

THE RELATIONSHIPS AMONG ACCULTURATION, EXECUTIVE
FUNCTIONING, AND ENGLISH LANGUAGE PROFICIENCY IN
BILINGUAL ADULTS

A DISSERTATION

SUBMITTED TO THE GRADUATE SCHOOL

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE

DOCTOR OF PHILOSOPHY

BY

LAUREN E. MOSS

DISSERTATION ADVISOR: DR. ANDREW S. DAVIS

BALL STATE UNIVERSITY

MUNCIE, INDIANA

DECEMBER 2016

ACKNOWLEDGMENTS

Throughout my graduate career, I have been fortunate to have the support and encouragement of so many wonderful people, without whom I certainly would not have made it to this point. I would like to take this time to thank these individuals and try to convey how much I truly appreciate you all. First, I would like to thank my mama. You have always encouraged me to follow my dreams and have been amazingly patient and reassuring throughout the ups and downs of graduate school. Your work ethic, passion for helping others, and joy for life are such an inspiration to me; I love you so very much.

I would like to thank my mentor and dissertation chair, Dr. Andrew Davis, for all of the support, knowledge, and opportunities you have given me. I've learned how much I know and don't know about psychology and neuropsychology because of your guidance and wisdom. Your support throughout the dissertation process and my graduate studies far surpassed what I deserved and for that, I am very grateful to you.

I would also like to thank the other members of my dissertation committee, Drs. Holmes Finch, Maria Hernández Finch, Thomas Holtgraves, and Kristin Perrone McGovern. Dr. Finch, thank you so very much for your substantial help with my statistical analyses. Dr. Hernández Finch, thank you for all of the opportunities and support you have given me throughout graduate school to become a more culturally-competent practitioner and researcher. Dr. Holtgraves, I am so grateful for all of the support, guidance, and encouragement you have given me since I asked you to be my undergraduate thesis advisor all those years ago. Last, but certainly not least, Dr. McGovern, thank you for challenging and encouraging me to think creatively during this dissertation process and in the classroom.

I would be remiss if I did not take the time to thank my cohort mates; we were such an amazing group and you all supported me in your own way. I know I would not have been able to manage the pressures of graduate school without you all and am better for having you in my life. Kurts and Reets, especially, there are not words to express how blessed I am to have your love, friendship, and support; I love you both. I would also like to thank my fantastic intern cohort at the INSPiRE Clinic and all of the wonderful ISPIC interns for being such amazing friends and colleagues during an especially trying year.

Thank you to Jared Bishop, Angela Mion, and Adele Larsson for your help in coordinating and testing participants while I was on internship. I know the data collection process took a lot longer than expected and am so grateful you all stuck with me; I would not have been able to finish my dissertation without you.

Thank you to all of my family and friends outside of school psychology for your boundless love and encouragement. To Fei, Selene, Michelle, Mo, Twin, Dana, Mike, Ashley, my Moss and Troike relatives, Kendall, the Malms, Tim (Rork and Rudolph), and so many others – you have kept me grounded and I am so moved by the support you all have shown me both professionally and personally.

Finally, I would like to take a moment to honor my dad's memory. Despite our differences, I likely would not have gone into psychology if not for you. I know how much you loved me and how proud you were of me. I'm glad you are finally at peace; I love you so very much.

TABLE OF CONTENTS

ACKNOWLEDGMENTS	ii
LIST OF TABLES	vi
CHAPTER I. INTRODUCTION	1
Overview	1
Bilingual English Language Learners	2
English Language Proficiency	5
Executive Functioning	7
Acculturation	9
Rationale of the Study	11
Significance of the Study	12
Research Questions and Hypotheses	15
CHAPTER II. REVIEW OF THE LITERATURE	18
Bilingual English Language Learners	18
English Language Proficiency	32
Factors Influencing English Language Proficiency	39
Executive Functioning	40
Acculturation	54
Conclusions	62
CHAPTER III. METHODOLOGY	63
Participants	63
Procedures	64
Instrumentation, Validity, and Reliability	64

Demographic Questionnaire	64
Wechsler Individual Achievement Test, Third Edition	65
Delis-Kaplan Executive Function System	68
Stephenson Multigroup Acculturation Scale	70
Statistical Procedures and Data Analysis	72
CHAPTER IV. RESULTS	75
Results and Analyses	75
Description of the Sample	75
Descriptive Statistics	79
Statistical Assumptions	84
Moderated Multiple Regression	87
Multiple Linear Regression	92
Summary of the Statistical Analyses	99
CHAPTER V. DISCUSSION	101
Summary of the Study	101
Discussion and Implications	105
Discussion	105
Implications	110
Delimitations and Limitations of the Study	117
Directions for Future Research	120
Conclusions	123
REFERENCES	126

LIST OF TABLES

Table 1	76
<i>Descriptive Statistics for the Sample – Age, Years Lived in the United States, Gender, Ethnicity, Income Level, Mother’s Level of Education, and Father’s Level of Education Demographic Variables</i>	
Table 2	78
<i>Descriptive Statistics for the Sample – Participants’ First and Second Languages Spoken in the Home</i>	
Table 3	79
<i>Descriptive Statistics for the Sample – Participants’ Birth Status, Native Language Education, Reading Abilities, and Writing Abilities</i>	
Table 4	82
<i>Mean and Standard Deviation Statistics for the SMAS, WIAT-III, and D-KEFS</i>	
Table 5	83
<i>Paired-Sample t-Test Analyses of Participants’ Acculturation, English Language Proficiency, and Executive Functioning Profiles</i>	
Table 6	85
<i>Independent Variable VIF Statistics for Moderated Multiple Regression Analysis</i>	
Table 7	86
<i>Independent Variable VIF Statistics for Multiple Regression Analyses</i>	
Table 8	89
<i>Correlations among Independent Variables in the Moderated Multiple Regression Model</i>	

Table 9	90
<i>Moderated Multiple Regression and Dominance Analyses Predicting WIAT-III Oral Language Composite Score from Demographic, Acculturation, and Executive Functioning Variables: Standardized and Unstandardized Regression Coefficients</i>	
Table 10.....	94
<i>Correlations among Independent Variables in the Multiple Regression Models Predicting Color-Word Interference Test: Condition 4 (Inhibition/Switching) and Proverb Test: Total Achievement Score (Free) Scores from Demographic, Acculturation, and English Language Proficiency Variables</i>	
Table 11.....	94
<i>Correlations among Independent Variables in the Multiple Regression Models Predicting Color-Word Interference Test: Condition 4 (Inhibition/Switching) and Proverb Test: Total Achievement Score (Free) Scores from Demographic and Acculturation Variables</i>	
Table 12.....	95
<i>Multiple Linear Regression Model and Dominance Analysis Predicting Color-Word Interference Test: Condition 4 (Inhibition/Switching) Scores from Demographic, Acculturation, and English Language Proficiency Variables</i>	
Table 13	96
<i>Multiple Linear Regression Model and Dominance Analysis Predicting Proverb Test: Total Achievement Score (Free) Scores from Demographic, Acculturation, and English Language Proficiency Variables</i>	

Table 1497
*Multiple Linear Regression Model Predicting Color-Word Interference Test: Condition 4
(Inhibition/Switching) Scores from Demographic and Acculturation Variables*

Table 1597
*Multiple Linear Regression Model and Dominance Analysis Predicting Proverb Test:
Total Achievement Score (Free) Scores from Demographic and Acculturation Variables*

CHAPTER I

INTRODUCTION

Overview

Racial and ethnic minorities comprise the most rapidly growing ethnic demographic in the United States (United States Census Bureau [USCB], 2012), and these individuals are more likely to be bilingual than their Caucasian peers (USCB, 2006). Further, English language learners (ELLs) are the fastest-growing population in United States schools (Ruiz Soto, Hooker, & Batalova, 2015). In spite of this, these cultural and linguistic minorities have some of the worst academic and long-term outcomes when compared to monolingual Caucasian peers (Albrecht, Mulford Albrecht, & Murguia, 2005; Carson & Sabol, 2012; Hemphill, Vanneman, & Rahman, 2011), and more progress needs to be made to decrease this discrepancy. One important predictor of academic and long-term success is English language proficiency (ELP), but less emphasis has been placed on understanding the factors that contribute to the development of strong ELP, including executive functioning and acculturation. Understanding the impact of executive functioning on ELP is important because it provides insight into the cognitive factors that promote ELP, which can be used to develop interventions to help ELLs become proficient in English. Similarly, understanding the relationship between acculturation, executive functioning, and ELP will enable practitioners to be more culturally competent when working with bilingual ELLs.

The current study sought to expand the literature and provide practical recommendations for working with bilingual ELLs by furthering psychology's understanding of the relationships among executive functioning, acculturation, and English language proficiency. The purpose of this chapter is to provide a basic overview of each component of the study, clinical implications

of the study, the significance and rationale of the study, and the study's research questions and hypotheses.

Bilingual English Language Learners

Bilingual English language learners (ELLs) are individuals who speak English and another language fluently, but for whom English is not their first language. In addition to being linguistic minorities, these individuals are more likely to be ethnic and racial minorities than monolingual English-speakers (USCB, 2006). Current estimates indicate by 2044, there will not be a racial majority group in the United States; by that time, it is estimated Caucasians will comprise 49.7% of the population, followed by Hispanics (25.0%), Blacks (12.7%), Asians (7.9%), and multiracial individuals (3.7%; Frey, 2014). By 2060, projections indicate Caucasians will comprise 44% of the United States population, while the Asian and Hispanic populations will more than double and the multiracial population will more than triple (Frey, 2014).

In addition to increasing numbers of minorities in the United States, there have also been increasing numbers of students from non-English speaking backgrounds, and these students are the fastest-growing population in schools (Ruiz Soto et al., 2015). For example, while the national ELL population in public schools grew by 95% from 1991-2002, enrollment in public schools increased 12% during this same period (Padolsky, 2004). As of 2014, approximately 9.3% of the student population in the United States was composed of ELLs (Kena et al., 2016). Six states (i.e., Alaska, California, Colorado, Nevada, New Mexico, and Texas), as well as the District of Columbia, have public school ELL populations greater than 10%, with the largest concentration (22.7%) being in California (Kena et al., 2016). Between the 2003-2004 and 2013-2014 school years, all but 14 states experienced growth in their public school ELL

populations, with Kansas experiencing the most growth (4.6%) during this time (Kena et al., 2016). Although there are over 450 languages spoken by ELLs in the United States, 71% of ELL students speak Spanish, in comparison with 4% speaking Chinese, the second most-common language spoken by ELLs (Ruiz Soto et al., 2015). Overall, these statistics highlight the importance of knowing how to help bilingual ELLs succeed academically; they are a rapidly growing demographic in schools and in the nation, and it is important to increase psychologists' and educators' ability to address the performance gap between ELLs and their monolingual peers.

To address the rising number of ELL students in the United States, as well as the discrepant performance between ELL students and their monolingual and bilingual peers, the No Child Left Behind Act (NCLB, 2002) established guidelines for identifying, assessing, and educating ELLs. Under NCLB, states were required to set Annual Measurable Achievement Objectives (AMAOs) for ELLs. These objectives must include goals for increasing English-language proficiency, progress in learning English, and making Annual Yearly Progress in academic content areas (NCLB, 2002). The Every Student Succeeds Act (ESSA, 2015) expanded upon the guidelines put forth by the NCLB Act to reflect changes and growth in United States ELL populations since NCLB was enacted. ESSA increased federal funding of ELL programs, adjusted the accountability standards for ELLs to better reflect their delay in learning English, required states to develop entrance and exit procedures for ELLs, and increased schools' accountability for helping ELLs develop ELP.

Analyzing achievement gaps between ELL and non-ELL students' reading and math performance on the National Assessment of Educational Progress (NAEP) highlights the importance of having guidelines such as those from the NCLB and ESSA Acts and illustrates the

need for more research regarding how to help ELLs succeed academically (Abedi, 2004). As of 2015, non-ELL students have consistently performed better on the NAEP than ELL students since 1998 in reading and 1996 in math (Kena et al., 2016). These findings are especially concerning because since NAEP assessment data were first collected in 1992, approximately two-thirds of all fourth and eighth grade students (including ELL students since data were first collected for them in 1996 in math and 1998 in reading), have failed to perform at or above the “Proficient” level in reading and math (Benson, Marchand-Martella, Martella, & Kolts, 2007; Kena et al., 2016; Smith, Marchand-Martella, & Martella, 2011). Barth (2006) suggested that ten points represent one grade level on the NAEP. In math, the fourth grade gap between ELL and non-ELL students was 25 points in 2015, while the eighth grade gap between ELL and non-ELL students was 38 points (Kena et al., 2016). The fourth grade gap was not significantly different from those observed since 1996; however, the eighth grade gap did narrow significantly since 1996, when the gap was 46 points (Kena et al., 2016). These discrepancies indicate in math, the gap between ELL and non-ELL students increases between fourth and eighth grades, but over time, the gap between eighth grade ELL and non-ELL students has been narrowing. In reading, the fourth grade gap between ELL and non-ELL students was 37 points in 2015, while the eighth grade gap between ELL and non-ELL students was 45 points; these gaps were not significantly different from those observed in 1998 or 2013 (Kena et al., 2016). Overall, these achievement gaps show that ELL students are, as a group, not catching up to their non-ELL peers, indicating more research is needed to inform practice and improve the academic and long-term outcomes of ELL students.

English Language Proficiency

English language proficiency refers to the degree to which ELLs can use and understand English (Hakuta, Butler, & Witt, 2000) and is an important predictor of academic and long-term success (Hakuta et al., 2000; Halle, Hair, Wandner, McNamara, & Chien, 2012; MacSwan & Pray, 2005; Roessingh, 2006). The research focuses on both oral English proficiency and academic English proficiency (e.g., Aukerman, 2007; Hakuta et al., 2000; Halle et al., 2012; Roessingh, 2006). Oral English proficiency refers to conversational language abilities, while academic English proficiency refers to the language abilities that are necessary for educational attainment (Hakuta et al., 2000). In the literature, based on Cummins' (1979, 1994, 2000) theory, conversational language abilities are commonly referred to as Basic Interpersonal Communication Skills (BICS), while academic language abilities are referred to as Cognitive Academic Language Proficiency (CALP) (Aukerman, 2007; Hakuta et al., 2000; Roessingh, 2006). Typically, ELLs will have stronger oral English proficiency than academic English proficiency because conversational language is less cognitively demanding and more contextually embedded than academic language (Hakuta et al., 2000; Roessingh, 2006).

Cummins' (1979, 1994, 2000) theory of BICS and CALP has been subject to criticism on several grounds. The four quadrants have been criticized for being too simplistic and failing to consider the impact of environmental factors, such as the quality of the instructor (Mozayan, 2015; Scarcella, 2003). Similarly, CALP has been criticized as promoting a deficit theory for explaining ELLs' academic difficulties without considering other factors such as insufficient instruction or an underlying learning disability (Edelsky et al., 1983; MacSwan, 2000). CALP, specifically, has been criticized as measuring how well individuals can learn the tests used to

measure CALP, rather than measuring their actual ability to learn higher-level English (Edelsky et al., 1983; Martin-Jones & Romaine, 1986).

Other theories, such as Second Language Instructional Competence (SLIC; Rolstad, 2005), the iceberg model (Cummins, 2008), and the threshold hypothesis (Cummins, 1976) have also been used to conceptualize the development of English language proficiency. SLIC is more specific than CALP in that it is subject-specific (Rolstad, 2005). Rather than being a global conceptualization of academic language, it emphasizes having enough academic English in a given subject (e.g., math, science, social studies, language arts) to be able to complete tasks in that subject. As a result, it is possible for ELLs to have SLIC in some subjects, but not others. This theory is limited by the lack of standardized assessment measures for determining students' SLIC in different areas (Rolstad, 2005). The iceberg model assumes that while the first and second language are separate constructs, they still share an underlying foundation (Cummins, 2008). An example of this is the ability to store features of both languages (e.g., grammar, vocabulary) in long-term memory. The threshold hypothesis posits that ELLs need to achieve a certain level of proficiency in their first and second languages in order to benefit from being bilingual (Cummins, 1976). If these threshold levels are not reached, the cognitive demands of speaking and understanding both languages will hinder ELLs' ability to attain proficiency in the languages. Because of its significance to educational attainment, understanding students' English language proficiency, and especially their academic English proficiency, is an important part of improving the prognosis of bilingual ELL individuals both in and outside of the classroom. For that reason, the current study emphasized academic English over conversational English.

Executive Functioning

Executive functioning (EF) is a multidimensional construct that consists of numerous complex cognitive processes that are involved with independent, goal-directed behavior (Best & Miller, 2010; Lezak, Howieson, Bigler, & Tranel, 2012), such as achieving optimal success in English proficiency and succeeding academically. Although multiple areas of the cortex and subcortical regions are integral for executive functioning, it is typically primarily associated with the anterior frontal lobes, which are among the last areas of the brain to develop during childhood/adolescence and among the first to decline with age (Best & Miller, 2010; Kray, Eber, & Lindenberger, 2004). Because of this developmental trajectory, executive functioning typically increases during childhood and adolescence, peaks in adulthood, and then declines during older adulthood (Best & Miller, 2010; Kray et al., 2004).

Common constructs associated with executive functioning include: attention, working memory, planning, decision-making, verbal reasoning, inhibition, problem-solving, and set-shifting (Best & Miller, 2010; Chan, Shum, Touloupoulou, & Chen, 2008; Kray et al., 2004; Lezak et al., 2012). Attention is the ability to attend to a specific stimulus for a sustained period of time (Kray et al., 2004). Working memory refers to how much information the brain can process and remember for brief periods of time, as well as allowing this information to be manipulated for more complex processing (Best & Miller, 2010). Working memory is also the gateway to long-term memory—if information can't be stored long enough in working memory, it cannot go into long-term memory for later retrieval (although not all memory problems are due to working memory deficits; Best & Miller, 2010). Both attention and working memory are critical to the development of ELP – if individuals cannot sustain attention or effectively process English in working memory, they will have difficulty becoming proficient in English.

Planning involves identifying and organizing the steps and resources necessary to complete a goal (Chan et al., 2008). Problem-solving is involved in planning and occurs when individuals use a systematic approach to find a solution to a problem (Chan et al., 2008). Typical steps include: defining the problem, identifying alternatives, determining the pros and cons of those alternatives, selecting and testing an alternative, examining how effective the alternative was in resolving the problem, and if it wasn't effective, testing other alternatives until one provides satisfactory results (Chan et al., 2008). Both planning and problem-solving contribute to learning English and educational attainment because ELLs need to be able to plan to reach their educational goals and learn problem-solving strategies when they encounter unfamiliar English words, phrases, and grammar.

Decision-making is the ability to select one option from a group of options using some set of criteria (Kray et al., 2004). Verbal reasoning is the ability to understand and analyze verbal information, which can be presented visually (a hand-written note) or auditorally (someone giving a speech; Kray et al., 2004). Decision-making and verbal reasoning contribute to ELP by providing ELLs with a way to interpret the nuances of English. Set-shifting is the ability to mentally switch between two different tasks (Best & Miller, 2010). For example, someone who is able to fluidly switch between speaking two different languages demonstrates intact set-shifting. Inhibition is the ability to stop an automatic response (Best & Miller, 2010). For example, when switching between two different languages, bilingual individuals inhibit one language when speaking in the other language (Bialystok, Craik, Green, & Gollan, 2009; Stocco, Yamasaki, Natalenko, & Prat, 2014).

Often, multiple constructs will be engaged at the same time to help an individual accomplish a task (Chan et al., 2008). For example, when reading a book or article, attention,

verbal reasoning, and working memory must be intact if the individual is going to process and comprehend what has been read. Planning and decision-making are required during problem-solving because the individual must go through the problem-solving steps in the specified order (one can't weigh the pros and cons of alternatives before generating alternatives) and make decisions regarding which alternative(s) will be most helpful (Chan et al., 2008). All of these components of executive functioning seem to contribute to ELLs' ability to learn English, so it is important to know ELLs strengths and weaknesses regarding executive functioning to better understand how to help them become proficient in English.

Acculturation

Acculturation is an important consideration when working with bilingual ELLs because these individuals are functioning within the context of at least two cultures: their family's culture of origin and the United States culture they likely experience both at home and in their communities. Psychologists should strive for cultural competency in their work, and understanding the interplay between bilingual ELLs' cultures is part of demonstrating cultural competency. Research and practice focus on acculturation as it relates to individuals who have permanently moved to an area that is culturally dissimilar from their own (e.g., immigrants, refugees; Schwartz, Unger, Zamboanga, & Szapocznik, 2010).

Traditional acculturation models have categorized individuals depending on the extent to which they retain their original (heritage) culture and embrace their new (receiving) culture. Berry's (1980) acculturation model is one of the most well-known and cited models (e.g., Afafe-Munsuz & Brindis, 2006; Cleveland & Laroche, 2007; Crisp & Turner, 2011; Nguyen & Benet-Martínez, 2013; Pieter Van Oudenhoven, Ward, & Masgoret, 2006; Schwartz et al., 2010; Shore et al., 2009; Tadmor & Tetlock, 2006). This model considers how immersed individuals

are in both their heritage and receiving culture and includes four categories: assimilation, separation, integration, and marginalization. Assimilation and integration are both characterized by individuals adopting their receiving cultures; however, in assimilation, the individual rejects their heritage culture and in integration, the individual retains their heritage culture. In separation and marginalization, individuals reject their heritage cultures; however, in separation, the individual accepts their receiving culture and in marginalization, the individual rejects their receiving culture (Berry, 1980).

With regards to the impact that acculturation can have on ELP and educational attainment, it is important to consider the impact that factors such as migrant type, ethnicity, cultural similarity, gender, education, socioeconomic status, and age have on acculturation (Dow, 2010; Schwartz et al., 2010). Migrant type refers to the reason for which a person leaves his/her country and culture of origin. Individuals who travel to a new country and culture willingly (e.g., voluntary immigrants, international students, those seeking asylum) are likely to have a much different acculturation experience than those who leave their country because they feel that they have no other choice, such as those forced to leave their country because of war or a natural disaster (Schwartz et al., 2010).

With regards to ethnicity, in the United States, Caucasian (e.g., western European and Canadian) immigrants are perceived more positively by United States citizens than minority immigrants (Rumbaut, 2008). When this happens, minority immigrants are more likely to engage in reactive ethnicity, or maintain their heritage culture and reject the new culture (Rumbaut, 2008). Education level and socioeconomic status are similar to ethnicity, with members of the receiving culture being more accommodating and welcoming of immigrants who are more highly educated (Schwartz et al., 2010) and wealthy (Dow, 2010). Along these lines,

individuals who come from a culture that is more similar to the new culture will likely find adapting to the new culture to be easier than those who are coming into a culture that is vastly different from their heritage culture (Schwartz et al., 2010).

