AN INTERPLAY OF BILINGUALISM ON LANGUAGE SKILLS AND COGNITIVE FUNCTIONS AMONG SAUDI INTERNATIONAL SCHOOL STUDENTS

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by

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LIST OF ABBREVIATIONS

BICS	Basic Interpersonal Communicative Skills
CALP	Cognitive Academic Language Proficiency
EPT	English Proficiency Test
FDS	First-Dimension Size
GAT	General Aptitude Test
GCSE	General Certificate of Secondary Education
GJT	Grammaticality or Acceptability Judgment Tasks
LCDH	Linguistic Coding Differences Hypothesis
SES	Socioeconomic Status
ST	Stroop Task
TOEFL	Test of English as a Foreign Language
TOMAL	Test of Memory and Learning
VWM	Verbal Working Memory
WM	Working Memory

LIST OF APPENDICES

KAJIAN TENTANG KESAN DWIBAHASA TERHADAP KEMAHIRAN BAHASA DAN FUNGSI KOGNITIF DALAM KALANGAN PELAJAR SEKOLAH ANTARABANGSA ARAB SAUDI

ABSTRAK

Kajian ini menyiasat pengaruh penguasaan bahasa pertama (L1) terhadap perkembangan bahasa kedua (L2) dan fungsi eksekutif di kalangan pelajar antarabangsa Saudi, menyumbang kepada bidang bilingualisme dan psikologi kognitif. Berdasarkan Hipotesis Ambang dan Ketergantungan Cummins, penyelidikan ini menekankan keperluan untuk menguasai kedua-dua bahasa untuk mencapai manfaat kognitif, manakala penguasaan L1 yang lebih tinggi meningkatkan pembelajaran L2. Mengatasi kekosongan kritikal dalam literatur sedia ada, kajian ini menumpukan kepada populasi yang berbahasa Arab, yang secara tradisinya kurang diterokai dalam kajian bilingual. Sampel 220 pelajar lelaki sekolah menengah dipilih untuk menilai penguasaan mereka dalam bahasa Arab dan Inggeris serta prestasi kognitif mereka melalui tugas seperti Tugas Stroop dan penilaian kelancaran lisan, menggunakan ujian TOEFL dan GCSE untuk penguasaan bahasa. Analisis statistik menunjukkan korelasi positif antara penguasaan bahasa Arab (L1) dan prestasi bahasa Inggeris (L2), menyokong Hipotesis Ketergantungan. Bilingual seimbang mengatasi semi-bilingual dalam tugas kognitif, terutamanya dalam pengambilan leksikal dan kelancaran fonemik, manakala tiada korelasi yang signifikan ditemui dengan status sosioekonomi, pendidikan dan pekerjaan ibu bapa, atau usia pendedahan awal L2. Penemuan ini menyoroti kompleksiti hasil kognitif bilingual dan kepentingan mempertimbangkan keperluan spesifik tugas dan klasifikasi bilingual dalam penyelidikan akan datang.

AN INTERPLAY OF BILINGUALISM ON LANGUAGE SKILLS AND COGNITIVE FUNCTIONS AMONG SAUDI INTERNATIONAL SCHOOL STUDENTS

ABSTRACT

This study investigates the influence of first language (L1) proficiency on second language (L2) development and executive functioning among Saudi international students, contributing to bilingualism and cognitive psychology. Grounded in Cummins' Threshold and Interdependence Hypotheses, the research underscores the necessity of mastering both languages to achieve cognitive benefits, while higher L1 proficiency enhances L2 learning. Addressing a critical gap in existing literature, this study focuses on Arabic-speaking populations traditionally underexplored in bilingual studies. A sample of 220 male secondary school students was selected to assess their proficiency in Arabic and English and their cognitive performance through tasks such as the Stroop Task and verbal fluency assessments, utilizing TOEFL and GCSE tests for language proficiency. Statistical analysis revealed a positive correlation between Arabic proficiency (L1) and English performance (L2), supporting the Interdependence Hypothesis. Balanced bilinguals outperformed semi-bilinguals in cognitive tasks, particularly in lexical retrieval and phonemic fluency. At the same time, no significant correlations were found with socioeconomic status, parental education and occupation, or age of initial L2 exposure. These findings highlight the complexity of bilingual cognitive outcomes and the importance of considering task-specific demands and bilingual classifications in future research.

