic guessing.

Another student with a strong grasp of English prefixes and suffixes used this knowledge to infer the meaning of the word "disenfranchise" during a vocabulary question. While they had never encountered the word before, they recognized the prefix "dis-" as indicating negation or removal, and from there, they guessed that the correct answer must relate to depriving someone of something. Although they did not know the full definition, their ability to break down the word and apply partial linguistic knowledge allowed them to make an educated guess.

This type of strategic guessing was common among students with moderate to high language proficiency, particularly in questions that involved contextual clues. By drawing on grammatical consistency or knowledge of word roots and affixes, these students could reduce the likelihood of guessing incorrectly, even when their knowledge of the subject matter was incomplete. This finding supports Piontek's (2008) observation that language proficiency enhances a student's ability to make informed guesses, as proficient students are better equipped to use contextual and structural knowledge to navigate uncertainty.

4.9. The Influence of Language Proficiency on Guessing

The study confirmed a strong correlation between language proficiency and guessing behavior. Students with higher proficiency levels were significantly more likely to engage in educated guessing, drawing upon their understanding of English grammar, syntax, and vocabulary to make logical choices. This contrasts sharply with the behavior of lower proficiency students, who tended to guess more randomly, particularly when they encountered unfamiliar or complex material.

For example, during the analysis of the test results, one high-proficiency student successfully navigated a difficult reading comprehension question by eliminating answers that didn't fit the logical flow of the passage. Although the student admitted in the interview that they were unsure of the correct answer at first, they were able to rely on their understanding of transitional phrases to eliminate options that disrupted the logical sequence of the text. This type of logical deduction exemplifies how proficient students are more adept at using test-taking strategies to compensate for gaps in their knowledge.

In contrast, a lower proficiency student shared that they often relied on the "longest answer is correct" strategy when they felt overwhelmed by difficult vocabulary questions. This student described how, when faced with unfamiliar content, they tended to choose the longest option because it seemed like a more "detailed" or "elaborate" answer. While this is an example of test-wiseness rather than an intellectual strategy, it highlights how students with lower proficiency often resort to superficial guessing strategies when they lack the linguistic skills to engage with the test content meaningfully.

Interestingly, even lower-proficiency students occasionally employed basic elimination strategies, particularly in questions where they could recognize obviously incorrect answers. For instance, one participant was able to eliminate two of the four answer choices on a grammar question based on their understanding of subject-verb agreement, even though they struggled with the more nuanced parts of the sentence. This suggests that even low-proficiency students have the capacity to engage in strategic guessing under certain conditions, especially when the question touches on basic grammatical principles they are familiar with.

This distinction between educated guessing and random guessing highlights the critical role that language proficiency plays in shaping guessing behavior. Higher proficiency students are more likely to use cognitive strategies to navigate unfamiliar content, while lower proficiency students often rely on chance or test-wiseness strategies when they encounter difficult material.

4.10. The Impact of Test Anxiety on Guessing

The study also revealed that test anxiety had a substantial impact on participants' guessing behavior, with high levels of anxiety often leading to more random guessing. Participants who reported high levels of anxiety in the post-test survey were far more likely to guess impulsively, particularly as the test progressed and the pressure to finish on time increased.

For instance, one student described how, by the final 10 minutes of the test, they felt so overwhelmed by the time constraint that they started guessing on almost every question, regardless of whether they understood the content or not. This type of behavior was especially prevalent among students with high levels of anxiety, who often reported feeling panicked and unable to focus on the logical process of elimination. These students frequently described feeling that they "blanked out" during the test, a finding consistent with Eysenck et al. (2007), who posited that high anxiety impairs cognitive functioning and inhibits decision-making abilities.

Interestingly, students with moderate levels of anxiety often reported a different pattern. Rather than feeling overwhelmed, some participants said that the moderate pressure of the test helped them to focus more intently on each question, encouraging them to engage in educated guessing even when they were unsure. One student explained in their interview that the test felt like a "puzzle" they had to solve, and this heightened their attention, leading them to carefully evaluate the answer choices before making a guess. In this sense, moderate anxiety acted as a motivating factor, sharpening the student's focus and improving their ability to engage with the material.

This aligns with the Yerkes-Dodson (1908) Law, which suggests that a moderate level of arousal can improve cognitive functioning by increasing alertness and attention, whereas too much anxiety has the opposite effect. The results of this study confirm this theory, as participants with moderate anxiety were often able to use their anxiety to enhance their test performance through more strategic guessing. However, students with high anxiety were more likely to feel overwhelmed by the complexity of the questions, leading them to guess blindly rather than take the time to consider each option. This type of guessing was especially common in the final stages of the test, when time pressure heightened the students' stress, leaving them little opportunity to engage in more thoughtful decision-making.

4.11. Gender Differences in Guessing Behavior

The findings also revealed gender differences in guessing behaviors, with female participants more likely to engage in educated guessing and male participants more prone to impulsive or random guessing. This gender disparity may be linked to broader educational patterns, as previous research has shown that female students tend to adopt more cautious, methodical approaches to test-taking (Nevo, 1989), while male students are more likely to take risks and guess impulsively when they encounter difficult or unfamiliar content.

For example, one female participant explained that she often re-read the question-and-answer choices multiple times before making a guess, even when she was unsure of the correct answer. This careful, deliberate approach was common among female participants, many of whom described using strategies such as elimination or contextual inference to guide their guesses. In contrast, male participants were more likely to guess quickly when they were uncertain, relying on gut instinct or surface-level features of the answer choices, such as length or familiarity of certain words.