It has been suggested that, depending on gender role differences between the heritage and receiving cultures, female immigrants may have difficulty adjusting to the receiving culture (Dow, 2010). If a woman comes from a culture where women typically have less power and goes into a more egalitarian culture, or vice versa, she may be more prone to experiencing dissonance between her culture's gender roles and the gender roles of the new culture (Dow, 2010). Finally, the age at which someone enters a new culture is negatively associated with how successful the acculturation process is (Dow, 2010; Schwartz et al., 2010). Younger individuals are able to receive the new culture more easily because they have had less exposure to their heritage culture (Schwartz et al., 2010). Each of these components of acculturation contribute to an individual's ability to embrace their receiving (United States) culture, which in turn impacts their ability and motivation to become proficient in English. Understanding the role of acculturation in ELP can help psychologists and educators identify and address these environmental factors that may hinder or promote bilingual ELLs' English language proficiency.

Rationale of the Study

Research that investigates the academic disadvantages of minority students tends to focus on environmental factors (e.g., socioeconomic status, ethnic group membership) that those within the educational system are relatively unable to change. Although identification of these factors is important because it allows for better understanding of how the environment shapes academic success and has led to the development of evidence-based treatments that focus on improving the student's environment to enhance his/her education, these environmental factors

are likely not the only factors that contribute to minority students' academic profiles. As previously mentioned, the link between English language proficiency and achievement is well-established (e.g., Hakuta et al., 2000; Halle et al., 2012; MacSwan & Pray, 2005; Roessingh, 2006), but the research often does not extend beyond this, illustrating the need for the current study.

Much attention has been devoted to understanding how English language proficiency influences academic achievement. In spite of the clinical significance of understanding factors that contribute to English language proficiency in bilingual ELLs, very little research to date has examined these factors, especially with regards to understanding the relationship between executive functioning and English language proficiency. English language proficiency is a skill that is developed over time, and the identification of components of acculturation and executive functioning that can be assessed and develop earlier than English language proficiency can lead to earlier identification and intervention of bilingual ELL students who may have more difficulty learning English. Further, by providing additional insight regarding the impact of acculturation and English language proficiency on executive functioning, this study contributes to existing neuropsychology literature that focuses on understanding environmental correlates of executive functioning.

Significance of the Study

The current study was two-fold: it extended the literature by providing insight into the factors that contribute to English language proficiency in bilingual ELLs, as well as the impact of English language proficiency and acculturation on executive functioning in bilingual ELLs. Racial and ethnic minorities are surpassing the Caucasian population in the United States (Frey, 2016) and these individuals are more likely to speak more than one language than Caucasians

(USCB, 2006). ELLs comprise the fastest-growing demographic in United States schools (Ruiz Soto et al., 2015). Achievement gaps between native English speakers and ELLs (Kena et al., 2016) highlight the need to identify ways for practitioners, including school psychologists and neuropsychologists, to help ELLs achieve at the same level as their monolingual peers. The relationship between English language proficiency and academic achievement in a variety of populations (e.g., based on ethnicity, age, and ELL status) is well established in the literature (e.g., Hakuta et al., 2000; Halle et al., 2012; MacSwan & Pray, 2005; Roessingh, 2006), but there is less research regarding the factors that contribute to English language proficiency, especially within the ELL population.

Implications for Research

By exploring the impact of demographic variables, acculturation, and executive functioning on English language proficiency in the first model, the current study provided insight into the ways environmental and cognitive factors may contribute to the development of English language proficiency in bilingual ELL adults. A second model for predicting executive functioning from acculturation and English language proficiency contributed to the literature by providing more information regarding the impact of environmental factors on executive functioning. Understanding the impact of these factors (i.e., demographic variables, dominant and ethnic society immersion, and receptive and expressive language skills) on executive functioning measures is especially important to the practice of neuropsychology because it provides some context for interpreting results from neuropsychological measures with bilingual ELL populations. These models created a starting point from which future research can build and are useful from a scientist-practitioner perspective because of the direct implications of this research on practice, which will be discussed below.

Clinical Implications

In addition to the theoretical significance of the current study, this study helped identify practical ways of working with bilingual ELLs. An understanding of the roles that acculturation and executive functioning play in the development of English language proficiency among bilingual ELLs, as well as the impact that acculturation and English language proficiency have on executive functioning, can aid in the identification, prevention, and intervention of students who may be at risk for English language proficiency difficulties, and as a result, poor academic achievement. Understanding the relationship between executive functioning, acculturation, and English language proficiency helps inform specific practices that may be beneficial for school psychologists working with ELL students in the United States, such as: engaging in home-school collaboration to promote development of acculturation in their ethnic cultures and United States culture, routinely screening ELL students to monitor their academic progress, using interventions that have demonstrated efficacy with ELLs, and assessing for acculturation and expressive language skills in evaluations with ELLs. Identifying ways to improve the educational outcomes of bilingual ELL students will improve educators' multicultural competence, help narrow the achievement gap between ELLs and monolingual English speakers, and improve the long-term outcomes of ELL students.

The current study also has important implications for neuropsychologists who work with ELL populations because it investigated how culture and English language abilities impacted performance on verbal reasoning, inhibition, and set-shifting measures. By examining the impact of acculturation and English language proficiency on aspects of executive functioning, the current study will potentially allow practitioners to more confidently interpret executive

functioning measures when considering bilingual individuals' cultures and English language proficiency.

Research Questions and Hypotheses

R₁ What are the bilingual adults' acculturation profiles in terms of dominant society immersion and ethnic society immersion?

H₁ It is hypothesized the majority of the participants will report clinically high levels of dominant society immersion and ethnic society immersion (i.e., scores above 45 for Dominant Society Immersion and scores above 51 for Ethnic Society Immersion; M. Stephenson, personal communication, May 19, 2015). For individuals who do not report high levels of dominant society and ethnic society immersion, it is hypothesized they will report statistically significantly higher levels of ethnic society immersion than dominant society immersion. These hypotheses are based on research suggesting bilingual ELL individuals living in the United States today often have high levels of dominant and ethnic society immersion (e.g., Dow, 2010; Nelson & Infante, 2014; Schwartz, Unger, Zamboanga, & Szapocznik, 2010), but may be more likely to have difficulties adjusting to life in the United States because of their ethnic cultures (e.g., Lorenzo-Blanco, Unger, Ritt-Olson, Soto, & Baezconde-Garbanati, 2013; Martinez Jr., McClure, Eddy, & Wilson, 2011).

R₂ What are the bilingual adults' English language proficiency profiles?

H₂ It is hypothesized participants will have statistically significantly higher receptive English language skills than expressive English language skills, based on studies suggesting there is a larger receptive-expressive gap in bilingual individuals compared to monolingual individuals (e.g., Bialystok, Luk, Peets, & Yang, 2010; Gibson, Kimbrough Oller, Jarmulowicz, & Ethington, 2012; Kimbrough Oller, Pearson, & Cobo-Lewis, 2007).

R₃ What are the bilingual adults' executive functioning profiles in terms of verbal reasoning, set-shifting, and inhibition abilities?

H₃ Based on a review of the literature (e.g., Bialystok, Barac, Blaye, & Poulin-Dubois, 2010; Bialystok, Craik, & Luk, 2008; Yang, Yang, & Lust, 2011), it is hypothesized participants' set-shifting abilities will be statistically significantly higher than their inhibition abilities, which are hypothesized to be statistically significantly higher than their verbal reasoning abilities.

Model One

R₄ Does the degree of acculturation predict English language proficiency in bilingual adults?

H₄ It is hypothesized degree of acculturation will predict English language proficiency, such that individuals with higher levels of dominant society and ethnic society immersion will have higher English language proficiency than individuals with lower levels of immersion. It is hypothesized dominant society immersion scores will be the strongest predictor of English language proficiency with regards to acculturation variables.

R₅ Does executive functioning predict English language proficiency in bilingual adults?

H₅ It is hypothesized executive functioning will predict English language proficiency. Specifically, it is hypothesized verbal reasoning will be the strongest predictor, followed by set-shifting and inhibition (Bialystok et al., 2010; Kray, Eber, & Lindenberger, 2004).

R₆ What impact does level of acculturation have on the relationship between executive functioning and English language proficiency in bilingual adults?

H₆ It is hypothesized acculturation will moderate the relationship between executive functioning and English language proficiency, such that the correlation between executive functioning and English language proficiency will be weaker in individuals with higher levels of acculturation.

Model Two

R₇ Does acculturation predict executive functioning in bilingual adults?

H₇ It is hypothesized acculturation will predict executive functioning, such that dominant society immersion will be the strongest predictor, followed by ethnic society immersion (Brauer Boone, Victor, Wen, Razani, & Pontón, 2007; Razani, Burciaga, Madore, & Wong, 2007). It is hypothesized the relationship between dominant society immersion and executive functioning will be positive, while the relationship between ethnic society immersion and executive functioning is hypothesized to be negative.

R₈ Does English language proficiency predict executive functioning in bilingual adults?

H₈ It is hypothesized English language proficiency will predict executive functioning, such that expressive language skills will more strongly predict executive functioning than receptive language skills. It is hypothesized both expressive and receptive language skills will be positively related to executive functioning.

CHAPTER II

REVIEW OF THE LITERATURE

This literature review is divided into three broad sections to provide an in-depth view of bilingual English language learners (ELLs), English language proficiency (ELP), acculturation, executive functioning, and the relationships among these topics. The bilingual ELL section will provide demographic information, academic outcomes, intellectual functioning information, social-emotional outcomes, and long-term outcomes associated with bilingual ELLs. The ELP section will discuss the development and assessment of ELP. The third section will provide an overview of factors that influence ELP, with an emphasis on acculturation and executive functioning. This section will address the development and assessment of executive functioning and acculturation, as well as their relationship to ELP and bilingual ELLs.

Bilingual English Language Learners

Bilingual ELLs speak both English and a second language, but English is not their first language. Additionally, when compared to monolingual English speakers, bilingual ELLs are more likely to be racial and ethnic minorities (United States Census Bureau [USCB], 2006). Racial and ethnic minority populations are far surpassing the Caucasian population in the United States and it is projected that by 2044, there will not be a racial/ethnic majority group in the United States (Frey, 2014). By that time, Caucasians will comprise approximately 49.7% of the population, followed by Hispanics (25.0%), Blacks (12.7%), Asians (7.9%), and multiracial individuals (3.7%). Further, by 2060, the United States population is estimated to be 44% Caucasian, while the Hispanic and Asian populations will more than double (by 115% and 129%, respectively), and the multiracial population will increase by nearly 220% (Frey, 2014).

Bilingual ELLs in the Schools

As a whole, ELL students are the most rapidly growing population in schools (Ruiz Soto, Hooker, & Batalova, 2015) and as of 2014, account for approximately 9.3% of the entire student population in the United States (Kena et al., 2016). Between 1991 and 2002, the ELL population in the schools increased by 95%, while general school enrollment only increased by 12% during the same time period (Padolsky, 2004). These growth trends are occurring throughout the United States (Aud et al., 2013; Kena et al., 2016). Some states, such as Indiana, Nebraska, North Carolina, South Carolina, Tennessee, Alabama, and Tennessee have experienced more than a 300% growth in their ELL populations between 1994-2005 (Aud et al., 2013). The ELL school population has increased in all but 14 states from the 2003-2004 to 2013-2014 school years, with Kansas experiencing the most growth (4.6%) during this time period (Kena et al., 2016). As of 2014, California has the largest concentration of ELL students in its public schools (22.7%). Five other states (i.e., Alaska, Colorado, Nevada, New Mexico, and Texas), as well as Washington, D.C., have public school ELL populations greater than 10% (Kena et al., 2016). ELL students in the United States speak over 450 languages, with Spanish being the most commonly-spoken language and spoken by 71% of these students. In comparison, Chinese, which is the second-most common language spoken by ELL students, accounts for 4% of the total ELL population in the schools (Ruiz-Soto et al., 2016).

Academic Outcomes

In spite of the rapidly growing ELL student population in the United States, these students continue to perform more poorly on math and reading assessments than their monolingual peers (Kena et al, 2016). This is especially concerning Achievement gaps on the National Assessment of Educational Progress (NAEP) in reading and math between ELL and

non-ELL students are persistent and well-documented (Abedi, 2004). It has been suggested ten points represent one grade level on the NAEP (Barth, 2006). Data comparing ELLs' performance to non-ELLs' performance has been collected since 1996 in math and 1998 in reading. These data indicate since that time, ELLs have consistently performed worse than non-ELLs in both reading and math (Kena et al., 2016).

In 2015, fourth grade non-ELL students performed 3.7 grades better than fourth grade ELL students; this gap had widened to 4.5 grades between eighth grade non-ELL and ELL students. Further, these gaps were not significantly different from the gaps observed since 1998 (Kena et al., 2016). In math, fourth grade non-ELL students performed approximately 2.5 grades better than ELL students in 2015, with this gap increasing to 3.8 grades between eighth grade ELL and non-ELL students. While the fourth grade gap was not significantly lower than gaps observed since 1996, the eighth grade math gap has significantly decreased since 1996, when ELL students performed approximately 4.6 grades below non-ELL students (Kena et al., 2016). These findings are especially concerning given approximately two-thirds of all students in fourth and eighth grades have consistently failed to perform at or above the "Proficient" level in both reading and math (Benson, Marchand-Martella, Martella, & Kolts, 2007; Kena et al., 2016; Smith, Marchand-Martella, & Martella, 2011).

To address these issues, the No Child Left Behind Act (NCLB, 2002) set forth guidelines states must follow to aid in the identification, assessment, and education of ELL students. These guidelines include: assessing ELLs' English language proficiency once per year, setting standards and benchmarks to raise ELLs' ELP, collaborating with parents of ELLs regarding their children's English language instruction, and assessing ELL students' language arts and math skills in English after they have lived in the United States for one year (NCLB, 2002). Part

of the NCLB (2002) includes setting goals for ELL students to help improve their English language proficiency and academic performance (NCLB, 2002). Although the guidelines set forth by the NCLB (2002) are steps in the right direction, the performance patterns described above indicate current efforts to reduce the achievement discrepancy between ELL and monolingual students are ineffective. To that end, the Every Student Succeeds Act (ESSA, 2015) expanded upon the guidelines put forth by the NCLB Act to reflect changes and growth in the United States ELL population. These changes included: increasing federal funding of ELL programs, adjusting the accountability standards for ELLs to better reflect their delay in learning English, requiring states to develop entrance and exit procedures for ELLs, and increasing schools' accountability for using assessments and evidence-based interventions to help ELLs develop ELP (ESSA, 2015).

ELLs also face challenges when they pursue post-secondary education, and these challenges are related a variety of factors including: race/ethnicity, gender, parents' level of education, and socioeconomic status (SES; Bifuh-Ambe, 2011; Flores, Batalova, & Fix, 2012; Kanno & Cromley, 2013; Lems, 2012; Roessingh & Douglas, 2012). Understanding these challenges provides additional insight into the relationship between academic achievement and the long-term outcomes of ELLs.

Kanno and Cromley (2013) analyzed data from the National Education Longitudinal Study of 1988 (NELS:88; National Center for Education Statistics [NCES], n.d.) to compare ELLs' access to and attainment in postsecondary education to that of their monolingual English-speaking and English-proficient linguistic minority peers. Specifically, they were interested in predicting both access to and attainment in postsecondary education from a variety of factors, including: demographic variables (i.e., immigrant generation, gender, race/ethnicity, family

income), family capital (i.e., parental education, family composition, parents' educational expectations), high school factors (i.e., highest level of high school math completed, GPA, 12th grade math and reading standardized test scores), and postsecondary education factors (i.e., part-time status, first-year undergraduate GPA, delay in beginning postsecondary education, credits earned in the first year of postsecondary education). Data from 10,300 students were analyzed and students were divided into three groups: monolingual English students ($n = \sim 8,450$), linguistic minority students who were proficient in English ($n = \sim 1,500$), and ELLs ($n = \sim 350$) (Kanno & Cromley, 2013).

Results indicated ELL students were half as likely as the English-proficient linguistic minorities and nearly three times less likely than the monolingual English-speakers to earn a bachelor's degree. Further, 20.9% of ELLs were high school dropouts, compared to 6.8% of English-proficient linguistic minorities and 6.3% of monolingual English-speakers. Results also suggested non-linguistic factors such as family income, parents' education level, parental education expectations, high school GPA, and highest level of high school math completed were more significantly related to the ELLs' access to postsecondary education than their actual ELL status, which was nonsignificant after controlling for these other variables (Kanno & Crowley, 2013).

Significant predictors of ELLs' postsecondary education attainment included: immigrant generation, family income, part-time enrollment status, delayed entry into postsecondary education, undergraduate GPA after the first year, and credits earned after the first year. While being an ELL did not predict college access, being an English-proficient linguistic minority did. This finding suggests linguistic minorities who are highly bilingual are more likely to pursue some form of postsecondary education than ELLs. Overall, results from this study underscore

the importance of considering demographic and environmental factors when understanding the individual and systemic barriers ELLs face in accessing and attaining postsecondary education (Kanno & Crowley, 2013).

Intellectual functioning and ELLs. Intelligence is known to be positively associated with academic achievement (Chamorro-Premuzic & Furnham, 2008; Laidra, Pullmann, & Allik, 2007; Lezak et al., 2012). As a result, it is important to consider how bilingual ELLs' intellectual abilities are assessed and interpreted with tests that are normed using predominately Caucasian samples, especially when these tests can be used to make decisions about bilingual ELLs' educational trajectories (e.g., receiving special education services; graduating on the diploma track or receiving a completion certificate). It is also important to consider intelligence because of its direct relationship to the development of ELP and achievement skills. For example, ELL students with verbal reasoning weaknesses independent of their ELP status will require more support when learning verbal information and English than ELL students with intact verbal reasoning abilities (Lakin, 2012). Traditionally, the literature has advocated for the use of nonverbal intelligence tests when assessing ELLs because they are perceived as having less bias when compared to verbal and quantitative tests, which are believed to have more cultural and linguistic bias (Cormier, McGrew, & Ysseldyke, 2014; Kranzler, Flores, & Coady, 2010; Lakin, 2012).

Emerging research (e.g., Giessman, Gambrell, & Stebbins, 2013; Lakin, 2012; Lakin & Lai, 2012) suggests this may not be the case, though. Giessman et al. (2013) compared minority and Caucasian performance on the *Naglieri Nonverbal Ability Test, Second Edition* (NNAT2; Naglieri, 2008), which is entirely nonverbal, and the *Cognitive Abilities Test, Form 6* (CogAT6; Lohman & Hagen, 2001), which is composed of verbal, nonverbal, and quantitative batteries.

Participants were 5,833 second graders who were administered the CogAT6 and 4,038 students in Kindergarten through second grade who were administered the NNAT2 during screening for a gifted program. The participants were Caucasian, Hispanic, Black, Asian, and ELL students. Results supported use of the CogAT6 over the NNAT2 with regards to identifying high-ability minority students, suggesting that nonverbal measures may not provide the best estimate of minorities' and ELLs' cognitive abilities (Giessman et al., 2013).

Other research has found mixed support for the use of multidimensional cognitive tests over nonverbal tests when assessing ELL, culturally, and linguistically diverse students (Lakin, 2012; Lakin & Lai, 2012). Lakin and Lai (2012) examined how reliably the CogAT6 measures the cognitive abilities of ELL and non-ELL students. They administered the test to 381 third and fourth grade students. Participants were 38% ELL students ($n = 145$). Results indicated that the CogAT6 measured verbal and quantitative abilities of non-ELL students better than ELL students, but overall, composite scores for ELLs compared to non-ELLs were equally reliable. These results indicate the need for more research to provide more conclusive evidence regarding the use of multidimensional tests in ELL populations (Lakin & Lai, 2012).

In a different study, Lakin (2012) examined how well the CogAT6 predicted future achievement scores in ELL and non-ELL students. Participants were 124 Hispanic ELL students, 161 non-ELL Hispanic students, and 72 non-ELL Caucasian students in third through fifth grades during the first year of the study. Participants were administered the CogAT6 during the first year and the *Arizona Instrument to Measure Standards Dual Purpose Assessment* (AIMS DPA; Arizona Department of Education, 2006) as a measure of academic achievement during the second year of the study. Results indicated the verbal and quantitative scores on the CogAT6 were stronger predictors of achievement scores than the nonverbal score for both ELL

and non-ELL students (Lakin, 2012). Overall, these results indicate that assessing ELLs' intellectual abilities using exclusively nonverbal measures is unlikely to yield the best estimate of their abilities and may not be the best indicator of future performance when compared to multidimensional measures (Giessman et al., 2013; Lakin, 2012; Lakin & Lai, 2012). Given that the current literature regarding how to best assess ELLs' cognitive abilities focuses exclusively on the CogAT6 and the NNAT2, future research examining ELLs' performance on other cognitive measures is warranted.

Social-emotional outcomes. Students with social-emotional problems are at risk for academic problems, and vice versa (e.g., DeRosier & Lloyd, 2010; Joffe & Black, 2012; Niehaus & Adelson, 2014; Nix, Bierman, Domitrovich, & Gill, 2013); as a result, it is important to consider the social-emotional functioning of bilingual ELL students in grades Kindergarten-12. Unfortunately, there is limited research regarding social-emotional outcomes specific to bilingual ELL students (Castro-Olivo, 2014; Niehaus & Adelson, 2014), as well the relationship between acculturation and social-emotional functioning (e.g., Lee & Padilla, 2014; Padilla, 2008; Yoon, Lee, & Goh, 2008); as a result, this section will also focus on social-emotional outcomes of minority students, specifically. Given that minority students are more likely to be bilingual than their Caucasian peers (USCB, 2006), this literature is still somewhat relevant to bilingual ELLs.

Data from the Youth Risk Behavior Surveillance System (YRBSS; Kann et al., 2016) from September 2014 to December 2015 indicate there are racial/ethnic differences in the extent to which Caucasian, Black, and Hispanic high school students engage in protective and risky behaviors. Caucasian students were more likely than Black and Hispanic students to engage in sexual (e.g., contraceptive use), dietary (e.g., eating vegetables daily, not drinking soda), physical (e.g., being physically active for at least 60 minutes at least five days per week), and

other (e.g., having seen a dentist) protective behaviors. Hispanic and Black students were not more likely to engage in any protective behaviors than Caucasian students. Caucasian students were more likely than Hispanic and Black students to engage in certain injury-related (e.g., texting while driving, carrying a weapon) and tobacco-use related (e.g., currently using cigarettes, cigars, or smokeless tobacco) risk behaviors (Kann et al., 2016).