CHAPTER 1

INTRODUCTION

1.1 Introduction

Globalization has facilitated closer connections among diverse societies in today's interconnected world, leading to frequent communication and interaction between different cultures (Hamers & Blanc, 2000). This increased diversity has given rise to bilingualism, which is defined as the adept use of two languages (Grosjean, 2010). Bilingualism holds particular significance in regions where two languages coexist as dominant forms of communication (Baker, 2011). In such environments, individuals predominantly communicate using these two languages, making bilingualism more pertinent than multilingualism, which encompasses proficiency in three or more languages (Cenoz & Gorter, 2009). A focus on bilingualism allows for a detailed examination of the cognitive, social, and educational dynamics associated with this specific mode of language use. This focus enhances comprehension of how individuals navigate their bilingual contexts and sheds light on the effects on cognitive development and cultural interactions (Bialystok, 2001; Kecskes, 2007).

Bilingualism initially faced criticism due to its potential negative impact on cognitive development (Peal & Lambert, 1962). Consequently, parents hesitated to raise bilingual children during this period, fearing adverse cognitive outcomes such as linguistic confusion, verbal deficiencies, and social barriers (Diaz, 1983; Tsushima & Hogan, 1975). These critiques of bilingualism were prevalent when monolingualism was the norm and bilingualism was not widely accepted (Baker & Wright, 2021; Grosjean, 2020; Heller, 2018; Sánchez, 2023). Cummins (1979) asserts that the challenge in demonstrating the advantages of bilingualism among scholars may be

attributed to deficient research methodologies and the oversight of crucial variables such as language proficiency, parental socioeconomic factors, and gender. Consequently, researchers have undertaken a series of studies to explore the influence of bilingualism on cognitive development. The outcomes of these studies suggest that bilingualism confers numerous cognitive benefits, including heightened complex mental processes, enhanced executive function, improved attention, verbal working memory, mental flexibility, and superior control over cognitive processes such as planning, organizing, and executing tasks (Degirmenci et al., 2022; Nguyen et al., 2023; Takakuwa, 2000).

This ongoing discourse regarding the association between bilingualism and cognitive development has prompted researchers to delve deeper into two influential frameworks: the Interdependence Hypothesis and the Threshold Hypothesis, initially posited by Cummins (Cummins & Marks, 2020; Louis et al., 2023). The Interdependence Hypothesis focuses on the impact of the first language on developing the second language. The Interdependence Hypothesis, proposed by Jim Cummins, posits that developing a second language (L2) is closely tied to the proficiency and development of a person's first language (L1). This hypothesis emphasizes that the skills, knowledge, and cognitive abilities acquired through L1 can significantly facilitate the acquisition and mastery of L2, rather than existing as separate, isolated processes. The Threshold Hypothesis examines how bilingualism may enhance the development of cognitive functions (Cummins, 1981; Bialystok, 2001; Collier & Thomas, 2017). Cognitive function refers to a range of mental processes encompassing the ability to think, learn, remember, solve problems, and make decisions. It includes various cognitive abilities such as attention, which is the capacity to focus on specific stimuli or tasks while ignoring distractions. Memory also plays a crucial role,

involving the ability to encode, store, and retrieve information across short-term and long-term periods.

This study investigates the relationship between these hypotheses and the cognitive performance of male international secondary school students in Saudi Arabia, specifically examining the interplay between their bilingual proficiency and various cognitive tasks. Valian (2015) emphasizes the importance of addressing multiple cognitive tasks to comprehend the impact of different tasks on performance. This study encompasses four cognitive tasks: grammatical judgment tasks, backward digit recall tasks, verbal fluency tasks, and the Stroop task. Moreover, Hammer (2011) emphasizes the importance of accounting for demographic variables that may influence cognitive development in bilingualism studies. These variables may encompass parental socioeconomic status (SES), the age at which the second language (L2) is initially encountered, and the parents' educational levels and occupations. The present study also considers an analysis of these factors on cognition.

This research focuses exclusively on male participants for several justifiable reasons. First, cultural norms and gender dynamics in Saudi Arabia often influence educational opportunities and access to resources, with males typically having greater access to specific educational environments. By concentrating on a homogeneous group, the study aims to control for these cultural variances and their potential impact on language acquisition and cognitive performance. Additionally, the research focuses on understanding cognitive outcomes and language proficiency benefits from analyzing a defined demographic without the added complexities of gender differences in socialization and educational experiences. Preliminary pilot studies may have indicated distinctive characteristics in language acquisition among males, justifying a deeper exploration of this group. Limiting the sample also helps control for

confounding variables, as female language development experiences may vary significantly due to societal expectations and roles. Furthermore, this male-only focus establishes a foundational understanding of the phenomenon within this particular demographic, paving the way for future research exploring female language acquisition and cognitive functioning. Lastly, practical constraints, such as recruitment and ensuring study consistency in contexts where gender segregation is common, further support this decision. Overall, while focusing on male participants directs attention to a specific demographic, it is a strategic decision to generate coherent findings amidst the complex interplay of language, culture, and cognitive function.