These gender differences in guessing behavior have important implications for test design and pedagogical strategies. Female students may benefit from assessments that reward careful consideration and penalize random guessing, while male students may need additional support in developing more strategic test-taking strategies. For example, teaching male students how to use elimination techniques and contextual clues could help reduce their reliance on impulsive guessing and improve their overall performance.

Moreover, these gender dynamics suggest that educators should be mindful of how test conditions (such as time limits or the complexity of the questions) may affect male and female students differently, leading to different patterns of guessing behavior. By acknowledging these differences, educators can create more equitable assessment environments that support all students in performing to the best of their abilities.

5. Conclusion

The findings from this study reveal a comprehensive and intricate spectrum of guessing behaviors among Saudi EFL learners, extending from random selections to sophisticated, informed guesses. The introduction of "Guessing with Partial Knowledge" due to language attrition has underscored how residual knowledge affects guessing behavior, bridging the gap between blind guessing and more deliberate strategies like educated guessing and elimination methods.

Language proficiency significantly influences the likelihood of engaging in complex guessing strategies, with more proficient student's adept at using educated guesses that harness linguistic knowledge and contextual clues. In contrast, students with lower proficiency often resort to simpler guessing methods, though they occasionally demonstrate basic elimination strategies. Gender differences also played a significant role, with female students generally adopting more cautious and methodical approaches to guessing, while male students were more likely to guess impulsively.

Moreover, the study highlighted that test anxiety impacts guessing behaviors variably; high anxiety often leads to more frequent random guessing, whereas moderate anxiety can enhance focus and support strategic guessing.

These insights call for tailored educational practices that address both cognitive and emotional aspects of test-taking, as well as the distinct approaches of male and female students. By fostering instructional methods that enhance language skills to combat attrition and equipping students with effective test-taking strategies, educators can help learners navigate the complexities of guessing and improve their overall test performance. This comprehensive approach not only acknowledges but actively leverages the dynamics of gender, anxiety, and proficiency in test environments, offering a more effective framework for supporting diverse learner needs in EFL contexts.

References

[1]   AlQahtani, M. (2005). *The use of vocabulary learning strategies by EFL learners at three different educational levels.* Unpublished PhD thesis. University of Essex.

[2]   Akeroyd, M A. (1982). Progress in Multiple Choice Scoring Methods, 1977/81. Routledge, 6(3), 86-90. https://doi.org/10.1080/0309877820060310

[3]   Burton, R. (2002). Misinformation, partial knowledge and guessing in true/false tests. Wiley, 36(9), 805-811. https://doi.org/10.1046/j.1365-2923.2002.01299.x

[4]   Bush, M. (2006). Quality assurance of multiple-choice tests. Emerald Publishing Limited, 14(4), 398-404. https://doi.org/10.1108/09684880610703974

[5]   Eysenck MW, Derakshan N, Santos R, Calvo MG. Anxiety and cognitive performance: attentional control theory. *Emotion*, 7(2):336-53. https://doi:10.1037/1528-3542.7.2.336.

[6]   Frary, R B., Cross, L H., & Lowry, S R. (1977). Random Guessing, Correction for Guessing, and Reliability of Multiple-Choice Test Scores. Taylor & Francis, 46(1), 11-15. https://doi.org/10.1080/00220973.1977.11011603

[7]   Guo, H., Rios, J A., Haberman, S J., Liu, O L., Wang, J., & Paek, I. (2016). A New Procedure for Detection of Students' Rapid Guessing Responses Using Response Time. Taylor & Francis, 29(3), 173-183. https://doi.org/10.1080/08957347.2016.1171766

[8]   Guthrie, M W., Zhang, T., & Chen, Z. (2020). A tale of two guessing strategies: interpreting the time students spend solving problems through online log data. https://doi.org/10.1119/perc.2020.pr.guthrie

[9]   Huang, S., & Eslami, Z R. (2013). The Use of Dictionary and Contextual Guessing Strategies for Vocabulary Learning by Advanced English-Language Learners. Canadian Center of Science and Education, 3(3). https://doi.org/10.5539/ells.v3n3p1

[10]   Nevo, N. (1989). Test-taking strategies on a multiple-choice test of reading comprehension. *Language Testing*, 6(2), pp. 199-215.

[11]   Piontek, M E. (2008). BEST PRACTICES FOR DESIGNING AND GRADING EXAMS. https://www.edu.uwo.ca/graduate-education/lead_ta/legacy_project_2014/documents/PRINTpg9.pdf

[12]   Plake, B S., Wise, S L., & Harvey, A L. (1988). Test-taking behavior under formula and number-right scoring conditions. *Springer Science+Business Media*, 26(4), 316-318. https://doi.org/10.3758/bf03337668

[13]   Sideridis, G D., Tsaousis, I., & Harbi, K A. (2017). Improving Measures via Examining the Behavior of Distractors in Multiple-Choice Tests. *SAGE Publishing*, 77(1), 82-103. https://doi.org/10.1177/0013164416637107

[14]   Sweller, J. (1988), Cognitive Load During Problem Solving: Effects on Learning. *Cognitive Science*, 12: 257-285. https://doi.org/10.1207/s15516709cog1202_4

[15]   Thorndike, E. L. (1922). *The psychology of arithmetic*. MacMillan Co. https://doi.org/10.1037/11080-000

[16]   *Yerkes RM, Dodson JD (1908). The relation of strength of stimulus to rapidity of habit-formation. Journal of Comparative Neurology and Psychology. 18(5): 459–482. doi:10.1002/cne.920180503.*