Black students were more likely than Hispanic and Caucasian students to engage in some injury-related (i.e., rarely or never wearing a seatbelt, having been in a physical fight), sexual (i.e., having intercourse before age 13, having four or more sexual partners), dietary (e.g., not eating vegetables, not drinking milk or water), and physical activity (i.e., not exercising for one hour at least one day per week, watching three or more hours of television each day) risk behaviors.

Black students were also more likely than Caucasian or Hispanic students to have asthma and to avoid certain foods due to allergic reactions. Hispanic students were more likely than Black and Caucasian students to have ridden in a car with someone who had been drinking, felt sad or hopeless, used electronic cigarettes, tried to lose weight, considered themselves to be overweight, and used illegal drugs or alcohol (Kann et al., 2016). These results highlight the importance of helping ethnic and racial minority students increase their prosocial behaviors and decrease their risky behaviors to improve their social-emotional functioning as compared to Caucasian students.

Understanding the social-emotional functioning of elementary-aged ELL students is an important part of understanding how to help them succeed educationally. To that end, Niehaus and Adelson (2014) examined how school support and parental school involvement impacted academic and social-emotional outcomes of ELL students. In the study, school support included the amount of English as a second language (ESL) instruction received by students, how many

languages teachers spoke, how often resources were used students' native language, and family outreach services (such as translating school documents and providing interpreters). Parental support included how often parents communicated with their students' teachers and how often they participated in school events (such as open houses or volunteering for school activities; Niehaus & Adelson, 2014). Participants were 1,020 third grade ELL students who participated in the Early Childhood Longitudinal Study (ECLS-K; Niehaus & Adelson, 2014). Niehaus and Adelson (2014) found that schools that provided more support had more involved parents. Higher levels of parental involvement were indicative of lower levels of social-emotional problems, and fewer social-emotional problems were associated with higher levels of academic achievement (Niehaus & Adelson, 2014). In spite of these findings, when ELL students attended schools with higher levels of support, they had lower levels of academic achievement and more social-emotional problems. Niehaus and Adelson (2014) proposed this may be due to an unaccounted variable, such as the ethnic and socioeconomic composition of schools providing the most support to ELLs. In other words, students have poorer academic outcomes when their schools have higher concentrations of ethnic students, ELL students, and impoverished students (Suárez-Orozco, Suárez-Orozco, & Todorova, 2008), but these schools are the ones that are more likely to provide extensive support services to ELL students (Niehaus & Adelson, 2014). Overall, these results suggest there is more work that needs to be done to determine how to meet the academic and social-emotional needs of ELL students.

In addition to impacting short-term academic achievement, social-emotional functioning can also impact students' long-term academic motivation and performance (Bavarian et al., 2013; Sung, 2014). Sung (2014) examined longitudinal data from 10,038 linguistic minority students who were in the ECLS-K class of 1998-1999 to determine the impact of social-

emotional behaviors on students' academic achievement over time after controlling for gender, students' poverty status, and SES; data were tracked from Kindergarten through fifth grade. The social domains measured included: approaches to learning, self-control, interpersonal skills, externalizing problems, and internalizing problems. Academic scores were students' reading and math achievement scores in the spring of Kindergarten, first, third, and fifth grades. Results indicated students from impoverished families experienced greater academic improvement in reading and math related to their increased social skills compared to students who were not from impoverished families (Sung, 2014).

Bavarian and colleagues (2013) followed 1,170 students in low-income, urban schools starting when they were in third grade until the end of eighth grade to determine how a social-emotional and character-building program impacted students' academic motivation and performance. Participants were 48% African American, 27% Hispanic, and 19% Other (e.g., White, Asian). Data were collected over a six-year period and during a total of eight waves (i.e., when the students began third grade in Fall 2004, Spring and Fall 2005, Spring 2006, Spring 2007, Fall 2008, Spring 2009, and when the students finished eighth grade in Spring 2010). Students completed self-report measures assessing their dissatisfaction with learning, teachers completed ratings of students' academic ability and motivation, and archival data of students' standardized reading and math scores were collected. Attendance data were also collected to determine the participating schools' absenteeism rates (Bavarian et al., 2013).

The social-emotional program was associated with improvements in math across time, particularly for female and low-income students. The program also significantly contributed to reading improvements in African American males and students transitioning between seventh and eighth grades. Regarding educational attitudes, the program was found to increase students'

academic motivation, decrease their dissatisfaction with learning, and decrease schools' absenteeism rates (Bavarian et al., 2013). Results from these studies further highlight the importance of providing linguistic minorities, including bilingual ELLs, with additional social-emotional support to enhance their academic functioning and motivation, which can in turn, improve their long-term outcomes.

Long-term outcomes. In addition to the academic achievement discrepancies described previously, as adults, members of minority groups are more likely to be imprisoned (Carson & Sabol, 2012; Motivans, 2013), be perceived negatively by the majority group (King & Wheelock, 2007; Kohut, Ketter, Doherty, Suro, & Escobar, 2006), have poorer long-term academic outcomes (Bailey, Jenkins, & Leinbach, 2005; Cook & Cordova, 2006; Greene, Marti, & McClenney, 2008; Price, 2004; Sirin, 2005), and struggle socioeconomically (Albrecht, Mulford Albrecht, & Murguia, 2005; Sirin, 2005). As with the social-emotional section, there is a dearth of research regarding long-term outcomes of bilingual ELLs, so this section will focus more broadly on research that exists regarding the long-term outcomes of minorities, given they are more likely to be bilingual ELLs than Caucasian individuals (USCB, 2006). Due to the association between academic performance and these long-term outcomes (e.g., Katsiyannis, Ryan, Zhang, & Spann, 2008; Jeynes, 2005; Sirin, 2005), improving the academic outcomes of bilingual ELL students is an important part of improving their long-term outcomes.

Understanding the impact of negative perceptions on minority individuals is important, especially when these perceptions are inaccurate. For example, in spite of data indicating that immigrants are less likely to commit non-immigration-related crimes than individuals born in the United States (e.g., Lee, Martinez, & Rosenfeld, 2001; Lopez & Miller, 2011; Miller, 2012), many Americans (born in the United States) believe increases in immigration lead to higher

crime rates (Kohut et al., 2006). This may be attributed to group threat theory, which posits that majority groups feel threatened by minority groups; as a result, prejudice and discrimination are higher in areas with larger minority populations and more competition for resources (King & Wheelock, 2007). There is also a negative perception regarding the impact of the increasing immigrant population in the United States on income inequality, especially in rural areas (Parrado & Kandel, 2010). In actuality, it appears that income inequality in the United States is the result of economic and population growth, rather than the increasing minority population (Lichter, Parisi, & Taquino, 2012; Parrado & Kandel, 2010). These inaccurate perceptions likely contribute to the poorer long-term outcomes of minority individuals, including ELLs, as compared to their majority peers.

Minorities are disproportionately arrested and incarcerated compared to White individuals. Nearly half of all arrests in 2010 were related to immigration offenses (Motivans, 2013). With regard to drug offenses, 48.9% of 2010 arrests involved individuals of Hispanic or Latino descent (Motivans, 2013). Black and Hispanic individuals are more likely to be incarcerated for violent offenses than White individuals (Carson & Sabol, 2012). They are also incarcerated at a higher overall rate and at younger ages than White individuals (Carson & Sabol, 2012). Given that immigrants are less likely than Caucasian individuals to commit non-immigration-related offenses (Lee et al., 2001; Lopez & Miller, 2011; Miller, 2012), these disproportionate arrest rates strongly suggest negative perceptions of minorities contribute to actual discriminatory practices in the criminal justice system. This highlights the importance of working to change these inaccurate perceptions to improve minorities' long-term outcomes.

Minorities also tend to be at a socioeconomic disadvantage compared to their majority peers (Albrecht et al., 2005; Hoover & Yaya, 2010). When compared to White individuals from

a low socioeconomic background, minorities (i.e., Blacks and Hispanics) experience different outcomes related to having a lower socioeconomic status (SES; Hoover & Yaya, 2010). For example, Black and Hispanic individuals are not as impacted by unemployment as White individuals because they have a lower mean income (Hoover & Yaya, 2010). In areas with higher minority concentrations, minority individuals have lower levels of education and employment compared to minority populations living in areas with lower minority concentrations (Albrecht et al., 2005). Additionally, regardless of minority concentration, compared to individuals in the dominant culture, minority groups have overall lower rates of education and employment; this inequality increases as minority concentration increases (Albrecht et al., 2005).

In spite of the socioeconomic disadvantage compared to the majority group, minority students do not appear to be as limited by their socioeconomic status as majority peers in terms of educational attainment and outcomes. A meta-analysis conducted by Sirin (2005) indicated the relationship between familial socioeconomic status (SES) and academic achievement is weaker for minority students than for White students. In other words, White students with a lower familial SES are at a higher risk for lower levels of academic achievement than minority students with a lower familial SES. This suggests minority students would benefit from more community and school resources, so more emphasis should be placed on community and school resources and SES because minority are more likely to experience higher levels of academic achievement because of the resources afforded to them by their schools and communities (Sirin, 2005). Unfortunately, minority students are more likely to live in areas where their schools and communities are lacking in resources, which perpetuates the cycle of low academic achievement (Sirin, 2005).

When minority students attend college, they are more likely to be a first-generation college student (Bailey et al., 2005), are enrolled in lower proportions (Cook & Cordova, 2006), and perform more poorly (Price, 2004) than their Caucasian peers. To examine the relationship between academic engagement and academic performance for college aged students (i.e., the effort-outcome gap), Greene et al. (2008) compared 3,143 African American, Hispanic, Asian American, Native American, and White community college students in terms of the amount of effort they expend and the results of their effort. Participants completed the Community College Student Report (CCSR) in 2002, 2003, or 2004. Of the 3,143 participants, 75.17% were White, 13.83% were African American, 8.86% were Hispanic, 1.63% were Asian American, and 0.50% were Native American. Results indicated when compared to their White peers, African American students had the largest effort-outcome gap, followed by Hispanic students, and then Asian American students (Greene et al., 2008). In other words, although the minority groups expended equal or more amounts of effort than White students, they performed more poorly than their majority peers. Given this trend, it is important to identify ways to narrow the effort-outcome gap to improve the long-term academic outcomes of minority students.

English Language Proficiency

In the United States, the degree to which ELL students understand and produce English, or English language proficiency (Hakuta, Butler, & Witt, 2000), greatly impacts their ability to be successful in school and later in life (Hakuta et al., 2000; Halle, Hair, Wandner, McNamara, & Chien, 2012; MacSwan & Pray, 2005; Roessingh, 2006). Based on Cummins' (1979, 1994, 2000) theory, the literature makes a distinction between two types of ELP: oral English proficiency, or conversational language, and academic English proficiency (e.g., Aukerman, 2007; Hakuta et al., 2000; Hall et al., 2012; Roessingh, 2006). Conversational English is

language required for interpersonal communication, while academic English is required for learning in academic settings (Hakuta et al., 2000). ELP research typically refers to conversational English as Basic Interpersonal Communication Skills (BICS) and academic English as Cognitive Academic Language Proficiency (CALP) (Aukerman, 2007; Hakuta et al., 2000; Roessingh, 2006).

Partially because exposure to conversational English occurs more frequently than exposure to academic English, ELLs often develop BICS before CALP (Hakuta et al., 2000). Conversational English is not as cognitively demanding or technical as academic English, which also contributes to ELLs developing BICS first (Roessingh, 2006). Although BICS often develops first, CALP is more related to educational attainment because it is academic language. This highlights the importance of the distinction between BICS and CALP: a student may have proficient conversational English skills, but it is unlikely his/her CALP skills are equivalent to his/her BICS skills. In the schools, this may lead to frustration for educators, school psychologists, and ELL students alike because the ELL student may appear to have adequate language skills when talking to teachers and peers, but struggle when completing academic language tasks involving reading and writing. This means that assessment of both BICS and CALP are critical to determining how to individualize their education to help them have the best possible outcomes.

Although Cummins' (1974, 1994, 2000) model is the one typically used in research (Aukerman, 2007; Hakuta et al., 2000; Roessingh, 2006), it has been subject to varied criticism regarding being too simplistic, failing to consider environmental factors, and promoting a deficit theory related to ELLs' academic difficulties (Edelsky et al., 1983; MacSwan, 2000; Martin-Jones & Romaine, 1986; Mozayan, 2015; Scarcella, 2003). The four quadrants that comprise

BICS and CALP have been criticized for being too simplistic to accurately capture the development of ELP in ELLs, as well as failing to consider how environmental factors (e.g., the quality of the instructor) impact the development of ELP (Mozayan, 2015; Scarcella, 2003). CALP has also been criticized as a measure of ELLs' ability to learn the tests that are used to assess CALP (e.g., Edelsky et al., 1983; Martin-Jones & Romaine, 1986). It has also been cited as promoting a deficit theory that doesn't consider ELLs may have academic difficulties independent of their ELL status and more related to factors such as poor instruction or underlying disabilities (Edelsky et al., 1983; MacSwan, 2000).

Given these criticisms, it is important to consider other ways ELP development has been conceptualized, including Second Language Instructional Competence (SLIC; Rolstad, 2005), Cummins' iceberg model (Cummins, 2008), and the threshold hypothesis (Cummins, 1976). SLIC is a subject-specific way of conceptualizing academic language and recognizes students can have sufficient academic language abilities to complete tasks in some subjects (e.g., language arts, math, social studies, science), but not others (Rolstad, 2005). The primary limitation of this model is the lack of standardized assessments for determining students' SLIC in different subject areas (Rolstad, 2005).

Cummins made many revisions to his theories over time, which is how the iceberg model and threshold hypothesis were developed (Cummins, 1976; 2008). The threshold hypothesis suggests ELLs must achieve a certain level of proficiency in both languages to benefit from being bilingual; otherwise, the cognitive demands associated with balancing both languages will surpass the individual's ability to gain proficiency in either language (Cummins, 1976). The iceberg model recognizes that while ELLs' first and second languages have different physical manifestations (i.e., their spoken and written languages), they share an underlying foundation

(e.g., storing features of both languages in memory) (Cummins, 2008). This is an important improvement upon Cummins' model because it better accounts for potential individual differences in how ELLs develop ELP. Although these varied theories deviate from the BICS/CALP conceptualization of ELP development in some ways, they still consider the complexities of ELP development, which includes recognizing the difference between conversational and academic English skills. For that reason, the current study emphasized academic English over conversational English because it is more strongly related to academic achievement (Hakuta et al., 2000; Roessingh, 2006).

Assessing ELP

A variety of methods are utilized when assessing BICS and CALP. BICS is often measured using standardized proficiency tests, while CALP is measured using standardized achievement tests (Hakuta et al., 2000). Informal methods of BICS and CALP assessment include parent, teacher, and student interviews, student observations, records review, and checklists or questionnaires (O'Bryon & Rogers, 2010). Some commonly-used formal measures include the *Bilingual Verbal Ability Test* (BVAT; Muñoz-Sandoval, Cummins, Alvarado, & Ruef, 2005) and the *Woodcock-Muñoz Language Survey* (WMLS; Schrank, Wendling, Alvarado, & Woodcock, 2010; Woodcock, Muñoz-Sandoval, Ruef, & Alvarado, 2005). The BVAT measures CALP in both English and Spanish, while the WMLS measures BICS in English and Spanish.

The literature differs regarding how ELP is defined and measured. For example, Hakuta et al. (2000) emphasize language as it relates to academic achievement, while MacSwan and Pray (2005) view ELP as a construct unrelated to academic achievement. Hakuta et al. (2000) investigated the length of time it takes ELLs to develop both oral and academic language

proficiency. They used data sets from two schools in California and two schools in Canada to examine these types of ELP as functions of students' exposure to English. The results from all four data sets were consistent and indicated that oral proficiency develops in 3 to 5 years, while academic proficiency develops in 4 to 7 years (Hakuta et al., 2000).

MacSwan and Pray (2005) examined oral language proficiency in 89 Hispanic ELLs who were in Kindergarten, first, second, and third grades. Participants were administered the *Bilingual Syntax Measure* (BSM; Burt, Dulay, & Hernandez-Chavez, 1980). Results indicated participants developed oral language proficiency in 1 to 6.5 years, with an average time of 3.31 years to fluency (MacSwan & Rolstad, 2005). Interestingly, older participants learned English more quickly than younger participants, which contradicts the notion that the earlier the exposure to a new language, the better. Both of these studies illustrate the importance of long-term bilingual education programs to support both conversational and academic language development (Hakuta et al., 2000; MacSwan & Pray, 2005).

Development of ELP

Although this distinction is made between academic and conversational language, it is important to recognize the overlap between academic and conversational language when understanding how ELP develops. Roessingh (2006) presents a quadrant framework based on Cummins' (1979, 1994, 2000) theory that is useful for conceptualizing this overlap.

As mentioned previously, conversational language is more context-embedded and less cognitively demanding than academic language. Roessingh's (2006) framework places context on the x-axis and cognitive demand on the y-axis. Quadrants one and two, which range from context-embedded to context-reduced and are both less cognitively demanding, represent BICS. Skills in these quadrants include understanding simple grammar, learning high frequency and

common vocabulary words, and developing basic reading and writing skills (Roessingh, 2006). In the second quadrant, the language learner has acquired a 2,500-5,000-word vocabulary (Roessingh, 2006).

Quadrant three represents a transitional stage between BICS and CALP; this quadrant is still context-embedded, but it is also cognitively demanding. In this stage, learners are attaining more proficiency with regards to academic language and are more focused on “reading to learn [than] learning to read” (Roessingh, 2006, pp. 94). In quadrant three, learners increase their academic vocabulary and have an overall vocabulary of approximately 8,000 words (Roessingh, 2006). Quadrant four is cognitively demanding and context-reduced; this quadrant represents CALP (Roessingh, 2006). In this stage, learners are able to think abstractly and understand metaphors, imagery, symbolism, and idioms. Learners are able to read, write, and speak academically and their vocabulary is in excess of 12,000 words (Roessingh, 2006).

Critical periods in ELP development. The idea of a critical period, which is the window of time, typically by puberty, when a non-native speaker of a language can attain native-like fluency in that language (Johnson & Newport, 1989; Lenneberg, 1967), has been central to understanding how ELLs learn English. Initially, research emphasized the idea of a critical period for both first and second language acquisition, which posits if the language is not acquired (or learned) by puberty, fluency in that language will never be attained (Johnson & Newport, 1989; Lenneberg, 1967). More recent research is mixed regarding the concept of a critical period for second language acquisition, with some research suggesting sensitive periods, which are less strict than critical periods, may better reflect the process of second language acquisition (Birdsong, 2006; Morgan, 2014).

In children, developmental variations have been observed across age groups. Kohnert, Bates, and Hernandez (1999) examined lexical-semantic production and cognitive processing in 100 children and young adults across five different age groups. These age groups were: 5-7, 8-10, 11-13, 14-16, and young adults. All of the participants began formal English instruction between the ages of 4 and 6 and Spanish was their first language. Participants completed a timed picture-naming task with three trials: Spanish, English, and mixed Spanish and English. The first two trials measured lexical-semantic development and the third trial assessed participants' ability to utilize cognitive processing strategies and minimize the impact of interference (i.e., incorrectly responding in English when prompted to respond in Spanish or vice versa). Results indicated as participant age increased, accuracy and fluency in both English and Spanish increased, as did the ability to resist interference (Kohnert et al., 1999). There was also support for a shift from Spanish to English language dominance over time, with the transition occurring during middle childhood (ages 8-13; Kohnert et al., 1999). Kohnert et al.'s (1999) study provided evidence for sensitive periods because of the increases in English proficiency in terms of fluency, naming, and cognitive processing across the age groups. The switch in language dominance also supports the notion of critical periods, given the transitional period between Spanish and English dominance ended around age 13.

There are also differences when examining ELP in children versus adults (Bleakley & Chin, 2010; Johnson & Newport, 1989). Bleakley and Chin (2010) investigated the impact of age at arrival and social assimilation on immigrants' English proficiency using 2000 Census microdata. Their analyses focused on individuals who came to the United States before the age of 15 and were between the ages of 25 and 55 at the time of the study. The results of Bleakley and Chin's (2010) study supported the critical period concept. Immigrants who arrived in the

United States before the age of nine had significantly higher English language proficiency than those who arrived in the United States after age nine (Bleakley & Chin, 2010).

Johnson and Newport (1989) examined ELP in 46 Chinese and Korean individuals who moved to the United States. Participants ranged in age from 3 to 39 years and had “lived in the United States between 3 and 26 years [at] the time of testing” (Johnson & Newport, 1989, pp. 60). Participants completed the judgments of grammaticality test as a measure of English language proficiency. Results suggested that after controlling for extraneous variables (e.g., motivation, experience with English, American identification), participants who moved to the United States before puberty had much greater English proficiency than those who moved to the United States later in life (Johnson & Newport, 1989). These findings more strongly support the idea of a sensitive period for second language acquisition because while individuals who moved to the United States when they were younger had greater ELP than those who moved after puberty, the latter group was still able to attain proficiency in English (Johnson & Newport). This supports the sensitive period hypothesis because it shows while second language acquisition becomes more difficult with age, it is not impossible (Morgan, 2014). Although critical and sensitive periods are an important component in terms of understanding English language proficiency, it is important to consider other factors that impact English language proficiency to improve the outcomes of ELLs.

Factors Influencing English Language Proficiency

There are many individual, family, and educational factors that influence English language proficiency. Factors such as socioeconomic status, parental level of education, neighborhood variables, experiencing discrimination, the reason for immigration, social-emotional functioning, how long the individual has been exposed to English, level of

acculturation, executive functioning, intellectual functioning, and motivation all play an important role in the development of ELP (Carlson & Meltzoff, 2008; Halle et al., 2012; Krashen & Brown, 2005; MacSwan & Pray, 2005; Sotelo-Dynega, Ortiz, Flanagan, & Chaplin, 2013). Educational factors include participation in preschool and educational programs, parents' level of school involvement, teacher attitudes and characteristics, the ELL population in the school, and access to effective bilingual education programs (Halle et al., 2012; Klingner, 2006). This portion of the literature review will focus on individual and family variables, rather than educational variables. Specifically, executive functioning and acculturation will be discussed.

Executive Functioning

Executive functioning is an umbrella term for the cognitive processes that are associated with independent, goal-directed behavior (Best & Miller, 2010; Lezak, Howieson, Bigler, & Tranel, 2012). Many different areas of the brain are involved with executive functioning, but the anterior frontal lobes are the primary structures with which executive functioning are associated. The anterior frontal lobes are one of the last areas of the brain to develop in children and adolescents, and one of the first areas to decline in older adults (Best & Miller, 2010; Kray, Eber, & Lindenberger, 2004); as a result, executive functioning increases during adolescence, reaches its peak during young adulthood, and decreases during old adulthood (Best & Miller, 2010; Kray et al., 2004).