1.2 Background of the Study

Bilingualism involves the proficient use of two languages, which encompasses both receptive skills (listening and reading) and expressive skills (speaking and writing) (Grosjean, 2010). This linguistic proficiency can be categorized into three distinct types: balanced bilinguals, who demonstrate equivalent proficiency in both languages; dominant bilinguals, who exhibit a greater degree of competence in one language; and semi-bilinguals, who possess limited proficiency in one of their languages (Baker, 2011; Chen & Leung, 2018). A comprehensive understanding of the impact of bilingualism necessitates examining associated cognitive skills, which pertain to the mental processes through which individuals acquire, retain, and interpret knowledge based on thought, experience, and sensory input (Kail & Ferrer, 2007). These cognitive competencies encompass linguistic abilities and critical executive functions that enhance problem-solving and reasoning skills, including attention and memory (Bialystok, 2017; Li et al., 2020). A substantial body of research has validated

the significant advantages of bilingualism for cognitive development (AlGanim, 2000; Al-Ahmari, 1992; Al-Nasser, 1991; Ashofteh et al., 2023; Sun, 2022).

Despite these recognized advantages, early research suggested that bilingualism might have negative implications for cognitive functioning, which refers to various mental processes such as attention, problem-solving, memory, and decision-making, or might not confer any cognitive benefits (Goriot et al., 2021; Pelham & Abrams, 2014).

Due to methodological deficiencies, Wei (2012) contended that these studies failed to establish a relationship between bilingualism and cognitive development. Moreover, these studies often lack homogeneity regarding socioeconomic status, educational background, parental occupations, and the age of second language exposure (Prior & Gollan, 2011). Additionally, the predominant focus of these inquiries has been on direct comparisons among various forms of bilingualism and the requisite level of bilingual proficiency necessary for the acquisition of cognitive advantages (Abutalebi & Rietbergen, 2014; Iluz-Cohen & Armon-Lotem, 2013; Marian et al., 2014; Pivneva et al., 2012; Veivo & Järvikivi, 2012). The intricate relationship between bilingualism and cognition has captivated researchers for over a century, leading to a dynamic and evolving field of inquiry (Xie & Zhou, 2020). This complexity is further compounded by ongoing debates regarding how bilingualism affects cognitive processes, with evidence yielding both affirmative and negative outcomes across varying studies (Abdelgafar & Moawad, 2015; Bialystok, 2017; Lehtonen et al., 2018; Paap & Greenberg, 2013). Consequently, a nuanced understanding of how bilingualism influences cognitive development remains a complex domain requiring further exploration, as it involves various interacting factors such as cognitive processes, individual differences in language proficiency,

demographic variables, and the context in which bilingualism is experienced. These complexities can lead to differing outcomes and interpretations in research findings.

Many scholars argue that the Threshold Hypothesis plays a crucial role in understanding how proficiency in two languages fosters cognitive growth (Lasagabaster, 2001; Nadzir & Halim, 2022; Siame, 2022; Weiss et al., 2020; Wei et al., 2022). This hypothesis posits that individuals must achieve specific thresholds of language proficiency for the cognitive advantages associated with bilingualism to manifest. Therefore, employing this hypothesis as a framework, this study investigates how bilingualism in Arabic and English influences cognitive abilities, including inhibitory control, working memory, metalinguistic skills, and lexical retrieval.

Numerous scholars argue that language development is not directly linked to cognitive development (Morgan et al., 2020). As a result, the inconsistencies found in previous research can be primarily attributed to two key factors: the demographic characteristics of bilingual individuals and the cognitive tasks used in studies (Van den Noort, Struys, et al., 2019; Marton, 2016).

This study examines key demographic variables, including socioeconomic status (SES), educational level, parental occupation, and the age at which individuals first learn a second language (L2). These factors may significantly impact the cognitive development of bilingual students attending international schools in Saudi Arabia (Bialystok & Shorbagi, 2021; Hirsch & Kayam, 2020; Pfenninger, 2020; Uth & Martinez Garcia, 2022).