Attention, working memory, planning, decision-making, verbal reasoning, inhibition, problem-solving, and set-shifting are often associated with executive functioning (Best & Miller, 2010; Chan, Shum, Touloupoulou, & Chen, 2008; Kray et al., 2004; Lezak et al., 2012). Although these constructs form the collective whole of executive functioning and are interrelated, it is important to understand how they are defined and assessed individually.

Attention refers to the ability to attend to stimuli for an extended period of time (Kray et al., 2004). Working memory is the ability to hold on to and manipulate information, such as when ELLs are able to generate a sentence in one language and translate it into English (or vice versa) (Best & Miller, 2010). Working memory is a critical precursor to long-term memory because if information doesn't stay in working memory, it won't make it to long-term memory for later retrieval (Best & Miller, 2010). Attention and working memory are crucial to the development of ELP because ELLs need to be able to attend to and process English in order to gain proficiency.

Planning is the ability to identify and organize the steps and resources necessary to reach a goal (Chan et al., 2008). Problem-solving is part of the planning process and involves using a systematic approach to solve a problem (Chan et al., 2008). Typical steps in the problem-solving process include: defining the problem, identifying alternatives, identifying pros and cons of those alternatives, selecting and testing one of the alternatives, examining the alternative's effectiveness, and testing other alternatives if the first one was ineffective (Chan et al., 2008). Both planning and problem-solving contribute are critical to the development of ELP and academic achievement for ELLs for achieving both short (e.g., learning English vocabulary and grammar) and long-term goals (e.g., graduating from high school).

Decision-making involves using a set of criteria to choose one option from a variety of options (Kray et al., 2004). When individuals are able to understand and analyze verbal information, they are using verbal reasoning skills (Kray et al., 2004). Verbal information can be presented visually (e.g., reading words on a page) or auditorally (e.g., listening to someone talking; Kray et al., 2004). ELLs use decision-making and verbal reasoning when understanding

the complexities of English, such as understanding the difference between “there,” “their,” and “they’re” and being able to decide which of these to use when completing writing tasks.

Set-shifting is the ability to mentally switch between two different tasks (Best & Miller, 2010), such as when ELLs switch between speaking their native language and English.

Inhibition is involved with set-shifting and is the ability to stop an automatic response (Best & Miller, 2010). Research suggests bilingual individuals use inhibition when switching between languages to inhibit the language they aren’t speaking (Bialystok, Craik, Green, & Gollan, 2009; Stocco, Yamasaki, Natalenko, & Prat, 2014). This inhibition does not appear to result in speech delays or increases in cognitive load for bilinguals (Bialystok, Craik, & Luk, 2008; Gutiérrez-Clellen, Calderón, & Ellis Weismer, 2004). As indicated in the examples throughout this section, all of these components of executive functioning play an important role in helping ELLs develop ELP and succeed academically. Because of this, understanding ELLs’ strengths and weaknesses in executive functioning is critical to determining how to help them succeed when they do struggle with ELP or academics.

Development of executive functioning. As mentioned previously, executive functioning develops starting in childhood, peaks in adulthood, and declines in late adulthood (Best & Miller, 2010; Kray et al., 2004). Research focuses on understanding developmental variations in executive functioning, as well as the factors that contribute to the development of executive functioning.

Bernier, Carlson, Deschênes, and Matte-Gagné (2012) examined the relationship between attachment in early childhood and the development of executive functioning skills and working memory later in life. Participants were 62 families that consisted of a mother, father, and child. Attachment was measured when the child was between 1-2 years old and executive functioning

was assessed at ages 2 and 3. Measures included observations of the infant with his/her mother and father, child attachment security, executive functioning measures of inhibition, set-shifting, and working memory, and the child's receptive vocabulary abilities. Results suggested that at age 3, child attachment security was the best predictor of executive functioning abilities. This highlights the importance of developing secure attachment patterns at a young age to promote the development of executive functioning later in life (Bernier et al., 2012). This is important when thinking about executive functioning and academic achievement because of the propensity for executive functioning to positively impact ELP and academic achievement.

There is variation in the development of different components of executive functioning. Inhibition abilities begin to develop and improve in the preschool years, with significant improvements occurring in early and middle childhood (Best, Miller, & Jones, 2009; Jurado & Rosselli, 2007). Generally, inhibition does not improve significantly during adolescence and adulthood (Best et al., 2009). The ability to complete simple working memory tasks appears to be developed by age 9, but more complex working memory skills can continue to improve into adulthood (Best et al., 2009). This developmental trajectory coincides with the development of ELP in terms of critical periods, which may help to explain why ELLs have improved inhibition when compared to monolinguals: during the time when their inhibition abilities are developing, they are actively practicing inhibition in a way monolinguals aren't.

Set-shifting abilities improve dramatically between early childhood and young adulthood. Developmental variations are obvious in that adolescents and adults are more likely than children to sacrifice speed for increased accuracy (Best et al., 2009). Planning is similar to working memory in that mastery is attained earlier for simpler planning tasks than for complex tasks. Improvements in planning abilities extend into adolescence and adulthood, which makes sense

given that planning is one of the most complex executive functioning abilities (Best et al., 2009). The developmental trajectory of set-shifting, in particular, may help to explain why children develop native-like ELP better than adults: ELLs who learn English while set-shifting abilities are developing (i.e., children) receive concurrent practice in set-shifting and English language learning, rather than learning English after set-shifting abilities are established (i.e., adults).

Declines in executive functioning in late adulthood are typically observed starting in the 70s (Best et al., 2009; Jurado & Rosselli, 2007). These deficits are observed across all components of executive functioning (Jurado & Rosselli, 2007), but it is unclear if different components are affected differently by aging (Best et al., 2009). Research suggests working memory, inhibition, and processing speed deficits are likely responsible for the decline in executive functioning associated with aging (Best et al., 2009; Hartman, Bolton, & Fehnel, 2001; Wang et al., 2011). Given that executive functioning abilities decline with age, it makes sense that it is more difficult to learn a new language as individuals get older because executive functions contribute to individuals' ability to learn a new language.

Neuroanatomy of executive functioning. An examination of the neuroanatomy of executive functioning provides insight into how the brain works as a functional whole and the developmental trajectory of executive functioning. The prefrontal cortex (PFC; Arnsten & Li, 2005; Bunge, Hazeltine, Scanlon, Rosen, & Gabrieli, 2002; Dalley, Cardinal, & Robbins, 2004; Mansouri, Tanaka, & Buckley, 2009), anterior cingulate cortex (ACC; Aarts & Roelofs, 2011; Bunge et al., 2002; Lau, Rogers, & Passingham, 2006), basal ganglia (BG; Kotz, Schwartz, & Schmidt-Kassow, 2009), parietal lobes (Bunge et al., 2002), and cerebellum (Bellebaum & Daum, 2007; Ridler et al., 2006; Schweizer et al., 2008) have all been implicated in executive functioning.

Prefrontal cortex. The prefrontal cortex is associated with decision-making, response selection and inhibition, and working memory (Arnsten & Li, 2005; Bialystok et al., 2009; Bunge et al., 2002; Dalley et al., 2004; Mansouri et al., 2009). Arnsten and Li (2005) examined the impact of catecholamine, a neurotransmitter, on the prefrontal cortices. The prefrontal cortex requires optimal levels of norepinephrine and dopamine to function. Blockage of norepinephrine and dopamine in the PFC by catecholamine produced symptoms similar to those seen in attention-deficit/hyperactivity disorder (e.g., impulsivity, hyperactivity, inattention). Bunge et al. (2002) demonstrated the role of the PFC in executive functioning by using fMRI imaging to determine which areas of the brain were activated during a decision-making and working memory task in adults. They found that the PFC was activated during the working memory task (Bunge et al., 2002). Mansouri et al. (2009) examined the dorsolateral PFC in humans and monkeys to better understand the PFC's role in behavioral adjustment. They found that the dorsolateral PFC is implicated in both memory and attentional control. Overall, these results support the idea that the prefrontal cortices impact executive functioning, and especially attention and memory, but it is important to recognize that executive functioning does not lie solely within the prefrontal cortices.

Anterior cingulate. The anterior cingulate has been implicated in working memory, attention, inhibition, and set-shifting tasks (Aarts & Roelofs, 2011; Bunge et al., 2002). In the above study, Bunge et al. (2002) found that the anterior cingulate was activated during the working memory task, but not the decision making task. Aarts and Roelofs (2011) examined the role of the ACC in attention, inhibition, and set-shifting using a Stroop-like task with cueing that indicated the probability of upcoming targets being congruent or incongruent to the previous target. Participants were 20 healthy Dutch adults between the ages of 19 and 26. Neuroimaging

indicated activation of the ACC during the Stroop-like task when participants had to adjust based on the congruent or incongruent cues, suggesting the ACC plays an important role in attention, inhibition, and set-shifting abilities (Aarts & Roelofs, 2011).

Basal ganglia. The basal ganglia, which has traditionally been associated with motor functioning (DeLong & Georgopoulos, 2011; Kravitz et al., 2010; Lezak et al., 2012. Rinehart et al., 2006), is also believed to be associated with planning, set-shifting, working memory, verbal reasoning, and verbal fluency (Bialystok et al., 2009; Kotz et al., 2009; Monchi, Petrides, Strafella, Worsley, & Doyon, 2006). Monchi et al. (2006) used fMRI to determine the role of the basal ganglia in planning and set-shifting. Results indicated the subthalamic nucleus (a basal ganglia region) was activated in all set-shifting conditions, but the caudate nucleus and putamen (other basal ganglia regions) were only activated when participants were required to use both planning and set-shifting (Monchi et al., 2006). Nakayama et al. (2013) examined the impact of a basal ganglia infarction in two Japanese adults (ages 38 and 70). After the infarct, both patients presented with verbal dysfluency, but other language abilities were spared. Melrose, Poulin, and Stern (2007) used fMRI to determine the role of the basal ganglia in abstract reasoning and working memory. Participants were 22 healthy adults who completed a reasoning and working memory task with reasoning, reasoning control, matching (working memory), and matching control conditions. Results showed bilateral caudate activation occurred during the reasoning and working memory tasks, while the left caudate was more active during reasoning than working memory tasks. Overall, these findings support the role of the basal ganglia in numerous components of executive functioning, including reasoning, set-shifting, inhibition, and working memory.

Parietal lobes. The parietal lobes, specifically, the inferior parietal lobes, appear to be involved with working memory and decision-making abilities (Baldo & Dronkers, 2006; Bunge et al., 2002). Bunge et al. (2002) found that the left inferior parietal cortex had greater activation during the decision-making task than the working memory task. Baldo and Dronkers (2006) examined the role of the inferior parietal lobe during verbal working memory tasks in patients with inferior parietal lesions. Ten patients with lesions in their left inferior parietal lobe completed a language assessment, word span tasks, repetition tasks, rhyming tasks, and a two-back working memory task. All participants demonstrated deficits on the rhyming, span, and repetition tasks, which is indicative of the left inferior parietal lobe's role in verbal working memory tasks. There is also evidence that the parietal lobes are involved with visuospatial working memory. Vance et al. (2007) used fMRI to determine the neuroanatomical structures associated with spatial working memory deficits seen in children with attention-deficit/hyperactivity disorder, combined type (ADHD). Participants were 12 males between the ages of 8-12 with ADHD and 12 matched controls. They completed a mental rotation task to measure spatial working memory. Results indicated males with ADHD had significantly less right inferior parietal lobe activation than the healthy controls (Vance et al., 2007). Overall, these studies highlight the role of the parietal lobes in decision making and verbal and visuospatial working memory tasks.

Cerebellum. The cerebellum has been implicated in reasoning, working memory, planning, attention, verbal fluency, set-shifting, and inhibition abilities. In a hallmark study, Schmahmann and Sherman (1998) examined the impact of cerebellar diseases on executive functioning tasks including planning, set-shifting, verbal fluency, abstract reasoning, and working memory. Twenty patients with cerebellum-specific disorders completed a

comprehensive medical evaluation, neurological examination, neuropsychological assessment, mental status examination, and MRI and EEG imaging. All patients demonstrated significant impairment on planning, set-shifting, abstract reasoning, working memory, and verbal fluency tasks. This suggests that any type of cerebellar dysfunction will lead to executive functioning impairment, which highlights the importance of the cerebellum in executive functioning tasks.

Cerebellar function has also been implicated in the typical developmental trajectory of executive functioning. Ridler et al. (2006) conducted a longitudinal investigation to gain a better understanding of the developmental trajectory of schizophrenia. One-hundred forty-two participants received a motor development assessment when they were one-year-old. Executive functioning testing and MRIs were completed between the ages of 33-35. Results indicated adult executive functioning was associated with increased cerebellar grey matter volume in healthy subjects, but not those who developed schizophrenia. This indicates that cerebellar dysfunction contributes to executive dysfunction in people with schizophrenia and plays an important role in the typical development of executive functions.

The cerebellar deficit hypothesis is one explanation for the cause of dyslexia and provides insight into the role of the cerebellum in verbal reasoning, working memory, and fluency tasks (Brookes & Stirling, 2005; Raberger & Wimmer, 2003). Brookes and Stirling (2005) examined the relationship between dyslexic tendencies and cerebellar soft signs in 27 healthy children between the ages of 8-9 without a formal dyslexia diagnosis. Participants completed tasks of nonverbal intelligence, reading, auditory and picture sequencing, applied sequences (e.g., days of the week), and balance and coordination (i.e., cerebellar soft signs). Results indicated participants' reading and applied and picture sequences skills were related to

cerebellar soft signs, which supports the role of the cerebellum in reading and reasoning skills (Brookes & Stirling, 2005).

In another study examining the cerebellar deficit hypothesis, Raberger and Wimmer (2003) examined the relationship between balance and verbal fluency in children with ADHD and dyslexia. Participants were divided into four groups and included: children with dyslexia but not ADHD, children with ADHD but not dyslexia, children with comorbid ADHD and dyslexia, and healthy controls. There were ten children in each group, for a total of 40 participants. Participants completed a balance task and a rapid naming task as measures of cerebellar function and verbal fluency, respectively. Results indicated participants with comorbid ADHD and dyslexia demonstrated balance and rapid naming deficits, but children with dyslexia only did not demonstrate balance problems. The researchers concluded this does provide evidence for the involvement of the cerebellum in verbal fluency for dyslexic individuals, but is not implicated in their motor skills (e.g., balance; Raberger & Wimmer, 2003). In sum, the cerebellum plays an integral role in most executive functioning activities, including reasoning, planning, set-shifting, inhibition, working memory, and verbal fluency tasks.

Assessing executive functioning. Lezak et al. (2012) provided an excellent summary regarding the assessment of each of the components of executive functioning. Given that executive functioning abilities are often assessed individually, it is important to understand how executive functioning tasks are differentiated from one another. There are no pure measures of attention and given that attention is impacted by processing speed and capacity, these constructs are often measured separately (Lezak et al., 2012). Processing speed tasks involve determining how quickly an individual is able to process both verbal and visual information, while attentional capacity tasks measure how much an individual can remember in a short period of time (Lezak et

al., 2012). There are also sustained attention tasks, which measure individuals' ability to focus over a longer period of time and discriminate between stimuli (Kray et al., 2004). Working memory tasks expand on attention measures by requiring individuals to manipulate the information after they have processed it (Best & Miller, 2010). Due to the interrelated nature of attention, processing speed, and working memory tasks, it is important to assess each of these components to gain a full understanding of individuals' attention and memory abilities.

Assessing the attention and memory abilities of ELLs is important because it provides insight into their abilities to attend to and remember information in English.

Set-shifting and inhibition are often assessed simultaneously through activities such as the Trail Making task from the *Delis-Kaplan Executive Function System* (D-KEFS; Delis, Kaplan, & Kramer, 2001). In order to effectively complete one aspect of the task, participants must be able to inhibit the previous response to switch between two categories. Inability to complete either of these components results in slowed response time or a higher rate of errors (Delis et al., 2001). Assessment of inhibition and set-shifting in ELLs is critical when conceptualizing their English language abilities because of the roles that set-shifting and inhibition play in bilingual language development (Bialystok et al., 2009; Stocco et al., 2014).

Verbal reasoning is typically assessed through verbal comprehension tasks, which can include measures of expressive and receptive language (Kray et al., 2004). Planning (including problem-solving) and decision-making are measured through similar, overlapping methods. These are often assessed both verbally and visually. For example, individuals may be asked to complete a storytelling task to assess their ability to verbally organize information in a logical sequence (Chan et al., 2008). Visual-spatial tasks such as clock drawings and maze tasks elicit individuals' ability to plan independent of language abilities; as such, these methods may be

preferable to verbal planning tasks when there are concerns about language proficiency. One of the most popular decision-making tasks is the *Iowa Gambling Task* (IGT; Bechara, 2007). By combining uncertainty with positive and negative reinforcement, the IGT is able to approximate real-life decision making (Lezak et al., 2012). With regards to ELLs, it is especially important to assess their verbal reasoning, planning, and decision-making abilities because these abilities directly impact their ability to learn and understand English.

In addition to individual tests, there are a variety of wide-range neuropsychological measures available that assess components of executive functioning. Using these wide-range assessments is preferable to administering many individual tests because these assessments draw from one normative sample, thus making them more statistically sound (Lezak et al., 2012). Some commonly used wide-range assessments are: the D-KEFS, the *NEPSY-II* (Korkman, Kirk, & Kemp, 2007), the *Halstead-Reitan Neuropsychology Test Battery* (Halstead-Reitan; Reitan & Wolfson, 1993), and the *Luria-Nebraska Neuropsychological Battery* (LNNB; Golden, Purisch, & Hammeke, 1985). Although there is research comparing the executive functioning abilities of bilinguals/ELLs to monolinguals, there is a lack of research regarding the reliability and validity of neuropsychological and executive functioning measures in these populations. Future research should focus on filling this gap in the literature.

Bilingualism and executive functioning. Research indicates there are executive functioning and verbal ability differences in individuals who speak more than one language compared to monolinguals, and that these differences are consistently present across age groups (e.g., Bialystok, Barac, Blaye, & Poulin-Dubois, 2010; Bialystok et al., 2008; Carlson & Meltzoff, 2008). Bialystok et al. (2008) examined cognitive control and lexical access in 96 monolingual and bilingual adults ranging in age from 20-68 years. Participants were assessed

with tasks of working memory, lexical retrieval (e.g., receptive vocabulary, naming, and verbal fluency tasks), and executive control (e.g., measures of inhibition, set-shifting, and attention). Results indicated monolingual individuals performed better than bilingual individuals on lexical retrieval tasks, but bilinguals performed better on executive control tasks. There were no group differences with regards to working memory and little evidence for group differences on the basis of age (Bialystok et al., 2008). These results suggest bilingual/non-native English speakers have additional linguistic barriers to overcome, but their ability to manage two linguistic systems may enhance their performance on inhibition and set-shifting tasks compared to monolingual individuals (Bialystok et al., 2008).

Support for an executive functioning advantage in bilingual individuals has been demonstrated starting in early childhood. Carlson and Meltzoff (2008) examined inhibitory control in 50 native bilingual, English monolingual, and ELL (with Spanish as the first language) Kindergarten students. The students completed tests of executive functioning and a picture vocabulary test to assess and control for verbal ability. After controlling for verbal ability and demographic variables, the native bilingual children were found to perform better than both the monolingual and ELL groups on the executive functioning measures, and especially those tasks that required set-shifting and inhibition (Carlson & Meltzoff, 2008).

In addition to this executive functioning advantage, a verbal ability deficit when compared to monolingual individuals has been observed in bilingual children as young as three. Bialystok et al. (2010) compared word mapping and executive functioning in 162 monolingual English, monolingual French, and bilingual children between 3-5 years old. Similar to the previously-described results, the bilingual children performed better on executive functioning

tasks (e.g., inhibition and set shifting), while the monolingual children in both groups had stronger verbal abilities than the bilingual students (Bialystok et al., 2010).

There are several proposed mechanisms regarding why bilinguals have an executive functioning advantage compared to monolinguals, including: having improved subcortical auditory encoding skills (Krizman, Marian, Shook, Skoe, & Kraus, 2012), having frequent practice managing two language systems (Bialystok, 2009), and having an increased ability to maintain action goals during inhibition tasks (Colzato et al., 2008). Krizman et al. (2012) compared subcortical auditory encoding and sustained selective attention for visual and auditory stimuli in 25 monolingual and 23 bilingual adolescents who were matched on age and SES. Results indicated the bilingual participants were able to encode auditory stimuli more quickly than the monolingual participants, as well as sustain both visual and auditory attention better than the monolingual participants. These findings suggest the experience of being bilingual may promote enhanced auditory encoding compared to monolinguals because bilingual individuals are constantly managing sounds in two different languages (Krizman et al., 2012).

Colzato et al. (2008) compared active and reactive inhibition mechanisms in bilingual and monolingual individuals to further analyze the nature of bilinguals' advantage in inhibition tasks. They used three measures of inhibition: stop signal performance (an active inhibition task), inhibition of return (a reactive inhibition task), and attentional blink (a measure of suppression efficiency). Both groups of participants performed equally well in the active inhibition task, but bilingual participants had stronger reactive inhibition and suppression efficiency abilities. In other words, the bilingual individuals were better able to ignore distractors and maintain the task goals than monolingual individuals. These findings help to explain why bilingual individuals may perform better than monolingual individuals on

confrontational inhibition tasks, as being able to ignore irrelevant information and attend to the task goals are required in inhibition tasks (Colzato et al., 2008). In sum, the research supports the idea that individuals who speak more than one language have an executive functioning advantage over monolingual individuals, but they struggle with verbal abilities compared to monolinguals. This profile may be related to cognitive and environmental differences between bilingual and monolingual individuals. It is important to expand upon this literature and develop strategies that can utilize ELLs' executive functioning abilities to aid in developing stronger language skills.

Acculturation

Bilingual ELLs in the United States are likely operating within at least two cultures: the culture from which they come and the United States culture to which they're exposed in their schools, jobs, and communities. It is psychologists' ethical duty to be culturally competent, and part of this includes being sensitive to the unique experiences of bilingual ELLs that are the result of their blended cultures. In both application and theory, acculturation is conceptualized in terms of people who have permanently moved to a location that is culturally dissimilar from their original culture (e.g., immigrants, refugees; Schwartz, Unger, Zamboanga, & Szapocznik, 2010).

Traditional acculturation models categorize individuals based on how much they retain their original (heritage) culture and embrace their new (receiving) culture. Berry's (1980) acculturation model is likely the most cited (e.g., Afable-Munsuz & Brindis, 2006; Cleveland & Laroche, 2007; Crisp & Turner, 2011; Nguyen & Benet-Martínez, 2013; Pieter Van Oudenhoven, Ward, & Masgoret, 2006; Schwartz et al., 2010; Shore et al., 2009; Tadmor & Tetlock, 2006). Berry's model considers how immersed individuals are in both cultures and separates individuals into one of four categories: assimilation, separation, integration, and

marginalization. Individuals in the integration and assimilation groups have both adopted their receiving cultures; however, integrated individuals retain their heritage culture and assimilated individuals reject their heritage culture. Individuals in the separation and marginalization groups have both rejected their receiving cultures; however, separated individuals maintain their heritage culture and marginalized individuals reject their heritage culture (Berry, 1980).

Measuring acculturation. This section will focus on the use of unidimensional and bidimensional models to measure acculturation. Unidimensional models view acculturation as a spectrum, with the individual's heritage (original) culture on one end and the receiving (new) culture on the other end (Ryder, Alden, & Paulhus, 2000). Bidimensional models view acculturation as having two separate, but interrelated axes, as in Berry's (1980) model (Ryder et al., 2000). These models categorize individuals depending on the extent to which they retain their heritage culture and embrace their new receiving culture.

Bidimensional models are seen as an improvement over unidimensional models because they recognize that individuals do not have to sacrifice one culture to embrace another (Lopez-Class, Castro, & Ramirez, 2011). Ryder et al. (2000) compared unidimensional and bidimensional models of acculturation in 728 Asian individuals. The bidimensional model was better able to represent the distinct identities of participants' heritage and receiving cultures than the unidimensional model. Additionally, the bidimensional model was correlated with participants' individual variables, such as personality, which indicates that it represents a more holistic view of acculturation than a unidimensional model (Ryder et al., 2000). Flannery, Reise, and Yu (2001) compared unidimensional and bidimensional models in 291 Asian Americans and found that while both models were a good fit regarding Asian preferences, the bidimensional model did not maintain independence between the heritage and receiving cultures. Overall, this

study still supported using a bidimensional model over a unidimensional model because the bidimensional model was a better predictor of more variables (e.g., preferences, cultural knowledge, test performance; Flannery et al., 2001).

Although bidimensional models are typically viewed as being superior to unidimensional models (Flannery et al., 2001; Lopez-Class et al., 2011; Ryder et al., 2000), there is a push for the development of a more multidimensional/tridimensional model that can overcome the limitations of bidimensional models and provide an even more comprehensive view of acculturation that takes into account the factors that impact acculturation that were previously discussed (Flannery et al., 2001; Lopez-Class et al., 2011). This tridimensional model conceptualizes acculturation in terms of individualism-collectivism, self-construals, and prior dimensions of cultural identifications (Schwartz et al., 2010) as observed in attitudes, behaviors, and values (Locke, 1998). In other words, a measure using a tridimensional model would have three scales (attitudes, behaviors, and values) and would feature questions and/or statements designed to elicit information about how their attitudes, behaviors, and values have changed as a result of their receiving culture (Locke, 1998). In spite of the conceptual advantages of multidimensional and tridimensional acculturation models, these types of models are in need of further research and development. Bidimensional acculturation models are better-established in the literature (Flannery et al., 2001; Lopez-Class et al., 2011; Ryder et al., 2000) and relevant to bilingual ELL populations because they are able to consider the cultures of these individuals' first and second languages.

Factors influencing the development of acculturation. Factors such as migrant type, ethnicity, cultural similarity, gender, education, socioeconomic status, and age all impact the acculturation process and, in turn, the development of ELP and academic success (Dow, 2010;

Schwartz et al., 2010). Migrant type is the reason a person leaves his/her country and culture of origin. Individuals who move to a new culture willingly, such as international students or those moving because of a job, are likely to have a more positive acculturation experience than those who leave their country because they feel that they have no other choice, such as those forced to leave their country because of war or a natural disaster (Schwartz et al., 2010). ELL students who come to the United States willingly will likely be more motivated to put forth effort at school and into learning English than students who felt forced to move.

United States citizens perceive Caucasian (e.g., western European and Canadian) immigrants more positively than minority immigrants (Rumbaut, 2008). Because of these perceptions, minority immigrants are more likely to engage in reactive ethnicity, or separation in Berry's (1980) model (Rumbaut, 2008). Similarly, members of the receiving culture are more accommodating and welcoming of immigrants who are more highly educated (Schwartz et al., 2010) and wealthy (Dow, 2010). Unfortunately, minority immigrants aren't often highly educated or wealthy (Albrecht et al., 2005; Sirin, 2005), which can make the acculturation process more difficult in the United States. Along these lines, when individuals move to a culture that is similar to their heritage culture, adjusting to the receiving culture is easier than if the two cultures are very different from one another (Schwartz et al., 2010). As it relates to ELLs, adjusting to United States culture may be more difficult for some minority ELL populations if their heritage culture is more collectivistic because United States culture is more individualistic (Lorenzo-Blanco, Unger, Ritt-Olson, Soto, & Baezconde-Garbanati, 2013).

Gender role differences between the heritage and receiving cultures can impact how female immigrants adjust to the receiving culture (Dow, 2010). Women coming into receiving cultures that have opposite gender role expectations as their heritage cultures are more likely to

experience dissonance because of the different expectations. Female ELLs coming from cultures that value more traditional gender roles than the United States may have a difficult time adjusting to United States culture because of these differences (Dow, 2010). Regarding age, younger individuals are often able to adjust to the receiving culture better than older individuals because younger individuals do not have as much exposure to their heritage culture (Dow, 2010; Schwartz et al., 2010). As highlighted throughout this section, all of these components of acculturation have the potential to impact ELLs' acculturation experiences in the United States, which includes the development of ELP and educational success in United States schools. Psychologists and educators should be aware of these factors so they can address them to help ELL students have the best possible outcomes.

Acculturation and English language proficiency. The research on the relationship between acculturation and ELP focuses on the way acculturation impacts ELP, but not the impact of ELP on acculturation (e.g., Jia, Gottardo, Koh, Chen, & Pasquarella, 2014; Jiang, Green, Henley, & Masten, 2008; Spenader, 2011). Jia et al. (2014) examined the role that acculturation plays in reading a second language. Participants were 94 adolescent Chinese immigrants in grades 7-12 in Canada. The researchers assessed vocabulary, reading fluency, and reading comprehension and found a positive relationship between acculturation and English literacy skills. This relationship remained after controlling for length of time in Canada, indicating the extent to which an individual acculturates is more important than the amount of time they have lived in the receiving country (Jia et al., 2014). This suggests that a more direct approach may be beneficial to helping ELL students integrate into their schools and develop ELP.

Jiang et al. (2009) conducted a similar study in the United States. Participants were 49 Chinese graduate students who arrived in the United States after age 18. They completed an acculturation scale, a sentence reading task, and an oral speaking proficiency interview. Results indicated higher levels of acculturation were associated with higher levels of proficiency, but not pronunciation. These findings are consistent with those found by Jia et al. (2014) and also support the idea of a critical period for second language acquisition – because all of the participants entered the United States after the age of 18, attaining native-like pronunciation skills would be expected to be very difficult.

Even short-term exposure to a country's culture can have an impact on ELP. Spenader (2011) followed four United States students during a year-long study abroad experience in Sweden. The students ranged in age from 16 to 18 years and completed acculturation interviews, an acculturation measure, and an informal oral proficiency interview five and ten months into their trips. As with Jia et al. (2014) and Jiang et al. (2009), higher levels of acculturation into the Swedish culture were associated with higher levels of new language proficiency. The evidence for the positive impact of acculturation on ELP is clear, and given the previously discussed relationships between ELP and academic achievement, and academic achievement and long-term outcomes, helping ELL students integrate into their receiving culture is critical to improving their long-term outcomes.

Racial and ethnic minorities and acculturation. There is an abundance of research regarding acculturation and racial and ethnic minority populations in the United States; given this population is rapidly increasing in the United States (USCB, 2012), this is unsurprising. The research on these individuals' acculturation experiences in the United States focuses on the

relationship between acculturation and academic achievement, physical health, and mental health.

Wolin, Colditz, Stoddard, Emmons, and Sorensen (2006) examined the relationship between acculturation and physical activity in over 3,900 low-income, urban adults. Participants were recruited from health centers and small businesses. Participants were 62.7% White, 17.1% Black, 10.3% Other, and 9.0% Hispanic. Participants completed leisure and occupational physical activity questionnaires, as well as language acculturation measures. They were grouped according to their acculturation level (i.e., low, moderate, and high) and generation level (i.e., born outside of the United States, first-generation U.S. citizen, and second-plus generation U.S. citizen). Results indicated those with higher levels of acculturation reported higher levels of leisure and occupational physical activity. Further, participants who were first or second-plus generation U.S. citizens reported higher levels of leisure physical activity than foreign-born participants. Engaging in regular physical activity is a protective factor associated with positive academic and social-emotional outcomes (Kann et al., 2016); as a result, it is important to determine ways to improve the extent to which foreign-born minorities engage in physical activity both at work and during their leisure time (Wolin et al., 2006).

Ying and Han (2007) conducted a longitudinal investigation to determine how the intergenerational acculturation gap impacted Southeast Asian American adolescents' conflict and mental health. Participants were 490 eighth and ninth graders; the first wave of data were collected when the students were in eighth/ninth grade, while the second wave was collected three years later. Participants completed measures of intergenerational discrepancy (i.e., how different their views were from their parents'), intergenerational and intercultural conflict, and depressive symptomatology. The intergenerational discrepancy data were collected during the

first wave, while conflict and depressive symptomatology data were collected during the second wave. Results indicated students with higher perceived intergenerational discrepancies reported higher symptoms of depression; however, intergenerational and intercultural conflict mediated this relationship. These results suggest acculturation-related conflict between minority children and their parents increases the children's risk of mental health problems over the long-term. This highlights the importance of providing social-emotional support to minority families to decrease initial stress and minimize future problems (Ying & Han, 2007).

To identify components of acculturation that result in positive outcomes for Hispanic individuals, Nelson and Infante (2014) interviewed 20 Mexican college students to learn about their adjustment experience. Participants responded to in-depth written surveys that featured open-ended questions. The majority of participants described themselves as ethnically and culturally being both Mexican and American, although some described themselves as being exclusively Mexican. Fourteen of the 20 participants indicated they preferred to speak both English and Spanish; four indicated a preference for speaking Spanish, and the remaining two participants preferred to speak English exclusively (Nelson & Infante, 2014). In almost unanimous agreement, 19/20 responders indicated the best way to adjust to American culture was to integrate their Mexican heritage with American culture. Participants indicated thinking that integrating cultures results in being more open-minded and willing to try new things. All participants indicated being Appreciative to Very Appreciative of their heritage culture. With regards to the factors that contribute to their bicultural identity, there was significant overlap between factors that contributed to both Mexican and American identities. For example, participants indicated that both identities were influenced by food, music, language, religion, and television. Interestingly, family was one factor that was only indicated in the Mexican identity

lists, while education was only indicated in the American identity lists. These findings reflect the collectivist nature of Mexican culture and the reason why many people immigrate to the United States: educational opportunities. Nelson and Infante (2014) provide valuable insight into the factors that contributed to success in Hispanic immigrants and underscore the importance, once again, of providing support to immigrants and ELLs to promote success in their United States lives.

Conclusions

Ethnic and racial minorities are the fastest-growing group in the United States today (USCB, 2012), and this trend is also evident when examining the ELL population in United States schools (Kena et al., 2013; Ruiz Soto et al., 2015). Given the academic and long-term outcome disadvantages associated with ELLs (Abedi, 2004; Albrecht et al., 2005; Hemphill et al., 2011; Kena et al., 2016; Kohut et al., 2006), it is important to understand how to better meet the needs of this rapidly expanding population. Although there is a substantial amount of research regarding bilingual ELLs and acculturation, executive functioning, and ELP, there is a relative lack of research on the interplay between these factors. A better understanding of this interplay would likely improve psychologists' and educators' abilities to help ELLs succeed in school and in life in several ways. First, practitioners would be better able to identify students who may be at risk for educational and ELP difficulties. This identification would allow for subsequent preventative or intervention services to address students' difficulties. Finally, understanding the relationships among executive functioning, acculturation, and ELP will help practitioners better interpret assessment results in these areas when working with ELLs.

CHAPTER III

METHODOLOGY

This chapter is organized into four sections: (1) Participants; (2) Procedures; (3) Instrumentation, Validity, and Reliability; and (4) Statistical Procedures and Data Analysis. The purpose of this chapter is to provide a detailed explanation of how the participants were selected and what procedures were utilized to collect and analyze the data.

Participants

Participants were bilingual adults living in a large Midwestern town. Participants were recruited from a medium-sized university in the town and the town itself. Participants from the university were recruited using the university's campus-wide email distribution system, the Communication Center. The principal investigator submitted the recruitment letter to the Communication Center, where it was published by an authorized university employee and distributed campus-wide through the "Academics: Research and Programs" and "Academics: Survey Participation" categories. The principal investigator also recruited university participants through the multicultural center and the international center via distribution of the recruitment letter. To recruit participants from the town, the principal investigator made requests to attend local churches and other community organizations to speak to members and request their participation. Participants received \$5 in exchange for their participation as an incentive to participate. Money for the incentive came from the principal investigator's personal funds. Participants were at least 18 years old with a maximum age of 50 years (this is the maximum age of one of the measures used in the study), and were proficient in English. The university Internal Review Board granted permission to conduct this study.

Procedures

Prior to beginning testing, informed consent was obtained from all participants. To evaluate the research hypotheses, all participants completed a demographic questionnaire, the Listening Comprehension and Oral Expression subtests from the *Wechsler Individual Achievement Test, Third Edition* (WIAT-III; Wechsler, 2009), the Proverb and Color-Word Interference tests from the *Delis-Kaplan Executive Function System* (D-KEFS; Delis, Kaplan, & Kramer, 2001), and the *Stephenson Multigroup Acculturation Scale* (SMAS; Stephenson, 2000). The principal investigator received permission to use the SMAS from the author via email (M. Stephenson, personal communication, May 19, 2015). The principal investigator and graduate students with extensive general assessment training, as well as specific training from the principal investigator in the measures that were used, administered the measures to participants. All participants completed the demographic survey first; however, the order of the SMAS, WIAT-III, and D-KEFS were counterbalanced to control for order effects. Participants completed all measures in one session that was approximately one-hour long.

Instrumentation, Validity, and Reliability

Demographic Questionnaire

Participants responded to demographic questions regarding gender, age, ethnicity, formal education in their native language, year in school, income level, parents' level of education, and length of time in the United States. The questionnaire took participants approximately 2 minutes to complete.

Wechsler Individual Achievement Test, Third Edition

The *Wechsler Individual Achievement Test, Third Edition* (WIAT-III; Wechsler, 2009) is an individually administered clinical instrument used to assess achievement skills in individuals aged 4 years, 0 months through 50 years, 11 months. The WIAT-III is a valid and reliable measure of global achievement skills. For both composites and subtests, the mean score is 100 with a standard deviation of 15. Participants completed the Listening Comprehension and Oral Expression subtests, which comprise the Oral Language composite, as a measure of academic language proficiency. Total administration time for both subtests was approximately 25 minutes. The WIAT-III is a commonly used measure of achievement skills in clinical and school settings, although a comprehensive literature search using Google Scholar, the university's OneSearch database (this database includes all the databases and resources to which the university has access), and the following combinations of terms: "WIAT-III culturally diverse," "WIAT-III culturally and linguistically diverse," "WIAT-III linguistically diverse," and "WIAT-III diverse populations" found no research regarding its use in culturally and linguistically diverse populations. The proposed study contributed to this gap and provided valuable insight into using the WIAT-III to better understand bilingual individuals' academic language abilities. Additionally, given the high internal consistency of the Oral Language composite and its validity intercorrelation with overall achievement (presented below), using the Oral Language composite helped yield statistically sound and clinically useful data from which to draw conclusions.

Reliability and validity statistics. The WIAT-III is comprised of seven composites that estimate achievement skills in a variety of areas: Oral Language, Total Reading, Basic Reading, Reading Comprehension and Fluency, Written Expression, Mathematics, and Math Fluency, as well as an overall Total Achievement composite score. The Spearman-Brown formula provides

an estimate of internal consistency, or reliability. Using age-based reliability coefficients and the Spearman-Brown formula, the overall average reliabilities range from 0.91 to 0.98, with the Oral Language composite having the lowest internal consistency (0.91) and the Basic Reading and Total Achievement composites having the highest internal consistency (0.98; Wechsler, 2009). The Listening Comprehension subtest has an internal consistency of 0.89, while the Oral Expression subtest has an internal consistency of 0.87 (Wechsler, 2009).

The WIAT-III has been shown to have high validity index correlations with the *Wechsler Individual Achievement Test, Second Edition* (WIAT-II; Wechsler, 2001) and various cognitive measures, such as the *Wechsler Adult Intelligence Scale, Fourth Edition* (WAIS-IV; Wechsler, 2008), the *Wechsler Intelligence Scale for Children, Fourth Edition* (WISC-IV; Wechsler, 2003), and the *Differential Ability Scales, Second Edition* (DAS-II; Elliot, 2007). The correlations between composite scores from the WIAT-III and WIAT-II ranged from .76 to .91, with the overall Total Achievement correlation being 0.93 (Wechsler, 2009). Correlations between WIAT-III composite scores and the WAIS-IV full-scale intelligence quotient (FSIQ) ranged from .59 to .80, with the Total Achievement-FSIQ correlation being .82 (Wechsler, 2009). Correlations between the DAS-II General Conceptual Ability (GCA) and WIAT-III composites ranged from .50 to .71, with the GCA-Total Achievement correlation being .67 (Wechsler, 2009).

Standardization. The WIAT-III features three standardization samples that are representative of the United States population in terms of gender, socioeconomic status, level of education, geographic region, and race/ethnicity. The first standardization sample comprised the grade-based normative sample and included 1,400 students from the fall sample and 1,375 students from the spring sample, for a total of 2,775 students. Students in this sample were

enrolled in grades PK-12. The second standardization sample comprised the age-based sample and included 1,826 students between the ages of 4-19. The third standardization sample consisted of 225 adults between the ages of 20-50. The proposed study used the age-based and adult sample norms.

Oral Language composite. The Oral Language composite is a measure of receptive and expressive oral language abilities, including measures of receptive and expressive vocabulary, oral discourse comprehension, oral word fluency, and sentence repetition (Vaughan-Jensen, Adame, McLean, & Gámez, 2011; Velleman & Mervis, 2011; Wechsler, 2009). Using age-based reliability coefficients, the Oral Language composite has an internal consistency overall average reliability of .91 using the Spearman-Brown formula (Wechsler, 2009). The average corrected stability coefficient measures test-retest stability. Adequate stability coefficients range from .70-.79; good stability coefficients range from .80-.89; and excellent stability coefficients are those above .90 (Wechsler, 2009). The stability coefficient for the Oral Language composite is .87 (Wechsler, 2009). The Oral Language composite has an internal validity intercorrelation of .83 with the WIAT-III Total Achievement score (Wechsler, 2009).

Listening Comprehension subtest. The Listening Comprehension subtest measures listening comprehension at word, sentence, and discourse levels (Canivez, 2013; Flanagan, Fiorello, & Ortiz, 2010). This subtest is composed of Receptive Vocabulary and Oral Discourse Comprehension components (Wechsler, 2009). Using age-based reliability coefficients, the Listening Comprehension subtest has an overall average reliability of .89 using the Spearman-Brown formula (Wechsler, 2009). The test-retest stability coefficient for the Listening Comprehension subtest is .75 (Wechsler, 2009). This subtest has an internal validity

intercorrelation of .90 with the WIAT-III Oral Language composite and .70 with the WIAT-III Total Achievement score (Wechsler, 2009).

Oral Expression subtest. The Oral Expression subtest measures skills associated with oral expression and includes Expressive Vocabulary, Sentence Repetition, and Oral Word Fluency components (Canivez, 2013; Vaughan-Jensen et al., 2011; Wechsler, 2009). Using age-based reliability coefficients, the Oral Expression subtest has an overall average reliability of .87 using the Spearman-Brown formula (Wechsler, 2009). The test-retest stability coefficient for the subtest is .89 (Wechsler, 2009). The Oral Expression subtest has an internal validity intercorrelation of .89 with the WIAT-III Oral Language composite and .78 with the WIAT-III Total Achievement score (Wechsler, 2009).

Delis-Kaplan Executive Function System

The *Delis-Kaplan Executive Function System* (D-KEFS; Delis, Kaplan, & Kramer, 2001) is an individually administered clinical instrument used to assess broad executive functioning in individuals aged 8 years, 0 months through 89 years, 11 months. The D-KEFS consists of nine stand-alone tests designed to measure a variety of abilities subsumed under the umbrella term of executive functioning, including set-shifting, inhibition, verbal reasoning, planning, and problem-solving (Delis et al., 2001; Homack, Lee, & Riccio, 2005; Latzman & Markon, 2010; Shunk, Davis, & Dean, 2006). Tests have a mean of 10 and a standard deviation of 3. The D-KEFS is a valid and reliable measure of executive functioning. Participants completed the Color-Word Interference and Proverb Tests, which measure inhibition and set-shifting, and abstract verbal reasoning (respectively). The total administration time for both tests was approximately 20 minutes. These specific tests were selected because research suggests verbal reasoning, inhibition, and set-shifting are the executive functions most strongly implicated in

ELLs' bilingual abilities (Bialystok, Barac, Blaye, & Poulin-Dubois, 2010; Bialystok, Craik, & Luk, 2008; Carlson & Meltzoff, 2008). As with the WIAT-III, although the D-KEFS is commonly used in clinical settings, there is a dearth of research regarding its use in diverse populations. The proposed study contributed to the literature by providing one baseline against which to compare future research that examines bilingual ELL performance on different executive functioning tests.

Reliability and validity statistics. The D-KEFS has been shown to have low to moderate correlations with other measures of executive functioning and episodic memory, including the *California Verbal Learning Test, Second Edition* (CVLT-II; Delis, Kaplan, Kramer, & Ober, 2000). The CVLT-II and D-KEFS Color-Word Interference Test had the strongest correlations between total immediate recall, short delay free recall, and recognition discriminability on the CVLT-II and Inhibition and Inhibition/Switching measures on the D-KEFS. These correlations were low and ranged from .30 to .35 (Delis et al., 2001). The CVLT-II and D-KEFS Proverbs Test had the strongest correlations between the delayed recall and recognition measures on the CVLT-II and the abstraction only score on the Proverb Test. These correlations were low and ranged from .25-.33 (Delis et al., 2001).

Standardization. The D-KEFS features a normative sample that is representative of the United States population in terms of age, sex, race/ethnicity, years of education, and geographic region. The sample consisted of 1,750 children and adults between the ages of 8-89 and was divided into 16 age groups. The groups for ages 8, 9, 10, and 11 consisted of 75 participants each. Age groups 12, 13, 14, 15, 40-49, 50-59, and 80-89 included 100 individuals per group. Age groups 60-69 and 70-79 included 125 individuals per group. 150 individuals aged 30-39 were included in the sample. Age groups 16-19 and 20-29 included 175 individuals per group.