Additionally, the study will explore the relationship between four cognitive assessments: grammatical judgment tasks, backward digit recall tasks, verbal fluency tasks, and the Stroop task. It will specifically analyze the bilingualism levels of

students in Grades 9–12 at a Saudi international school. This includes balanced bilinguals (who are proficient in both Arabic and English), dominant bilinguals (who excel in one language over the other), and semi-bilinguals (who have limited proficiency in both languages). This research will systematically examine the correlation between bilingualism and cognitive development, emphasizing how proficiency in the native language (Arabic) influences competence acquisition in the second language (English). Furthermore, the study integrates Cummins' Interdependence Hypothesis (August & Shanahan, 2006), which posits that proficiency in one language can facilitate the acquisition and development of another. This perspective highlights the importance of considering both languages in understanding bilingual individuals' cognitive development and academic achievements.

This study investigates the underlying reasons for the inconsistencies observed in prior research findings regarding the cognitive benefits of bilingualism. Previous studies have shown a wide range of outcomes, with some suggesting that bilingualism enhances cognitive functions such as problem-solving and attention, while others indicate little to no advantage or even potential negative effects. These varied conclusions create confusion about the true impact of bilingualism on cognitive development.

Specifically, it examines how language proficiency categories (such as balanced, dominant, and semi-bilinguals), demographic characteristics (including socioeconomic status and parental education), and cognitive assessment types (such as verbal fluency tasks versus memory tasks) contribute to these discrepancies. Discrepancies refer to the differing results found in studies related to how unique factors, like the type of cognitive tasks used or the specific demographic profile of

participants, can lead to varying interpretations of the relationship between bilingualism and cognitive development. By focusing on these elements, this research aspires to enhance our understanding of how they influence cognitive outcomes in bilingual individuals.

1.3 Statement of the Problem

Recent years have witnessed a significant expansion in scholarly research focusing on the potential cognitive benefits of bilingualism, defined as proficiency in two or more languages (Fox et al., 2019). However, despite this growth, the literature presents conflicting findings regarding the extent and nature of these cognitive benefits, highlighting a critical issue in understanding the relationship between bilingualism and cognitive function across different demographics. This study area is driven by a growing interest in understanding how bilingualism may influence cognitive function across different demographics. Empirical studies have shown that bilingual individuals often exhibit distinctive cognitive abilities, including enhanced problem-solving skills, creativity, and pattern recognition. However, some research suggests that these advantages may not be universally applicable, with other studies indicating that bilingualism may adversely affect cognitive development (Calabria et al., 2011; Paap & Greenberg, 2013) or that it has no clear impact on cognitive functioning at all (Hilchey & Klein, 2011; Paap, 2019; Prior & Gollan, 2013). These abilities are vital for successfully navigating complex tasks in a multicultural and multilingual world. These advantages are attributed to the necessity for bilinguals to navigate language choices within various contexts, which occurs subconsciously and demands substantial cognitive flexibility and mental agility (Ballarini et al., 2023; Carlson & Meltzoff, 2008; Costa et al., 2008; Javier, 2007; Jumani et al., 2024; Kroll

& Bialystok, 2013; Martin & Bialystok, 2004; Morales et al., 2013; Sharofova, 2024). However, the previously positive correlation between bilingualism and cognitive control has recently been reassessed, suggesting that bilingualism may hurt cognitive development (Calabria et al., 2011; Paap & Greenberg, 2013). In contrast, other studies have concluded that bilingualism neither positively nor negatively impacts cognitive functioning (Hilchey & Klein, 2011; Paap, 2019; Prior & Gollan, 2013).

The existing literature on bilingualism presents inconsistent findings. Kroll and Bialystok (2013) have criticized the prevailing body of research for its predominant focus on comparing cognitive distinctions between bilingual and monolingual individuals (Bialystok & Craik, 2010; Kecskes, 2013; Barac et al., 2016; Valian, 2015; Cummins, 2019). This narrow focus may overlook the broader implications of bilingual experiences across different contexts. Moreover, Elbedour et al. (2019) have highlighted a critical gap in examining bilingualism across diverse cultural settings, as most prior research has been conducted within Western contexts. This geographical limitation suggests that findings may not be generalizable to non-Western populations. This highlights the need for further investigation into the effects of various forms of bilingualism on cognitive outcomes in different cultural environments. Additionally, a notable gap within the bilingualism literature is the comprehensive consideration of the multifaceted variables influencing cognitive levels, as many studies have concentrated on a limited range of factors.

Thus, this study intends to contribute to the existing literature on bilingualism by addressing the aforementioned issues and examining the potential correlation between varying levels of Arabic-English bilingualism—specifically semi-, dominant, and balanced bilinguals—and the development of executive functions, which include inhibitory control, working memory, metalinguistic abilities, and lexical retrieval.

Executive functions are essential for both academic achievement and daily decision-making processes. The investigation is grounded in Cummins' Threshold Hypothesis (2001). Notably, the current study adopts a non-comparative approach, intentionally avoiding analyses about monolingual speakers.

Furthermore, this study seeks to address the knowledge gap within the bilingualism literature by comprehensively considering a range of variables that may correlate with cognitive development, including parents' socioeconomic status (SES), age of exposure to the second language (L2), academic level, and occupation. Understanding these factors is crucial in painting a holistic picture of bilingualism's impact on cognitive outcomes. As Kroll and Bialystok (2013), Costa et al. (2017), and Li et al. (2020) have rigorously explored the relationship between cognition and various factors, this study aims to investigate all relevant variables to elucidate the underlying causes of cognitive development. In this regard, Calvo and Bialystok (2014) found that children's cognitive development is significantly influenced by their socioeconomic status (SES) and bilingualism. This indicates that SES is a contributing factor that can enhance or hinder cognitive growth in bilingual children. AlShujairi et al. (2016) argue that individuals exposed to two languages during early childhood demonstrate enhanced cognitive abilities, including improved control over their thoughts and actions. Hammer (2011) discovered that parents in education-focused occupations, such as teachers or professors, are more likely to actively promote their children’s acquisition of multiple languages by enrolling them in language classes and facilitating access to resources in various languages, which may lead to enhanced cognitive development. This emphasizes the role of parental influence in shaping a child's bilingual experience. Furthermore, this study aims to investigate whether the nature of specific cognitive tasks influences the obtained outcomes. The nature of these

tasks encompasses factors such as task complexity, the type of cognitive skills they target (e.g., memory, flexibility, attention), and whether they require verbal or nonverbal responses.

Thus, this study aims to determine whether the inconsistencies in the field arise from the specific type of bilingual speakers, the nature of the cognitive task, or demographic variables. This nuanced approach will help to clarify why different studies may report conflicting results. Moreover, many studies have employed the Interdependence Hypothesis to examine the considerable influence of proficiency in a first language, specifically Arabic, on acquiring a second language, such as English. Understanding this relationship is crucial, as it can shed light on how varying degrees of proficiency in one language may facilitate or hinder the learning of another. This hypothesis is pertinent to the current study, which seeks to elucidate the effects of varying levels of Arabic-English bilingualism on executive functions encompassing cognitive flexibility and inhibitory control. Recent research underscores that a solid foundation in the first language significantly enhances the mastery of the second language, thereby positively influencing cognitive development (Hamadouche & Blanchard, 2020; Karpava et al., 2022). Establishing this foundational link helps to reinforce the idea that bilingualism is not merely additive but interdependent. By considering the interdependence of language proficiency, this study aligns with Cummins' Threshold Hypothesis (2001) and emphasizes the critical role of first-language proficiency as a determinant of cognitive outcomes.

Consequently, this investigation will explore how robust first-language proficiency can facilitate not only the acquisition of a second language but also the enhancement of cognitive abilities, thereby contributing to a deeper understanding of the intricate dynamics between bilingualism and cognition (Jiang & Dewaele, 2020;

Tarek et al., 2024). The outcomes of this study could have significant implications for educational practices and cognitive development strategies in bilingual contexts. By systematically addressing these variables and adopting a comprehensive approach to bilingualism, this study aims to clarify the complexities surrounding cognitive development in bilingual individuals, particularly in Arabic-English bilingualism. By doing so, this study hopes to provide more precise insights into how bilingual environments foster cognitive growth and the specific conditions that optimize these benefits. Moreover, the "obtained outcomes" in this study refer to the measurable results related to cognitive abilities, such as accuracy, response time, and the ability to switch between tasks effectively. By analyzing these outcomes, this research aims to elucidate how varying task characteristics impact cognitive performance among different groups of bilingual students, thereby contributing to a deeper understanding of the relationship between bilingualism, cognitive function, and the specific contexts in which these skills are tested.

The research is prompted by the need to clarify inconsistencies in existing literature regarding the cognitive benefits of bilingualism, particularly in Arabic-English contexts. It aims to explore the influence of varying proficiency levels among bilinguals on executive functions. Additionally, the study examines the impact of demographic factors such as socioeconomic status and age of exposure to a second language. Understanding these relationships can ultimately inform educational practices to enhance cognitive development in bilingual environments.

1.4 Research Objectives

The objectives of this research are to:

1. Examine the relationship between Arabic (L1) and English (L2) proficiency in reading and writing skills among male international secondary school students in Saudi Arabia.

2. Investigate how demographic factors, including parents' occupation, academic level, nationality, and socioeconomic status (SES), influence cognitive task performance among male international secondary school students in Saudi Arabia.