Color-Word Interference Test. The Color-Word Interference Test is a measure of set-shifting and inhibition and includes Color Naming, Word Reading, Inhibition, and Inhibition/Switching conditions (Delis et al., 2001). The Color-Word Interference Test is a Stroop-like task (Stroop, 1935) that has been found to accurately assess individuals' set-shifting and inhibition abilities (Latzman & Markon, 2009; Lipka & Davis, 2010; Wodka et al., 2008). Its validity has been demonstrated in a variety of clinical populations (e.g., ADHD, fetal alcohol spectrum disorder, schizophrenia), as well as non-clinical populations (Homack et al., 2005; Wodka et al., 2008). Estimates of internal consistency using the Spearman-Brown formula range from .62 to .86 across age groups (Delis et al., 2001). Test-retest stability estimates for all ages ranged from .62 to .76 across conditions (Delis et al., 2001).

Proverb Test. The Proverb Test is a measure of verbal reasoning and includes Free Inquiry and Multiple Choice conditions, as well as common and uncommon proverbs (Delis et al., 2001). The Proverb Test has demonstrated efficacy in assessing individuals' verbal reasoning abilities for both clinical and non-clinical populations (Ahmed & Miller, 2011; Jurado & Rosselli, 2007; Kiang et al., 2007). Estimates of internal consistency using the Spearman-Brown formula range from .68 to .81 across age groups (Delis et al., 2001). Test-retest stability estimates for all ages were .76 (Delis et al., 2001).

Stephenson Multigroup Acculturation Scale

The *Stephenson Multigroup Acculturation Scale* (SMAS; Stephenson, 2000) is an acculturation measure designed for any individual who is immersed in United States culture and any second culture. The SMAS consists of 32 items designed to assess acculturation in the United States (Dominant Society Immersion [DSI]) and individuals' ethnic societies (Ethnic Society Immersion [ESI]). Research suggests the SMAS accurately assesses' culturally diverse

individuals' levels of acculturation in a variety of populations, including adolescents, young adults, old adults, non-clinical, Iranians, Asian Americans, African Americans, Africans, and Hispanic Americans (e.g., Moshrefi, 2012; Rayle & Myers, 2004; Stephenson, 2000). The SMAS took participants approximately 5 minutes to complete. The SMAS was selected because it is an acculturation scale designed to be used with participants from a variety of cultural backgrounds. It also utilizes a bidimensional framework, which is preferable to the traditional unidimensional model because it simultaneously considers individuals' original and new cultures, rather than viewing the cultures as being bipolar (Lopez-Class, Castro, & Ramirez, 2011).

Reliability and validity statistics. Coefficient alphas for the SMAS ranged from .86 to .97, suggesting the SMAS provides a reliable estimate of acculturation (Stephenson, 2000). The overall reliability of the scale was .86, the reliability of the dominant society immersion subscale was .90, and the reliability of the ethnic society immersion subscale was .97 (Stephenson, 2000). The SMAS was concurrently validated with modified versions of the *Acculturation Rating Scale for Mexican Americans-II* (ARSMA-II; Cuellar, Arnold, & Maldonado, 1995) and the *Bidimensional Acculturation Scale for Hispanics* (BAS; Marín & Gamba, 1996). The ESI subscale from the SMAS was found to be positively correlated with the Mexican Orientation Scale from the ARSMA-II ($r = .87$) and the Hispanic Domain scale from the BAS ($r = .83$) (Stephenson, 2000). The ESI subscale was negatively correlated with the Anglo Orientation Scale from the ARSMA-II ($r = -.28$) and the Non-Hispanic Domain scale from the BAS ($r = -.25$) (Stephenson, 2000). Similarly, the DSI subscale was positively correlated with the Non-Hispanic Domain scale from the BAS ($r = .48$) and the Anglo Orientation Scale from the ARSMA-II ($r = .49$).

Standardization. The SMAS was developed using two studies. The goal of the first study was to create a measure with high content validity; this study consisted of reviews of the literature and previous acculturation measures to develop items, expert reviews of the SMAS, and field tests of the SMAS (Stephenson, 2000). The initial scale consisted of 195 items. The expert reviewers included ten community professionals and consultants. After the expert review, 50 items were culled from the measure before being administered to the participants in the field studies. Each field study included 50 participants of African American, African, Asian American, European American, and Hispanic American descent. These participants completed the measure and were subsequently debriefed and asked to comment on the items' relevance, clarity, offensiveness, and level of confusion. After this feedback, the SMAS was pared down to include 115 items. At this point, the expert panel reviewed the measure a second time and the final length of the SMAS after this review was 95 items (Stephenson, 2000).

The goal of the second study was to examine the factor structure, reliability, and validity of the 95-item SMAS. Participants were 436 adults recruited from New York City, Boston, Springfield, and a large university. The average age of the participants was 29.98 years and the sample was 70% female. Participants' ethnicities included African American, Asian American, European American, Hispanic American, and African. Results from the factor analysis indicated the data best fit into two factors, the ESI and DSI. Based on the factor loadings, the SMAS was reduced to 32 items, 17 of which are related to ESI and 15 of which are related to DSI. The 32-item SMAS became the final version of the scale (Stephenson, 2000).

Statistical Procedures and Data Analysis

Descriptive analyses were conducted to analyze the sample's composition, acculturation, English language proficiency, and executive functioning profiles. Paired-samples *t*-tests were

conducted to determine if there were significant differences within participants' acculturation, English language proficiency, and executive functioning profiles (e.g., Did participants have higher ethnic society immersion than dominant society immersion? Were participants' receptive language skills stronger than their expressive language skills? Were participants' set-shifting abilities stronger than their verbal reasoning abilities?) Multivariate linear regression analyses using two separate models were conducted to determine the relationships among executive functioning, acculturation, and English language proficiency. The first model was a moderated multiple regression model, while the second model was a standard multiple linear regression model. When conducting these analyses, the age and years in the United States demographic variables were entered into the first block as control variables in both models.

Model One

The first model included executive functioning and acculturation scores as predictor variables, with ELP being the dependent variable. This model was used to determine the impact of executive functioning and acculturation on ELP (research questions five and six), as well as the role of acculturation in moderating the relationship between executive functioning and ELP (research question seven). English language proficiency, as measured by the Oral Language composite from the WIAT-III, was the dependent variable. The Dominant Society Immersion and Ethnic Society Immersion scores from the SMAS and Color-Word Interference: Condition 4 (Inhibition/Switching) and Proverb Test: Total Achievement Score (Free) scores from the D-KEFS were the independent variables. These variables were entered into the second block. An interaction term for each acculturation variable with each executive functioning variable was created and entered into the third block to assess the moderation hypotheses.

Model Two

The second model included ELP and acculturation as predictor variables, with the executive functioning tests as the dependent variables. The dimension scores from the SMAS (i.e., Dominant Society Immersion and Ethnic Society Immersion) and Oral Language composite subtest scores from the WIAT-III (i.e., Listening Comprehension and Oral Expression), were entered into the second block. Proverb Test: Total Achievement Score (Free) and Color-Word Interference Test: Condition 4 (Inhibition/Switching) scores were the dependent variables.

CHAPTER IV

RESULTS

The results provide information regarding the relationship between scores on measures of acculturation, executive functioning, and English language proficiency in bilingual adults, and have additional implications regarding the relationships among these variables that will be discussed in-depth in Chapter V. In this chapter, the results of implemented statistical analyses are presented. This chapter is composed of two sections: (1) Results and Analyses and (2) Summary of the Statistical Analyses.

Results and Analyses

Description of the Sample

Participants were 38 adults (27 females and 11 males) from a large Midwestern town. Forty participants completed the study initially; however, two participants were excluded from the data analyses. One participant was excluded from the final statistical analyses due to examiner error on one subtest. One participant was excluded from the final statistical analyses because the participant reported being color-blind, and thus was unable to complete the Color-Word Interference Test. Sample descriptive statistics regarding participants' age, years lived in the United States, ethnicity, income, mother's level of education, and father's level of education appear in Table 1.

Table 1

Descriptive Statistics for the Sample – Age, Years Lived in the United States, Gender, Ethnicity, Income Level, Mother’s Level of Education, and Father’s Level of Education Demographic Variables

Variable	<i>n</i>	(%)	\bar{X}	SD	Range
Age (in years)			27.32	8.39	18-47
Years lived in the United States			15.30	9.76	1-43
Gender					
Female	27	71.1			
Male	11	28.9			
Ethnicity					
Asian	13	34.2			
White	12	31.6			
Hispanic/Latino	9	23.7			
Multiracial/Other	2	5.3			
African/African-American	2	5.3			
Income Level					
<\$10,000	6	15.8			
\$10-19,999	4	10.5			
\$20-29,999	2	5.3			
\$30-39,999	2	5.3			
\$40-49,999	3	7.9			
\$50-59,999	7	18.4			
\$70-79,999	3	7.9			
\$80-89,999	2	5.3			
\$90-99,999	1	2.6			
\$100-150,000	3	7.9			
Over \$150,000	2	5.3			
Prefer not to say	3	7.9			
Mother’s Level of Education					
Less than high school	8	21.1			
High school or equivalent	8	21.1			
Vocational/technical/associate’s degree	4	10.5			
Some college	2	5.3			
Bachelor’s degree	5	13.2			
Graduate or professional degree	10	26.3			
Not applicable	1	2.6			
Father’s Level of Education					
Less than high school	6	15.8			
High school or equivalent	6	15.8			
Vocational/technical/associate’s degree	4	10.5			
Some college	2	5.3			
Bachelor’s degree	6	15.8			
Graduate or professional degree	12	31.6			
Unsure	1	2.6			
Not applicable	1	2.6			

Note. *N* = 38.

Participants ranged in age from 18 to 47 years ($\bar{X} = 27.32$, $SD = 8.39$). The number of years participants reported having lived in the United States (U.S.) ranged from one to 43 years ($\bar{X} = 15.30$, $SD = 9.76$). Regarding reported ethnicity, participants were 34.2% Asian, 31.6% White, 23.7% Hispanic/Latino, 5.3% Multiracial/Other, and 5.3% African/African-American. The income level of the sample was as follows: <\$10,000 (15.8%), \$10-19,999 (10.5%), \$20-49,999 (18.4%), \$50-59,000 (18.4%), \$70,000 – Over \$150,000 (28.9%), and Prefer not to say (7.9%). Mother's level of education statistics for the sample were: Graduate or professional degree (26.3%), Less than high school (21.1%), High school or equivalent (21.1%), Bachelor's degree (13.2%), Vocational/technical/associate's degree (10.5%), Some college (5.3%), and Not applicable (2.6%). Father's level of education statistics for the sample were: Graduate or professional degree (31.6%), High school or equivalent (15.8%), Less than high school (15.8%), Bachelor's degree (15.8%), Vocational/technical/associate's degree (10.5%), Some college (5.3%), Unsure (2.6%), and Not applicable (2.6%). Additional sample descriptive statistics regarding participants' birth status, first and second languages spoken in the home, formal education in their native language, and reading and writing abilities in their native language appear in Tables 2 and 3.

Table 2

Descriptive Statistics for the Sample – Participants' First and Second Languages Spoken in the Home

Variable	<i>n</i>	(%)
First Language		
English	18	47.4
Japanese	3	7.9
Spanish	3	7.9
Vietnamese	2	5.3
Amharic	1	2.6
Arabic	1	2.6
Chinese	1	2.6
Greek	1	2.6
Hebrew	1	2.6
Malayalam	1	2.6
Portuguese	1	2.6
Romanian	1	2.6
Russian	1	2.6
Telugu	1	2.6
Urdu	1	2.6
Uzbek	1	2.6
Second Language*		
English	15	39.5
Spanish	7	18.4
Russian	3	8.1
French	2	5.3
Arabic	1	2.6
Chinese	1	2.6
Guragena	1	2.6
Hindi	1	2.6
Japanese	1	2.6
Sign Language	1	2.6
Swedish	1	2.6
Vietnamese	1	2.6

Note. $N = 38$.

Note. *Three participants did not report speaking a second language in the home; each of these participants were fluent in English and their first language, but did not report currently speaking English in the home.

Table 3

Descriptive Statistics for the Sample – Participants’ Birth Status, Native Language Education, Reading Abilities, and Writing Abilities

Variable	<i>n</i>	(%)
Birth Status		
First Generation (Born in the United States)	7	18.4
Second Generation (Born in the United States)	2	5.3
Fourth Generation or Higher (Born in the United States)	3	7.9
Born Outside of the United States	26	68.4
Received Education in Native Language		
Yes	31	81.6
No	7	18.4
Able to Read in Native Language at 6th Grade Level or Higher		
Yes	30	78.9
No	8	21.1
Able to Write in Native Language at 6th Grade Level or Higher		
Yes	33	86.8
No	5	13.2

Note. *N* = 38.

Descriptive Statistics

Descriptive statistics for this sample, including means and standard deviations of all *Stephenson Multigroup Acculturation Scale* (SMAS; Stephenson, 2000), *Wechsler Individual Achievement Test, Third Edition* (WIAT-III; Wechsler, 2009), and *Delis-Kaplan Executive Function System* (D-KEFS; Delis, Kaplan, & Kramer, 2001) variables, appear in Table 4.

Paired-samples *t*-tests were performed to further analyze participants’ acculturation, executive functioning, and English language proficiency profiles to determine participants’ variability within these profiles (e.g., did they report statistically significantly higher levels of ethnic society

immersion than dominant society immersion? Were participants' receptive English language skills statistically significantly higher than their expressive language skills?). Due to the Dominant and Ethnic Society Immersion scales having different value ranges (i.e., 15-60 for Dominant Society Immersion and 17-68 for Ethnic Society Immersion), but both being derived from the same four-point Likert scale, scores were converted to a four-point scale prior to conducting the paired samples *t*-test. Results from these analyses appear in Table 5. Assessment of these data addressed the following research questions and hypotheses:

R₁ What are the bilingual adults' acculturation profiles in terms of dominant society immersion and ethnic society immersion?

H₁ It is hypothesized the majority of the participants will report clinically high levels of dominant society immersion and ethnic society immersion (i.e., scores above 45 for Dominant Society Immersion and scores above 51 for Ethnic Society Immersion; M. Stephenson, personal communication, May 19, 2015). For individuals who do not report high levels of dominant society and ethnic society immersion, it is hypothesized they will report statistically significantly higher levels of ethnic society immersion than dominant society immersion. These hypotheses are based on research suggesting bilingual ELL individuals living in the United States today often have high levels of dominant and ethnic society immersion (e.g., Dow, 2010; Nelson & Infante, 2014; Schwartz, Unger, Zamboanga, & Szapocznik, 2010), but may be more likely to have difficulties adjusting to life in the United States because of their ethnic cultures (e.g., Lorenzo-Blanco, Unger, Ritt-Olson, Soto, & Baezconde-Garbanati, 2013; Martinez Jr., McClure, Eddy, & Wilson, 2011).

R₂ What are the bilingual adults' English language proficiency profiles?

H₂ It is hypothesized participants will have statistically significantly higher receptive English language skills than expressive English language skills, based on studies suggesting there is a larger receptive-expressive gap in bilingual individuals compared to monolingual individuals (e.g., Bialystok, Luk, Peets, & Yang, 2010; Gibson, Kimbrough Oller, Jarmulowicz, & Ethington, 2012; Kimbrough Oller, Pearson, & Cobo-Lewis, 2007).

R₃ What are the bilingual adults' executive functioning profiles in terms of verbal reasoning, set-shifting, and inhibition abilities?

H₃ Based on a review of the literature (e.g., Bialystok, Barac, Blaye, & Poulin-Dubois, 2010; Bialystok, Craik, & Luk, 2008; Yang, Yang, & Lust, 2011), it is hypothesized participants' set-shifting abilities will be statistically significantly higher than their inhibition abilities, which are hypothesized to be statistically significantly higher than their verbal reasoning abilities.

Table 4

Mean and Standard Deviation Statistics for the SMAS, WIAT-III, and D-KEFS

Variable	\bar{X}	SD
SMAS Variables		
Dominant Society Immersion	52.26	5.63
Ethnic Society Immersion	56.67	6.08
WIAT-III Variables		
Listening Comprehension	98.61	11.56
Oral Expression	99.87	14.99
Oral Language Composite	99.03	13.60
D-KEFS Variables		
Color-Word Interference Test: Condition 3 (Inhibition)	10.71	3.09
Color-Word Interference Test: Condition 4 (Inhibition/Switching)	10.68	2.26
Proverb Test: Total Achievement Score (Free)	11.16	2.42

Note. Interpretation of SMAS scores is based on cutoff scores of 45 for Dominant Society Immersion (DSI) and 51 for Ethnic Society Immersion (ESI), with scores at or above these values indicating high levels of DSI and ESI. DSI scores can range from 15 to 60, while ESI scores can range from 17 to 68.

WIAT-III normative data specify a mean score of 100 and a standard deviation of 15 for all subtests and composites.

D-KEFS normative data specify a mean score of 10 and a standard deviation of 3 for all tests.

Table 5

Paired-Sample t-Test Analyses of Participants' Acculturation, English Language Proficiency, and Executive Functioning Profiles

Pair	\bar{X}	t	df	p
Acculturation Variables*				
Dominant Society Immersion – Ethnic Society Immersion	.16	1.99	37	.04
English Language Proficiency Variables				
Listening Comprehension – Oral Expression	-1.26	-.63	37	.53
Executive Functioning Variables				
Inhibition – Inhibition/Switching	.03	.07	37	.95
Inhibition – Proverb	-.45	-.73	37	.47
Inhibition/Switching – Proverb	-.47	-.93	37	.36

Note. *DSI four-point \bar{X} = 3.48; ESI four-point \bar{X} = 3.32.

As the scores in Table 4 indicate, mean SMAS scores from the participants ranged from 52.26 (Dominant Society Immersion) to 56.47 (Ethnic Society Immersion), indicating participants reported high levels of both dominant and ethnic society immersion; however, participants' ratings indicated they experienced significantly higher levels of dominant society immersion than ethnic society immersion, $t(37) = 1.99$, $p < .05$. These findings are somewhat consistent with previous studies that have utilized the SMAS; in general, participants in the current study reported similar levels of ethnic society immersion, but higher levels of dominant society immersion, when compared with results from previous studies (e.g., Awad, 2010; Jiang, Green, Henley, & Masten, 2009; Lau, Fung, Ho, Liu, & Gudiño, 2011; Stephenson, 2000; Yi et al., 2016). Mean WIAT-III participant scores ranged from 98.61 (Listening Comprehension) to 99.87 (Oral Expression), with all mean scores falling within the Average range. Further, a paired-

samples *t*-test indicated no significant differences were observed between participants' receptive and expressive language skills, $t(37) = -.63, p > .05$. Mean D-KEFS sample scores ranged from 10.68 (Inhibition/Switching) to 11.16 (Proverbs). These scores fell within the Average range and there were no significant differences between participants' verbal reasoning, inhibition, and set-shifting abilities (see Table 5).

Statistical Assumptions

Data were assessed to ensure the assumptions of the moderated multiple and multiple linear regression analyses were met. Q-Q plots indicated all variables closely approximated a normal distribution. Scatterplots were employed to assess for linearity and homoscedasticity of the relationships among the variables. These scatterplots demonstrated relationships between all pairs were linear and the width of the scatterplots was approximately the same across the values for all variables. Variance inflation factors (VIFs) for each independent variable were analyzed to assess for multicollinearity. VIFs greater than 10 were considered to indicate the presence of multicollinearity (O'Brien, 2007). All variables included in the moderated multiple regression model were mean-centered prior to assessing for multicollinearity. These analyses indicated little evidence of multicollinearity across moderated multiple and multiple linear regression models, with VIF values ranging from 1.027 to 4.597. Complete VIF data are presented in Tables 6 and 7.

Table 6

Independent Variable VIF Statistics for Moderated Multiple Regression Analysis

Oral Language Composite	
Model 1	
Independent Variable	VIF
Age	1.027
Years Lived in the United States	1.027
Model 2	
Independent Variable	VIF
Age	1.263
Years Lived in the United States	1.488
Dominant Society Immersion	1.562
Ethnic Society Immersion	1.167
Inhibition/Switching	1.068
Proverb Test	1.193
Model 3	
Independent Variable	VIF
Age	1.492
Years Lived in the United States	1.831
Dominant Society Immersion (DSI)	1.814
Ethnic Society Immersion (ESI)	1.566
Inhibition/Switching (I/S)	1.764
Proverb Test (Proverb)	1.998
DSI X I/S	1.573
DSI X Proverb	1.813
ESI X I/S	1.958
ESI X Proverb	2.477
DSI X ESI X I/S	3.450
DSI X ESI X Proverb	3.260
DSI X Proverb X I/S	4.597
ESI X Proverb X I/S	3.333
DSI X ESI X I/S X Proverb	1.958

Table 7

Independent Variable VIF Statistics for Multiple Regression Analyses

Color-Word Interference Test: Condition 4 (Inhibition/Switching)	
Model 1	
Independent Variable	VIF
Age	1.165
Years Lived in the United States	1.407
Dominant Society Immersion	1.401
Ethnic Society Immersion	1.140
Model 2	
Independent Variable	VIF
Age	1.382
Years Lived in the United States	1.596
Dominant Society Immersion	2.125
Ethnic Society Immersion	1.249
Listening Comprehension	2.232
Oral Expression	1.844
Proverb Test: Total Achievement Score (Free)	
Model 1	
Independent Variable	VIF
Age	1.165
Years Lived in the United States	1.407
Dominant Society Immersion	1.401
Ethnic Society Immersion	1.140
Model 2	
Age	1.382
Years Lived in the United States	1.596
Dominant Society Immersion	2.125
Ethnic Society Immersion	1.249
Listening Comprehension	2.232
Oral Expression	1.844

Moderated Multiple Regression

Analysis using moderated multiple regression was performed to determine how age, years lived in the United States, culture, and executive functioning impact English language proficiency (ELP), as well as determine if level of acculturation moderates the relationship between executive functioning and ELP. Dominance analyses using the Fitting and Interpreting Multiple Regression (FIRE) program (Lorenzo-Seva & Ferrando, 2011) were conducted to further analyze the relative importance of predictors in the model. A dominance analysis was not conducted on the third model within this analysis due to the third model not explaining significantly more variance than the second model. This model addressed the following research questions and hypotheses:

R₄ Does the degree of acculturation predict English language proficiency in bilingual adults?

H₄ It is hypothesized that degree of acculturation will predict English language proficiency, such that individuals with statistically significantly higher levels of dominant society and ethnic society immersion will have statistically significantly higher English language proficiency than individuals with lower levels of immersion. It is hypothesized that dominant society immersion scores will statistically be most strongly related to English language proficiency with regards to acculturation variables.