3. Explore the impact of the age of exposure to the second language (L2) on cognitive development in male international secondary school students in Saudi Arabia.

4. Evaluate the effects of different cognitive tasks on the cognitive performance of male international secondary school students in Saudi Arabia.

5. Assess how bilingualism levels, demographic variables, and the type of cognitive task contribute to the inconsistencies observed in previous bilingualism research findings.

1.5 Research Questions

This study answers the following questions:

1. What is the relationship between male international secondary school students' Arabic proficiency (first language) and English proficiency (second language) in reading, listening, writing, and speaking skills?

2. What is the relationship between bilingualism and cognitive task performance among male international secondary school students in Saudi Arabia?

3. How do parents' occupation, academic level, nationality, socioeconomic status (SES)?

4. Does the age of exposure to the second language (L2) and grade level impact the cognitive development of male international secondary school students in Saudi Arabia?

5. How do different cognitive tasks affect the performance of male international secondary school students in Saudi Arabia?

6. How do bilingualism levels, demographic variables, and the type of cognitive task contribute to the inconsistencies observed in previous bilingualism research findings?

1.6 Significance of the Study

The current study's significance lies in its potential to enhance our understanding of the cognitive benefits of bilingualism, particularly in the context of Arabic-English bilingual students. By examining the correlation between varying levels of bilingual proficiency, specifically among semi-, dominant, and balanced bilinguals, and executive functions, the study aims to elucidate how language skills influence cognitive development. This focus is crucial as it addresses a notable gap in the literature regarding the specific cognitive outcomes associated with different types of bilingualism.

Furthermore, the research is grounded in Cummins' Interdependence Hypothesis, emphasizing the importance of simultaneously developing proficiency in both languages. This perspective reinforces that strong literacy skills in a student's first language can benefit their second language acquisition, improving overall academic performance. The study provides empirical evidence supporting this hypothesis and contributes to a deeper theoretical understanding of bilingualism and its cognitive implications.

Additionally, the study highlights the impact of demographic factors, such as socioeconomic status and parental involvement, on cognitive outcomes in bilingual education. By considering these variables, the research presents a more nuanced view of bilingualism beyond mere language proficiency, illustrating how various contextual factors can influence cognitive development.

Finally, this study's findings have practical implications for educators, parents, and policymakers. By demonstrating the essential role of bilingualism in developing executive functions and academic skills, the study advocates for implementing

bilingual education programs and instructional strategies that prioritize the maintenance and enhancement of both languages. This focus not only supports individual student growth but also contributes to the broader understanding of how bilingual environments can enrich educational practices and cognitive development for future generations.

1.7 The Scope of the Study

The current study is framed within Cummins's (2001) theoretical constructs of Interdependence and Threshold. The first hypothesis aims to determine whether proficiency in Arabic (L1) is a foundation for acquiring English (L2) proficiency. To evaluate this, 212 bilingual students from a single international school in Saudi Arabia participated in the General Certificate of Secondary Education (GCSE) to assess their Arabic proficiency and the English as a Foreign Language (TOEFL) test to evaluate their English skills. Based on the results, participants are classified into three categories: balanced, dominant, and semi-bilingual.

The second hypothesis examines the relationship between bilingualism categories and cognitive skills, including inhibitory control, working memory, metalinguistic abilities, and lexical retrieval, in line with the principles of the Threshold Hypothesis. This study also explores how various demographic variables—such as parents' socioeconomic status (SES), the age at which the second language was introduced, and the educational level and occupation of the parents—affect bilingual students' performance. Consequently, the focus remains on Cummins's (2001) hypotheses and four cognitive assessments: grammatical judgment tasks, backward digit recall tasks, verbal fluency tasks, and the Stroop task. These models have gained significant traction in academic and research contexts due to their efficacy in

measuring the impacts of diverse interventions and assessing cognitive abilities (CioèPeña, 2021; Efstathiou, 2021; Namakando, 2021; Sofologi et al., 2020).

To achieve the research objectives, it is essential that participants were exposed to the international school curriculum early in their educational experiences and that Arabic is their mother tongue, irrespective of nationality.

1.8 Limitation of the Study

While the current study provides valuable insights into the relationship between bilingualism and cognitive development, several limitations should be acknowledged. First, the research is confined to a single international school in Saudi Arabia, which may limit the generalizability of the findings to other contexts or educational systems. The unique environment of this school, combined with its specific curriculum and demographic profile, may not accurately reflect the experiences of bilingual students in different settings or countries. Additionally, the classification of participants into balanced, dominant, and semi-bilingual categories is based solely on their performance in specific assessments, which may not capture the full complexity and variability of language proficiency across different bilingual individuals. Furthermore, the study relies heavily on standardized assessments, including the TOEFL and the General Certificate of Secondary Education (GCSE), which may not fully account for the nuances of language acquisition and cognitive skills in real-life interactions. Inherent limitations in these assessments—such as test anxiety or cultural biases—may also impact students' performance and, consequently, the study's outcomes. Lastly, while the research aims to explore various demographic variables such as parents' socioeconomic status and educational level, it may not consider other critical factors, such as cultural influences, personal motivation, or

emotional experiences, that could also significantly affect bilingual students' cognitive skills and overall performance.

1.9 Definition of the Key Terms

This section provides concise definitions for the critical terms used in this study to facilitate a better understanding of the review literature. These terms are considered to be the building blocks of research and are, therefore, essential for grasping the subject matter thoroughly.

Cognitive Flexibility is the ability to adjust one's thoughts and actions in response to changing situations and circumstances. It is characterized by the ability to switch between different tasks or ways of thinking, solve problems creatively, and embrace new ideas (Chen et al., 2023). This skill enables individuals to approach challenges with an open mind, explore other perspectives, and adapt to changing environments. Cognitive flexibility is an attribute that helps people succeed in many areas of life, including work, school, and social relationships. This study measures cognitive flexibility using verbal fluency tasks, which assess individuals' ability to generate words within specific categories or start with particular letters. This approach provides insights into their cognitive flexibility and capacity for linguistic creativity.

Inhibitory Control is a cognitive ability that allows individuals to focus on task-relevant information while filtering out irrelevant or distracting stimuli. It involves regulating attention for successful tasks that require concentration and sustained effort (Derakshan & Eysenck, 2009). Inhibitory control is an essential executive function that enables individuals to prioritize and manage their cognitive resources effectively. This complex process requires coordinating various activities that necessitate considerable effort and practice. In this study, inhibitory control is

assessed through the Stroop task, which determines the extent to which linguistic knowledge proficiency plays a role in the mastery of attentional control.

The **Interdependence Hypothesis** emphasizes the relationship between the acquisition of the first language (L1) and proficiency in learning a foreign language

(Cummins, 2000). This hypothesis suggests that competence achieved in acquiring the L1 can impact the ability to learn any subsequent language. Essentially, the hypothesis posits that learning a second language can enhance and refine one's proficiency in the first language. This study examines the interdependence hypothesis to determine if Arabic, as the participants' first language, plays a vital role in their second language proficiency.

Metalinguistic Awareness is an essential cognitive skill that enables individuals to think about language as a separate entity and reflect upon it. It involves the ability to analyze the structural components of language, such as syntax, grammar, and vocabulary, and to use this knowledge to understand and manipulate language in different contexts (Bialystok, 2001). This study measures metalinguistic awareness using the Grammaticality Judgment Task, which evaluates participants' awareness of language structures and ability to communicate effectively in various situations.

Nonverbal Memory is a cognitive ability that enables individuals to retain and recall information related to various nonverbal stimuli, such as faces, shapes, images, songs, sounds, smells, tastes, and emotions (Harris et al., 2023). This process involves encoding, storing, and retrieving information without using spoken or written words. In this study, nonverbal memory is assessed through tasks requiring participants to remember and recognize nonverbal cues, allowing us to explore the role of bilingualism in enhancing memory capabilities.

The Threshold Hypothesis (Cummins, 2000) is a theoretical framework that elucidates how bilingualism can affect cognitive abilities. This hypothesis suggests that a bilingual speaker must achieve two distinct threshold levels to gain cognitive advantages, such as enhanced cognitive flexibility and better attention switching. Failure to accomplish these threshold levels can result in negative cognitive consequences, such as reduced cognitive control and language interference (Baker, 1988). This study explores the Threshold Hypothesis by evaluating the relationship between participants' language proficiency levels and their cognitive performance on various tasks.

Verbal Working Memory is a crucial cognitive process that temporarily allows us to store and manipulate a small amount of speech-related information (Schwering & MacDonald, 2020). It lets us briefly hold onto vital information to complete tasks or make decisions. This study examines verbal memory through tasks requiring participants to remember and manipulate verbal information.

Working Memory is a cognitive system that enables us to hold and manipulate information briefly while simultaneously performing other mental operations (Baddeley & Hitch, 1994). It is crucial to our ability to reason, solve problems, and make decisions. In this study, working memory is explored in the context of bilingualism, examining how mastery of two languages correlates with working memory capacity through various complex tasks.