R₅ Does executive functioning predict English language proficiency in bilingual adults?

H₅ It is hypothesized executive functioning will predict English language proficiency. Specifically, it is hypothesized verbal reasoning will statistically be most strongly related to English language proficiency, followed by set-shifting and inhibition (Bialystok et al., 2010; Kray, Eber, & Lindenberger, 2004).

R₆ What impact does level of acculturation have on the relationship between executive functioning and English language proficiency in bilingual adults?

H₆ It is hypothesized acculturation will moderate the relationship between executive functioning and English language proficiency, such that the relationship between executive functioning and English language proficiency will be statistically significantly weaker in individuals with higher levels of acculturation.

Acculturation scores from the SMAS included the Dominant Society Immersion and Ethnic Society Immersion Scores. English language proficiency scores included the Oral Language Composite score from the WIAT-III. Executive functioning scores included Color-Word Interference Test: Condition 4 (Inhibition/Switching) and Proverb Test: Total Achievement Score (Free) scores from the D-KEFS. A correlation matrix for the independent variables in this model appears in Table 8. Results appear in Table 9

Table 8

Correlations among Independent Variables in the Moderated Multiple Regression Model

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1.000	.161	.156	.346*	-.052	-.183	-.019	.021	.241	-.012	.071	-.041	-.060	.017	-.017
2		1.000	.530***	.109	.217	.083	.025	-.290*	-.096	-.020	.155	-.143	.241	-.003	-.008
3			1.000	.063	.071	.284*	.124	-.279*	-.123	-.072	.184	.126	.040	-.003	-.100
4				1.000	.033	.066	-.057	-.102	-.135	-.070	.279*	.298*	-.004	.106	-.379*
5					1.000	.093	-.090	-.076	.052	.246	.111	.001	.431**	-.173	-.011
6						1.000	-.045	-.318*	-.245	.046	-.005	.160	.295*	-.098	.209
7							1.000	.023	-.010	.088	.313*	-.070	-.375*	.250	-.122
8								1.000	.146	-.017	-.057	.192	-.394**	.250	-.122
9									1.000	.084	-.363*	-.258	.178	-.291*	.361*
10										1.000	.332*	-.372*	-.005	-.225	.217
11											1.000	.304*	-.140	.261	-.547***
12												1.000	-.099	.441**	-.589***
13													1.000	-.011	.438**
14														1.000	-.181
15															1.000

Note. 1 = Age. 2 = Years lived in the United States. 3 = Dominant Society Immersion (DSI). 4 = Ethnic Society Immersion (ESI). 5 = Inhibition/Switching (I/S). 6 = Proverb Test (Proverb). 7 = DSI X I/S. 8 = DSI X Proverb. 9 = ESI X Proverb. 10 = ESI X I/S. 11 = DSI X ESI X I/S. 12 = DSI X ESI X Proverb. 13 = DSI X I/S X Proverb. 14 = ESI X I/S/X Proverb. 15 = DSI X ESI X I/S X Proverb.

Note. * $p < .05$ ** $p < .01$ *** $p < .001$

Table 9

Moderated Multiple Regression and Dominance Analyses Predicting WIAT-III Oral Language Composite Score from Demographic, Acculturation, and Executive Functioning Variables: Standardized and Unstandardized Regression Coefficients

Oral Language Composite						
Model 1						
Predictors	B	SE	β	R^2	F	$R^2 \Delta$
Overall Model				.325	8.427**	
Constant	.184	1.870				
Age	-.529	.228	-.326*	.250 [^]		
Years Lived in the United States	.728	.196	.523**	.750 [^]		
Model 2						
Predictors	B	SE	β	R^2	F	$R^2 \Delta$
Overall Model				.717	13.084****	.392****
Constant	.595	1.290				
Age	-.299	.174	-.185	.071 [^]		
Years Lived in the United States	.349	.162	.251*	.181 [^]		
Dominant Society Immersion	1.005	.289	.416**	.335 [^]		
Ethnic Society Immersion	-.561	.231	-.251*	.082 [^]		
Inhibition/Switching	.691	.595	.115	.041 [^]		
Proverb Test	2.154	.586	.384**	.290 [^]		
Model 3						
Predictors	B	SE	β	R^2	F	$R^2 \Delta$
Overall Model				.774	5.034****	.057
Constant	.895	1.559				
Age	-.307	.201	-.189			
Years Lived in the United States	.261	.191	.187			
Dominant Society Immersion (DSI)	1.126	.330	.416**			
Ethnic Society Immersion (ESI)	-.619	.284	-.277*			
Inhibition/Switching (I/S)	.245	.811	.041			
Proverb Test (Proverb)	1.983	.804	.353*			
DSI X I/S	-.195	.126	-.197			
DSI X Proverb	.043	.169	.035			
ESI X I/S	-.016	.185	-.014			
ESI X Proverb	-.039	.189	-.029			
DSI X ESI X I/S	.043	.043	.190			
DSI X ESI X Proverb	-.022	.048	-.084			
DSI X Proverb X I/S	.059	.089	.122			
ESI X Proverb X I/S	-.021	.118	-.025			
DSI X ESI X I/S X Proverb	.000	.030	.003			

Note. * $p < .05$ ** $p < .01$ **** $p < .001$

Note. [^] R^2 value from dominance analysis.

Statistical analysis with moderated multiple linear regression revealed three significant models. The first model, which included age and years lived in the United States as predictor variables in the first block, accounted for approximately 32.5% of the variance in the dependent variable, the Oral Language Composite score ($R^2 = 0.325$, $F(2, 35) = 8.427$, $p < .01$). Both age and years lived in the United States contributed significantly to the prediction (Age – $\beta = -.326$, $p < .05$; Years lived in the United States – $\beta = .523$, $p < .01$). This indicates for every one standard deviation increase in the age variable, there was a .326 decrease in the Oral Language Composite score. Similarly, for every one standard deviation increase in the years lived in the United States variable, there was a .523 increase in the Oral Language Composite score. Results from the dominance analysis indicated years lived in the United States was most strongly related to Oral Language composite scores ($R^2 = .750$), followed by age ($R^2 = .250$). Overall, this model is somewhat useful in predicting the Oral Language Composite score; however, it is clear other variables unaccounted for in this model also significantly contributed to participants' scores.

The second model, which included the variables in the first model in block one (i.e., age and years lived in the United States) and acculturation and executive functioning scores in the second block, accounted for approximately 71.7% of the variance in the dependent variable, the Oral Language Composite score ($R^2 = 0.717$, $F(4, 31) = 13.084$, $p < .01$). The second model accounted for significantly more variance than the first model ($R^2 \Delta = 0.392$, $p < .01$), indicating acculturation and executive functioning variables significantly contributed to the Oral Language Composite score beyond age and years lived in the United States. Of the individual predictors, when holding all other predictors constant, years lived in the United States, Dominant Society Immersion, Ethnic Society Immersion, and Proverb Test scores contributed significantly to the prediction. Results from the dominance analysis indicated Dominant Society Immersion scores

were most strongly related to Oral Language Composite scores ($R^2 = .335$), followed by Proverb Test scores ($R^2 = .290$), years lived in the United States ($R^2 = .181$), and Ethnic Society Immersion scores ($R^2 = .082$). This model appears more useful than the first model with regards to predicting the Oral Language Composite score; however, the relatively low β values for the significant individual predictors suggest there are still variables unaccounted for in this model that contributed to participants' Oral Language Composite scores.

The third model, which included the variables mentioned above in the first (i.e., age and years lived in the United States) and second (i.e., acculturation and executive functioning variables) blocks and interactions terms between the acculturation and executive functioning variables in the third block, accounted for approximately 75.5% of the variance in the Oral Language Composite score ($R^2 = .755$, $F(6, 25) = 6.404$, $p < .01$). This model did not account for significantly more variance than the second model ($R^2 \Delta = .057$, $p > .05$). While Dominant Society Immersion, Ethnic Society Immersion, and Proverb Test scores contributed significantly to the prediction in the third model, none of the interaction terms contributed significantly to this prediction. This indicates there was not an interaction between participants' acculturation and executive functioning scores with regards to the Oral Language Composite scores.

Multiple Linear Regression

Analyses using standard multiple linear regression was implemented to determine the impact acculturation and English language proficiency have on executive functioning after controlling for age and years lived in the United States. Analysis with multiple linear regression further clarified the nature of the relationship between the variables; specifically, it allowed for the exploration of potentially relevant predictive relationships. Dominance analyses using the FIRE program (Lorenzo-Seva & Ferrando, 2011) were conducted to further analyze the relative

importance of predictors in the models. Dominance analyses were not conducted for the models that predicted Color-Word Interference and Proverb Test scores from demographic and acculturation variables because the overall model and all individual predictors for these models were nonsignificant. These analyses addressed the following research questions and hypotheses:

R₇ Does acculturation predict executive functioning in bilingual adults?

H₇ It is hypothesized acculturation will predict executive functioning, such that dominant society immersion will statistically be the most strongly related to executive functioning, followed by ethnic society immersion (Brauer Boone, Victor, Wen, Razani, & Pontón, 2007; Razani, Burciaga, Madore, & Wong, 2007). It is hypothesized the relationship between dominant society immersion and executive functioning will be positive, while the relationship between ethnic society immersion and executive functioning is hypothesized to be negative.

R₈ Does English language proficiency predict executive functioning in bilingual adults?

H₈ It is hypothesized English language proficiency will predict executive functioning, such that expressive language skills will statistically be more strongly related to executive functioning than receptive language skills. It is hypothesized both expressive and receptive language skills will be positively related to executive functioning.

Acculturation scores from the SMAS included the Dominant Society Immersion and Ethnic Society Immersion Scores. English language proficiency scores included the Listening Comprehension and Oral Expression scores from the WIAT-III. Executive functioning scores included Color-Word Interference Test: Condition 4 (Inhibition/Switching) and Proverb Test: Total Achievement Score (Free) scores from the D-KEFS. Correlation matrices for the independent variables in these models appear in Tables 10-11. Results appear in Tables 12-15.

Table 10

Correlations among Independent Variables in the Multiple Regression Models Predicting Color-Word Interference Test: Condition 4 (Inhibition/Switching) and Proverb Test: Total Achievement Score (Free) Scores from Demographic, Acculturation, and English Language Proficiency Variables

Variable	1	2	3	4	5	6
1	1.000	.161	.156	.346*	-.200	-.227
2		1.000	.530***	.109	.478**	.380**
3			1.000	.063	.581***	.537***
4				1.000	-.246	-.166
5					1.000	.595
6						1.000

Note. 1 = Age. 2 = Years lived in the United States. 3 = Dominant Society Immersion (DSI). 4 = Ethnic Society Immersion (ESI). 5 = Listening Comprehension. 6 = Oral Expression.

Note. * $p < .05$ ** $p < .01$ *** $p < .001$

Table 11

Correlations among Independent Variables in the Multiple Regression Models Predicting Color-Word Interference Test: Condition 4 (Inhibition/Switching) and Proverb Test: Total Achievement Score (Free) Scores from Demographic and Acculturation Variables

Variable	1	2	3	4
1	1.000	.161	.156	.346*
2		1.000	.530***	.109
3			1.000	.063
4				1.000

Note. 1 = Age. 2 = Years lived in the United States. 3 = Dominant Society Immersion (DSI). 4 = Ethnic Society Immersion (ESI).

Note. * $p < .05$ ** $p < .01$ *** $p < .001$

Table 12

Multiple Linear Regression Model and Dominance Analysis Predicting Color-Word Interference Test: Condition 4 (Inhibition/Switching) Scores from Demographic, Acculturation, and English Language Proficiency Variables

Predictors	B	SE	β	<i>t</i>	<i>p</i>	<i>R</i> ²
Constant	11.741	5.640		2.082	.046	
Overall Model					.057	.311
Age	-.006	.047	-.021	-.120	.905	.018*
Years Lived in the United States	.062	.044	.270	1.436	.161	.153*
Dominant Society Immersion	-.062	.087	-.154	-.708	.484	.065*
Ethnic Society Immersion	.006	.062	.017	.101	.920	.010*
Listening Comprehension	-.087	.043	-.444	-1.992	.055	.165*
Oral Expression	.096	.030	.635	3.138	.004	.589*

Note. **R*² value from dominance analysis.

Table 13

Multiple Linear Regression Model and Dominance Analysis Predicting Proverb Test: Total Achievement Score (Free) Scores from Demographic, Acculturation, and English Language Proficiency Variables

Predictors	B	SE	β	<i>t</i>	<i>p</i>	<i>R</i> ²
Constant	-7.277	5.507		-1.321	.196	
Overall Model					.005	.430
Age	-.012	.046	-.043	-.268	.790	.047*
Years Lived in the United States	-.064	.043	-.259	-1.509	.141	.044*
Dominant Society Immersion	-.024	.085	-.055	-.281	.781	.080*
Ethnic Society Immersion	.109	.060	.274	1.809	.080	.068*
Listening Comprehension	.054	.042	.260	1.282	.209	.197*
Oral Expression	.095	.030	.587	3.188	.003	.565*

Note. **R*² value from dominance analysis.

Table 14

Multiple Linear Regression Model Predicting Color-Word Interference Test: Condition 4 (Inhibition/Switching) Scores from Demographic and Acculturation Variables

Predictors	B	SE	β	<i>t</i>	<i>p</i>	<i>R</i> ²
Constant	10.705	5.204		2.057	.048	
Overall Model					.728	.058
Age	-.027	.049	-.099	-.546	.589	
Years Lived in the United States	.059	.046	.256	1.276	.211	
Dominant Society Immersion	-.021	.080	-.052	-.260	.796	
Ethnic Society Immersion	.016	.067	.043	.237	.814	

Table 15

Multiple Linear Regression Model Predicting Proverb Test: Total Achievement Score (Free) Scores from Demographic and Acculturation Variables

Predictors	B	SE	β	<i>t</i>	<i>p</i>	<i>R</i> ²
Constant	2.198	5.288		.416	.680	
Overall Model					.215	.157
Age	-.080	.050	-.278	-1.613	.116	
Years Lived in the United States	-.020	.047	-.080	-.423	.675	
Dominant Society Immersion	.155	.081	.361	1.908	.065	
Ethnic Society Immersion	.059	.068	.148	.869	.391	

Statistical analysis with multiple linear regression revealed a significant model (see Table 13) in which age, years lived in the United States, Dominant Society Immersion, Ethnic Society Immersion, Listening Comprehension, and Oral Expression as predictor variables accounted for approximately 43.0% of the variance in the dependent variable, Proverb Test: Total Achievement Score (Free) scores ($R^2 = .430$, $F(6, 31) = 3.901$, $p < .01$). Of the individual predictors, when holding all other predictors constant, Oral Expression was the only predictor variable that was significantly related to the dependent variable ($\beta = .587$, $p < .01$). This indicates that for every one standard deviation increase in the Oral Expression score, there was a .587 standardized unit increase in the Proverb Test: Total Achievement Score (Free) score. Results from the dominance analysis indicated Oral Expression explained 56.5% of the variance of Proverb scores in this model. This model is somewhat useful in predicting the Proverb Test: Total Achievement Score (Free) score; however, it is clear other variables unaccounted for in this model also significantly contributed to participants' scores. While the overall model was not significant, the multiple linear regression model predicting Color-Word Interference Test: Condition 4 (Inhibition/Switching) from demographic, acculturation, and English language proficiency variables did yield a significant individual regression coefficient. In this model, Oral Expression significantly contributed to the dependent variable ($\beta = .635$, $p < .01$). Results from the dominance analysis indicated Oral Expression explained 58.9% of the variance of Color-Word Interference scores in this model. The multiple linear regression models predicting Color-Word Interference Test: Condition 4 (Inhibition/Switching) and Proverb Test: Total Achievement (Free) scores from demographic and acculturation variables were not significant (see Tables 14-15).

Summary of the Statistical Analyses

Participants reported high levels of Dominant and Ethnic Society Immersion; however, Dominant Society Immersion scores were significantly higher than Ethnic Society Immersion scores. The sample demonstrated average performance across English language proficiency and executive functioning tasks, with no significant differences observed between participants' expressive and receptive language skills, nor inhibition, inhibition and set-shifting, and verbal abilities.

Results from the moderated multiple regression model indicated participants' age and years lived in the United States accounted for approximately 32.5% of the variance in Oral Language Composite scores. Acculturation (i.e., Ethnic Society and Dominant Society Immersion) scores and executive functioning (i.e., Proverb Test: Total Achievement Score [Free] and Color-Word Interference Test: Condition 4 [Inhibition/Switching]) scores accounted for 39.2% additional variance beyond that accounted for by age and years lived in the United States. Specifically, years lived in the United States, Dominant Society Immersion, Ethnic Society Immersion, and Proverb test scores significantly contributed to the prediction of Oral Language Composite scores. Acculturation was not found to moderate the relationship between executive functioning skills and English language proficiency.

The multiple linear regression analyses indicated a significant model in which age, years lived in the United States, Dominant Society Immersion, Ethnic Society Immersion, Listening Comprehension, and Oral Expression as predictor variables accounted for approximately 43.0% of the variance in the dependent variable, Proverb Test: Total Achievement Score (Free) scores. Of the individual predictors, Oral Expression was the only variable to significantly contribute to the model. While this model may be somewhat useful for predicting the Proverb Test: Total

Achievement Score (Free) scores, there are predictive variables which are unaccounted for in the model. While the overall model was not significant, the multiple linear regression model predicting Color-Word Interference Test: Condition 4 (Inhibition/Switching) from demographic, acculturation, and English language proficiency variables did yield a significant individual regression coefficient. In this model, Oral Expression significantly contributed to the model. The multiple linear regression models predicting Color-Word Interference Test: Condition 4 (Inhibition/Switching) and Proverb Test: Total Achievement (Free) scores from demographic and acculturation variables were not significant.

CHAPTER V

DISCUSSION

This chapter is divided into five sections: (1) Summary of the Study; (2) Discussion and Implications of the Relationships among Acculturation, Executive Functioning, and English Language Proficiency in Bilingual Adults; (3) Delimitations and Limitations of the Study; (4) Directions for Future Research; and (5) Conclusions.

Summary of the Study

The purpose of the current study was to examine the relationships among measures of acculturation from the *Stephenson Multigroup Acculturation Scale* (SMAS; Stephenson, 2000), executive functioning from the *Delis-Kaplan Executive Function System* (D-KEFS; Delis, Kaplan, & Kramer, 2001), and English language proficiency from the *Wechsler Individual Achievement Test, Third Edition* (WIAT-III; Wechsler, 2009) in a group of participants who were bilingual adults living in a large Midwestern town. Participants reported speaking 21 different languages, including: English, Japanese, Spanish, Vietnamese, Amharic, Arabic, Chinese, Greek, Hebrew, Malayalam, Portuguese, Romanian, Russian, Telugu, Urdu, Uzbek, French, Guragena, Hindi, Sign Language, and Swedish. Domains of acculturation assessed in the current study included dominant society immersion and ethnic society immersion. Areas of executive functioning included in the current investigation were inhibition, set-shifting, and verbal reasoning. Areas of English language proficiency assessed in the current study included expressive and receptive language skills. The current study explored participants' profiles of performance on measures of these constructs and the relationships among these constructs, as well as the implications of these profiles and relationships for theory and practice. Data for this study were collected from 38 participants (\bar{X} age = 27.32 years; SD = 8.39). All participants

were administered a demographic questionnaire, the SMAS, Color-Word Interference and Proverb Tests from the D-KEFS, and Listening Comprehension and Oral Expression subtests from the WIAT-III, which comprise the Oral Language Composite (OLC).

The Dominant Society Immersion (DSI) scale on the SMAS measured participants' level of United States acculturation, while the Ethnic Society Immersion (ESI) scale assessed how immersed participants were in their ethnic culture (Stephenson, 2000). The Color-Word Interference Test on the D-KEFS assesses a variety of functions, including set-shifting and inhibition, and includes four conditions: Color Naming, Word Reading, Inhibition, and Inhibition/Switching (Delis et al., 2001). For the D-KEFS Color-Word Interference Test, scaled scores were calculated for Condition 3 (Inhibition) and Condition 4 (Inhibition/Switching). The Proverb Test on the D-KEFS is a verbal reasoning measure that includes two conditions (Free Inquiry and Multiple Choice), as well as common and uncommon proverbs (Delis et al., 2001). For the D-KEFS Proverb Test, scaled scores were calculated for Total Achievement Score (Free) scores as a measure of participants' verbal reasoning abilities. This score was calculated from participants' responses to the Free Inquiry condition of the Proverb Test. The OLC measures receptive and expressive language abilities and is comprised of the Listening Comprehension and Oral Expression subtests. The Listening Comprehension subtest includes receptive vocabulary and oral discourse comprehension tasks, while the Oral Expression subtest measures expressive vocabulary, oral word fluency, and sentence repetition (Wechsler, 2009). Paired samples *t*-tests were used to analyze participants' acculturation, executive functioning, and English language proficiency profiles. Moderated multiple regression and dominance analyses were used to determine how acculturation and executive functioning impact English language proficiency after controlling for demographic variables (i.e., age and years lived in the United States), as well

as determine if acculturation moderates the relationship between executive functioning and English language proficiency (ELP). Multiple linear regression and dominance analyses were used to assess how acculturation, ELP, and demographic variables impact executive functioning.

Participants reported high levels of both DSI and ESI; however, DSI scores were significantly higher than ESI scores. This indicates while participants reported being highly immersed in both their ethnic cultures and United States culture, they were more highly immersed in United States culture. Participants may have reported higher levels of DSI than ESI because a majority of participants were enrolled in college in the United States, which may contribute to them being more involved in United States culture than their ethnic cultures (Costigan & Dokis, 2006; Dennis, Basañez, & Farahmand, 2010). The mean scores all fell within the Average range for both the D-KEFS and WIAT-III scores. Given the majority of participants were enrolled in an undergraduate or graduate program, it is unsurprising the majority of individual scores on the D-KEFS and WIAT-III fell within the average range. These results suggest this sample is not representative of the general population, where a greater range of scores would be observed.

Results indicated some statistically significant regression models for predicting Oral Language Composite, Color-Word Interference Test: Condition 4 (Inhibition/Switching), and Proverb Test: Total Achievement (Free) scores from varied combinations of demographic, acculturation, English language proficiency, and executive functioning variables. Moderated multiple regression and dominance analyses indicated demographic variables (i.e., age and years lived in the United States) accounted for approximately 32.5% of the variance of Oral Language Composite (OLC) scores, with years lived in the United States being more strongly related to OLC scores than age. Additionally, while increases in the years lived in the United States

variable were associated with an increase in OLC scores, increases in the age variable were associated with a decrease in OLC scores. Acculturation (i.e., ESI and DSI) scores and executive functioning (i.e., Proverb Test: Total Achievement Score [Free] and Color-Word Interference Test: Condition 4 [Inhibition/Switching]) scores accounted for approximately 39.2% additional variance beyond that accounted for by age and years lived in the United States. In this model, years lived in the United States, DSI, ESI, and Proverb Test variables significantly contributed to the prediction of OLC scores. DSI scores were most strongly related to OLC scores, followed by Proverb Test scores, years lived in the United States, and ESI scores. Acculturation did not moderate the relationship between executive functioning and OLC scores.