1.10 The Organization of the Thesis

The study comprises five chapters, each providing a comprehensive topic analysis. Chapter One offers an overview of the research subject, including an extensive description of the problem, research objectives, research questions,

significance of the study, limitations, organizational structure, and a definition of the key terms that will be used throughout the research.

Chapter Two focuses on the theoretical underpinnings, framework studies, and related topics, explicitly addressing bilingualism, its various categories, the factors contributing to second language development, and the cognitive benefits of mastering two languages.

Chapter Three introduces the methodology employed in the research, detailing the study design, participants, data collection methods, and analytical techniques. Chapter Four presents the collected data and discusses its implications in the context of the study's objectives. Finally, Chapter Five summarizes the findings, concludes, and provides detailed recommendations for future studies, offering a roadmap for further research.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter covers essential topics directly pertinent to the study's problem. The initial section, Arabic and English Language, comprehensively reviews both languages. The subsequent section, Definitions of Bilingualism, addresses various perspectives on what constitutes bilingualism, clarifying the terminology used throughout the study. Following this, the section on Bilingualism and Cognitive Development discusses the period of positive and negative impacts of bilingualism on cognitive abilities.

The third section, Language and Cognitive Tests, provides an overview of the specific assessments employed in the study, detailing their relevance for measuring language proficiency and cognitive skills. This subheading also focuses on the Cognitive Skills employed in the study, highlighting the cognitive functions assessed through the Stroop Task, verbal fluency tasks, grammatical judgment tasks, and backward digit tasks.

The fourth and fifth sections, Theoretical and Conceptual Framework, outline the underlying theoretical constructs guiding this research, clarifying the relationships among key variables. Subsequently, the section on Theories on the Bilingualism-Cognitive Development Correlation expounds on relevant theories that explore the connections between bilingualism and cognitive development, offering insights from existing literature.

The seventh section, Influence of Demographic Variables on Cognitive Development, examines the demographic variables that may affect cognitive outcomes, including socioeconomic status, parental education levels, and age of initial exposure to the second language. The eighth section categorizes the Categories of Bilinguals, distinguishing different types of bilingualism. The ninth section presents

Studies in Bilingualism, reviewing existing research in the field and examining the Gap in Existing Research, which identifies the specific areas where further investigation is needed presented in the tenth section.

2.2 Arabic and English Language

Arabic is a Semitic language consisting of 28 letters and is written from right to left. It comprises two primary branches: the spoken dialects, often called 'Aliyah, and a formal, standardized variety known as Fusha (Anderson & Suleiman, 2009). The informal dialects serve as the everyday medium of communication across Arab countries (Wahba, 2006) and are typically acquired through natural exposure to native speakers. These dialects can vary significantly based on local influences, resulting in distinct accents and vocabulary that reflect cultural nuances and regional identities. This linguistic diversity presents challenges for standardization, as speakers may effortlessly switch between dialects and Fusha depending on the context, requiring them to develop a nuanced understanding of both forms.

Formal Arabic, or Fusha, is employed in academic, religious, and official contexts. It represents the Modern Standard Arabic variety and serves as the medium for media, literature, academia, education, and governmental communications (ScottBaumann & Cheruvallil-Contractor, 2012). In educational contexts, proficiency in Fusha is essential for students, as it is the language of instruction for formal subjects

and scholarly discourse. Moreover, fluency in Fusha connects students to rich literary and historical texts, fostering critical thinking and analytical skills essential for academic success. This proficiency enhances cognitive development and cultivates a more profound cultural appreciation among students. Consequently, the participants in the current study are assessed in Arabic (Fusha), as this form is integral to their academic growth and social interactions within the educational system.

English is recognized as the most widely used international language and plays a critical role in global communication, technology, science, and commerce, making it an invaluable asset in today's interconnected world. In Saudi Arabia, however, the community initially exhibited substantial resistance to English due to concerns that it might undermine the Arabic language, culture, and religion. This resistance lasted for decades, influencing language policy and educational practices, but it gradually shifted as the global importance of English became more apparent.

Incorporating English as a second language into the educational framework began in 1928 (Rahman, 2011), highlighting early efforts to modernize and globalize education. The introduction of English was a response to the increasing need for Saudi students to participate in global dialogues and advancements in various fields. By 1943, English education was introduced at the intermediate level, explicitly targeting grades 7-9 (Al-Ghamdi & Al-Sadat, 2002). The Ministry of Education later expanded English instruction from grade 7 to grade 12, recognizing its importance in effectively developing students' skills to engage with the global community (Mahboob & Elias, 2014). By 2003, English was officially integrated as a core subject in all primary schools (Elyas, 2008), emphasizing early language acquisition as a critical foundation for future academic and career opportunities.