Multiple linear regression and dominance analyses revealed a significant model in which age, years lived in the United States, Dominant Society Immersion, Ethnic Society Immersion, Listening Comprehension, and Oral Expression as predictor variables accounted for approximately 43.0% of the variance in the dependent variable, Proverb Test: Total Achievement Score (Free) scores. Of the individual predictors, Oral Expression was the only variable to significantly contribute to the model, explaining approximately 56.5% of the variance of Proverb Test scores. While the overall model was not significant, the multiple linear regression model predicting Color-Word Interference Test: Condition 4 (Inhibition/Switching) from demographic, acculturation, and ELP scores yielded a significant individual regression coefficient. In this model, Oral Expression significantly contributed to the model, accounting for approximately 58.9% of the variance of Color-Word Interference Test scores. The multiple linear regression models predicting Color-Word Interference Test: Condition 4 (Inhibition/Switching) and Proverb Test: Total Achievement (Free) scores from demographic and acculturation variables were not significant.

Discussion and Implications of the Relationships

Discussion

The current study examined the executive functioning, acculturation, and English language proficiency (ELP) profiles, as well as investigated the relationships among these variables in a bilingual English language learner (ELL) adult population. By exploring these relationships, this study contributes to existing literature by providing insight into how executive functioning abilities are impacted by demographic factors, as well as how these factors and executive functioning abilities impact ELP. Analyzing participants' executive functioning, acculturation, and ELP profiles provides additional context for interpreting results from the current study and comparing them with findings from previous studies. Previous research regarding these variables tends to focus on executive functioning (e.g., Bialystok, Barac, Blaye, & Poulin-Dubois, 2010; Bialystok, Craik, & Luk, 2008; Carlson & Meltzoff, 2008), acculturation (e.g., Jia, Gottardo, Koh, Chen, & Pasquarella, 2014; Jiang et al., 2008; Spenader, 2011), and ELP (e.g., Hakuta, Butler, & Witt, 2000; Halle, Hair, Wandner, McNamara, & Chien, 2012; MacSwan & Pray, 2005; Roessingh, 2006) in bilingual individuals in isolation, rather than examining the relationships among them.

The finding that participants' DSI scores were significantly higher than their ESI scores is inconsistent with results from previous studies using the SMAS (e.g., Awad, 2010; Jiang, Green, Henley, & Masten, 2009; Lau, Fung, Ho, Liu, & Gudiño, 2011; Stephenson, 2000; Yi et al., 2016), which found that bicultural individuals reported higher levels of ESI than DSI. This acculturation profile may help to partially explain why, in the current study, there were not significant differences between participants' verbal reasoning, inhibition, and inhibition/switching abilities, nor were there differences between their expressive and receptive

language abilities. Because the participants reported higher levels of United States immersion than ethnic society immersion, they may be more similar to unicultural individuals living in the United States than bicultural individuals with lower DSI than ESI. If this is the case, participants with higher DSI than ESI might be expected to perform more similarly to unicultural individuals on these measures, which would explain the lack of significant differences described above.

These executive functioning and ELP profiles are also inconsistent with previous studies, which have found that bilingual adults often have stronger inhibition and set-shifting than verbal reasoning abilities (e.g., Bialystok et al., 2010; Bialystok et al., 2008; Yang, Yang, & Lust, 2011), as well as a more significant gap between their receptive and expressive language abilities when compared to monolingual individuals (e.g., Bialystok et al., 2010; Gibson, Kimbrough Oller, Jarmulowicz, & Ethington, 2012; Kimbrough Oller, Pearson, & Cobo-Lewis, 2007).

Having high levels of acculturation in both cultures, as well as higher DSI than ESI, suggests participants in the current study may be more likely to have similar verbal reasoning and inhibition/set-shifting abilities, as well as similar receptive and expressive language skills, than bicultural individuals who are more immersed in their ethnic cultures than United States culture. Individuals who are highly immersed in United States culture may have more opportunities to practice receptive and expressive English language skills (e.g., listening to and conversing with monolingual English speakers), as well as learning the nuances of English in the United States, which would contribute to their English language abilities (Scheffner Hammer, Lawrence, & Miccio, 2008; Winsler, Díaz, Espinosa, & Rodriguez, 1999).

Results from the current study also provide important insights into the relationships among acculturation, executive functioning, ELP, and demographic variables. Regression and dominance analyses highlighted factors that contribute to ELP and executive functioning, with

some factors being more strongly related to these variables than others. These factors included: demographic variables (i.e., age, years lived in the United States), acculturation, verbal reasoning, and expressive language, and will be discussed in the following sections.

Demographic variables. Age was significantly and negatively related to OLC scores in the moderated multiple regression model predicting OLC scores from age and years lived in the United States. This indicates as participants' age increased, their receptive and expressive language abilities decreased; however, age was not a significant predictor in any other analyses. Further, in the above model, years lived in the United States was more strongly and positively related to OLC scores than age and remained a significant positive predictor in the moderated multiple regression model predicting OLC from demographic, acculturation, and executive functioning variables. This suggests age is tangentially related to OLC scores, while years lived in the United States plays a more central role in predicting these scores (Kulkarni & Hu, 2014; Stevens, 1999). This makes sense because the longer an individual has lived in the United States, the more immersed in English they are likely to be, which would likely lead to increased receptive and expressive English language skills. In contrast, there is not necessarily a positive correlation between age and years lived in the United States; just because someone is older does not mean they have lived in the United States for a long time, which is supported by data indicating 94% of all immigrants who moved to the United States in 2013 were 18-years and older (United States Census Bureau [USCB], 2013). Based on these data, it should not be expected that someone who is younger would have lived in the United States for fewer years than someone who is older (USCB, 2013). As a result, practitioners should be careful not to infer bilingual ELL children will have poorer English skills than bilingual ELL adults solely on the basis of age, especially because the younger a person is when they start learning English, the

more likely it is they will attain native-like levels of ELP (Bleakley & Chin, 2010; Kohnert, Bates, & Hernandez, 1999).

Acculturation. Dominant and Ethnic Society Immersion scores were both significantly and positively related to OLC scores, with DSI scores having a stronger relationship with OLC scores than ESI scores. The relationship between DSI and OLC scores seems relatively intuitive; if an individual reports being more immersed in United States culture, they are likely to spend more time with monolingual English speakers, which would be expected to contribute to their ELP development. Although ESI scores were the weakest significant predictor of OLC scores, higher levels of ESI were associated with higher OLC scores. It is possible that individuals who are highly immersed in their ethnic cultures are able to use their native language skills to more effectively learn English. These positive and significant relationships among ESI scores, DSI scores, and OLC scores are consistent with research suggesting dual language education programs can be equally as or more effective than monolingual programs in developing students' ELP (e.g., Gort, 2006; Páez, Tabors, & López, 2007; Slavin, Madden, Calderón, Chamberlain, & Hennessy, 2011).

That acculturation did not predict executive functioning abilities or the relationship between executive functioning and OLC scores was unexpected. Acculturation may not have moderated the relationship between executive functioning and ELP in the moderated multiple regression and dominance analyses because there was not enough variability between participants' ESI and DSI profiles (i.e., overall, participants reported high levels of ESI and DSI, rather than one being high and the other being low). It is possible acculturation would moderate the relationship between executive functioning and ELP in populations with more significant variability between ESI and DSI scores. In populations with more varied acculturation profiles,

higher or lower levels of DSI compared to ESI would likely manifest differently. For example, individuals with high ESI scores and low DSI scores may not be as likely to speak or listen to English as much as individuals with higher DSI scores, which could potentially lead to lower OLC scores, even if these individuals have the cognitive capacity (as measured by the executive functioning tests) to develop strong receptive and expressive English skills (Barac & Bialystok, 2012; Yang, Yang, & Lust, 2011). The same could be true regarding the lack of relationship between ESI, DSI, and Proverb Test: Total Achievement (Free) scores. If participants in the current study had lower levels of DSI than ESI, as has been found in previous studies (e.g., Awad, 2010; Jiang et al., 2009; Lau et al, 2011; Yi et al., 2016), perhaps their performance on the Proverb Test would have been lower. The Proverb Test measures verbal reasoning using common and uncommon United States proverbs; therefore, if individuals were not highly immersed in United States culture, they might not be as familiar with the proverbs and perform more poorly on the test. This lack of relationship suggests in highly bicultural individuals, acculturation may not significantly impact performance on executive functioning tasks involving verbal reasoning.

Expressive language. Oral Expression scores, which represent expressive language abilities, were significantly and positively related to Color-Word Interference Test: Condition 4 (Inhibition/Switching) and Proverb Test: Total Achievement (Free) scores, which are measures of inhibition, set-shifting, and verbal reasoning. These relationships were expected given both executive functioning tasks required verbal responses. Oral Expression scores made similar contributions to both Color-Word Interference and Proverb Test scores (58.9% and 56.5%, respectively). As a measure of verbal reasoning, the Proverb Test should theoretically require stronger expressive language skills than the Color-Word Interference Test, which is primarily a

measure of inhibition and set-shifting. Oral Expression scores were likely related to the Proverb and Color-Word Interference Tests because of overlap between what is measured by the tests. The Oral Expression subtest includes three measures of expressive language skills: expressive vocabulary, oral word fluency, and sentence repetition (Canivez, 2013; Vaughan-Jensen, Adame, McLean, & Gámez, 2011; Wechsler, 2009). The nature of the expressive vocabulary and oral word fluency tasks, specifically, help to explain why Oral Expression scores would be related to both the Proverb and Color-Word Interference Test scores. Expressive vocabulary skills require higher levels of English proficiency than receptive vocabulary skills, and the Proverb Test measures higher-order English verbal reasoning; if an individual has high expressive vocabulary skills in English, it is likely they would have higher English verbal reasoning abilities than someone with lower expressive vocabulary skills. Both the Color-Word Interference Test and oral word fluency task within the Oral Expression subtest required speeded verbal responses; thus, the ability to quickly produce responses on these tasks would contribute to stronger performance.

Verbal reasoning. Verbal reasoning, as measured by Proverb Test: Total Achievement (Free) scores, was significantly and positively related to OLC scores. This is unsurprising because the OLC scores are a measure of cognitive academic language proficiency (CALP), which is cognitively demanding. Verbal reasoning is a cognitive construct, and thus, verbal reasoning skills would be needed to complete tasks involving CALP.

Implications

Implications for research. With the exception of the model predicting Proverb Test: Total Achievement (Free) scores from acculturation, ELP, and demographic variables, overall models predicting executive functioning abilities (i.e., verbal reasoning and inhibition/set-

shifting) were non-significant. This indicates much of the variance among these variables is unexplained in the current study. Further, within the models predicting these executive functioning scores, Oral Expression was the only significant individual predictor in any of the models. Set-shifting, inhibition, and verbal reasoning abilities that are not explained by age, years lived in the United States, DSI, ESI, and Listening Comprehension represented unaccounted variance in this sample and there is a need for further exploration into the factors that contribute to bilingual adults' verbal reasoning, inhibition, and set-shifting skills. These findings also highlight the importance of conducting research to clarify the nature of the relationship between the Oral Expression subtest and the executive functioning tests, and especially the Color-Word Interference Test, in bilingual adults. Although Oral Expression scores, which contribute to OLC scores, were significantly related to Color-Word Interference scores, Color-Word Interference scores were not significantly related to OLC scores. This is an important research implication because it suggests the processes involved with completing the Color-Word Interference Test are related to oral expression, but not, or to a lesser extent, the other constructs that constitute this composite. This hierarchy is important to consider in research because it can lead to hypotheses about the relationships between the constructs.

Another important research implication is the finding that Oral Expression scores explained similar amounts of variance for both Color-Word Interference Test: Condition 4 (Inhibition/Switching) and Proverb Test: Total Achievement (Free) scores. This suggests there is likely overlap in the constructs measured by these tasks and is somewhat consistent with the limited previous research examining the factor structure of the D-KEFS (e.g., Latzman & Markon, 2010). In their study, Latzman and Markon (2010) found that for older adults (aged 50-89), both the Proverb Test and Color-Word Interference Test significantly loaded onto the

Inhibition factor (rather than Shifting or Updating factors). While this finding is tangentially related to the current study because participants in the current study ranged in age from 18 to 47 years, it highlights the potential relationship between the Color-Word Interference and Proverb Tests. It also suggests researchers should be cautious when conducting studies that investigate executive functioning abilities, because even executive functioning constructs that appear to be relatively unrelated, such as verbal reasoning and inhibition/set-shifting, likely have some degree of overlap. This overlap could make it difficult to determine what factors uniquely contribute to different facets of executive functioning and suggests conceptualizing executive functioning as an umbrella construct (Best & Miller, 2010; Lezak, Howieson, Bigler, & Tranel, 2012) may be the most prudent way to bridge executive functioning research with clinical practice.

The model predicting OLC scores from demographic, acculturation, and executive functioning variables explained well over half the variance of OLC scores, which suggests this model has some theoretical utility in understanding the relationships among these variables, especially because components of demographics (i.e., years lived in the United States), acculturation (i.e., DSI and ESI scores), and executive functioning (i.e., Proverb Test: Total Achievement [Free] scores) all significantly contributed to the model. These findings suggest researchers should be careful to account for cognitive and environmental factors that can contribute to ELP in bilingual adults when designing studies and interpreting results from those studies. Attention should especially be given to the impact of acculturation on ELP, as ESI and DSI scores explained nearly 42% of the variance of OLC scores. Given nearly a third of the variance of OLC scores remained unaccounted for in this model, it is equally important to recognize there are other factors that contributed to participants' OLC scores, but were not considered in the current study. These could include other executive functions, such as attention

and working memory, as well as other environmental factors, including parents' level of education and the linguistic distance between the individual's native language and English.

Implications for the practice of school psychology. The findings of this study can be used to inform assessment and intervention practices within the school setting; however, caution should be exercised in applying these findings to populations outside of a bilingual ELL adult population until further research with participants of other ages and a variety of linguistic backgrounds is completed. In addition to having theoretical implications, the significant model predicting OLC scores from demographic, acculturation, and executive functioning variables has important implications for school psychologists. This model supports the importance of considering individuals' acculturation and executive functioning profiles, as well as how long they have lived in the United States, when understanding their ELP development. While not the strongest predictor of OLC scores, years lived in the United States explained approximately 18% of the variance of OLC scores. This suggests that while individuals who have lived in the United States are likely to have higher ELP than those who have not lived in the United States as long, it should not be assumed bilingual individuals who have lived in the United States a long time are not at risk for having receptive and expressive language difficulties. As it relates to the practice of school psychology, this suggests some older ELL students who have lived in the United States a long time may still benefit from assessment and intervention services if they have a history of academic difficulties. These services could include routine assessment to determine the students' academic strengths and weaknesses (e.g., are they able to fluently complete academic tasks, but struggle with comprehension? Do they still need to develop fluency?) and the use of evidence-based interventions that have demonstrated efficacy with ELL students, such as peer tutoring and response groups (Jun-Aust, 1985), the Fast ForWord[®] intervention (Scientific

Learning Corporation, 2004; Troia, 2004), and peer-assisted learning strategies (Sáenz, Fuchs, & Fuchs, 2005).

Understanding the relationship between acculturation and ELP is important because acculturation is related to social-emotional outcomes in immigrants (Berry, Phinney, Sam, & Vedder, 2006), and individuals with social-emotional problems are at an increased risk for academic difficulties (e.g., DeRosier & Lloyd, 2010; Joffe & Black, 2012; Niehaus & Adelson, 2014; Nix, Bierman, Domitrovich, & Gill, 2013). Both DSI and ESI scores were significantly related to OLC scores, which underscores the importance of engaging in culturally sustaining practices when working with ELL populations (Ladson-Billings, 2014; Paris, 2012). Of the significant individual predictors, DSI scores were the most strongly related to OLC scores, which suggests one way to promote ELP development in bicultural individuals would be to encourage them to be more immersed in United States culture. Because school psychologists often work with ELL populations, they are in a direct position to encourage and support ELL students in participating in extracurricular activities that could foster United States immersion, as well as give ELL students the opportunity to interact with monolingual English peers to further promote ELP development (Berry et al., 2006). The finding that ESI scores were also significantly positively related to OLC scores highlights the importance of encouraging bicultural individuals to foster their ethnic cultural identities to promote ELP development, as well. School psychologists could use systems-level consultation to promote ethnic society immersion by working with other school staff and community members to plan events that foster appreciation for different cultures and languages. These could include classroom lessons where all students are engaged in learning about specific minority populations and languages, as well as community events featuring customs from different minority cultures. If ELL students see their cultures

being celebrated and emphasized in their schools and communities, they may be more likely to want to foster their ethnic cultural identity in addition to immersing themselves in United States culture, which could in turn foster academic achievement (Altschul, Oyserman, & Bybee, 2006).

Recognizing the relationship between verbal reasoning, as measured by Proverb Test: Total Achievement (Free) scores, and OLC scores indicates it is also important to consider bilingual individuals' verbal reasoning abilities in assessment and intervention. Individuals who are identified as having verbal reasoning deficits on standardized assessment measures may benefit from receiving targeted interventions to improve their verbal reasoning and subsequently, their ELP. ELL students who receive targeted academic interventions that consider their unique needs experience increased academic achievement compared to ELL students who do not receive these same interventions (Esparza Brown & Doolittle, 2008; Kamps et al., 2007; Lee, Maerten-Rivera, Penfield, LeRoy, & Secada, 2008; Xu & Drame, 2007). School-based practitioners (e.g., school psychologists, speech-language pathologists) who are competent to work with culturally and linguistically diverse students, including ELLs, are in a direct position to help improve ELP in ELL students through provision of these interventions.

Implications for the practice of neuropsychology. It is also important to consider how the findings of the current study can impact the practice of neuropsychology. While school psychologists and neuropsychologists may conduct evaluations with similar pediatric populations (e.g., children with Attention-Deficit/Hyperactivity Disorder, Autism Spectrum Disorder, Learning Disorders, and other developmental disorders), neuropsychologists may be more likely to assess areas of functioning not typically included in school psychological evaluations (e.g., executive functioning, sensory-motor abilities, memory). This suggests it is

important to consider how results from the current study can specifically impact neuropsychological evaluations.

The finding that only Oral Expression scores significantly contributed to models predicting Color-Word Interference Test: Condition 4 (Inhibition/Switching) and Proverb Test: Total Achievement (Free) scores highlights the importance of routinely assessing bilingual patients' expressive language abilities in neuropsychological evaluations. Doing this would help in differentiating between bilingual individuals who have true verbal reasoning, inhibition, and set-shifting deficits compared with those who might perform more poorly on those tasks because they do not have adequate expressive language skills in English. If it is determined an individual has deficient expressive English language skills, it may be necessary to conduct the evaluation in the patient's native language or use executive functioning measures that are less language-dependent. It would also be important to consider the impact of the patient's ELL status when interpreting testing results and to exercise caution when making diagnoses (Brickman, Cabo, & Manly, 2006; Judd et al., 2009).

The lack of relationship between DSI, ESI, Proverb Test, and Color-Word Interference Test scores suggest it is critical to assess bilingual ELLs' acculturation during neuropsychological evaluations because it is possible individuals with higher levels of United States immersion perform better on verbal reasoning, set-shifting, and inhibition tasks than individuals who are more immersed in their ethnic cultures. As a result, determining participants' level of acculturation in both cultures would be critical to understanding how to interpret performance on executive functioning tasks in bilingual, bicultural individuals. Participants in the current study were highly bicultural and more immersed in United States culture than their ethnic cultures, which could suggest their levels of acculturation did not impact

their performance on the executive functioning tasks as much as if they had lower levels of United States immersion. If this is the case, neuropsychologists could be more confident in evaluation results with bilingual ELLs who have high levels of ESI and DSI, especially if they are more immersed in United States culture than their ethnic culture. Conversely, if an individual is not highly acculturated in one or both cultures, or if they are more immersed in their ethnic culture, it would be important to be especially cognizant of the impact this could have on their performance (Brauer Boone, Victor, Wen, Razani, & Pontón, 2007; Razani, Burciaga, Madore, & Wong, 2007).

Delimitations and Limitations of the Study

Delimitations

The primary strength of the study is the psychometric validity of the SMAS, D-KEFS, and WIAT-III. The SMAS was developed using two studies; the first included 250 participants and the second included over 400 participants, which are similar standardization sample sizes as have been obtained in other established acculturation measures, including the *Acculturation Rating Scale for Mexican Americans-II* (ARSMA-II; Cuellar et al., 1995) and the *Bidimensional Acculturation Scale for Hispanics* (BAS; Marín & Gamba, 1996). The SMAS has demonstrated reliability and validity and has been found to accurately assess acculturation in a variety of populations, including adolescents, young adults, old adults, non-clinical, Iranians, Asian Americans, African Americans, Africans, and Hispanic Americans (e.g., Moshrefi, 2012; Rayle & Myers, 2004; Stephenson, 2000). The D-KEFS was normed on over 1,500 individuals and was demographically and regionally matched against the population of the United States (Delis et al., 2001). It is a psychometrically-sound executive functioning test for individuals aged eight to 89 (Delis et al., 2001; Homack, Lee, & Riccio, 2005; Lutzman & Markon, 2010). The WIAT-

III was normed on approximately 3,000 individuals and is representative of the United States population (Wechsler, 2009). It has demonstrated reliability and validity and correlates well with other measures of achievement, suggesting it effectively measures a variety of academic skills, including oral language (Wechsler, 2009). The use of psychometrically-sound measures normed with individuals living in the United States provided a built-in control group against which to compare participants' performance. It also helps guide future research by allowing for replication of the current study with more diverse bilingual ELL populations, as well as being able to build on the current study and including additional measure.

Limitations

Although the current study provides important insights into the relationships among acculturation, executive functioning, and ELP in bilingual adults, it is limited by its small sample size and the recruitment of bilingual ELL adults from a variety of cultural and linguistic backgrounds. Participants in the current study reported speaking 21 different languages, which may limit the generalizability of the results, especially when considering the small sample size ($N = 38$). Replication of the current study with a larger sample, as well as with specific cultural-linguistic populations, would allow for increased reliability and generalizability of results from the current study. Replicating this study with specific bilingual ELL populations could reveal profile differences depending on individuals' backgrounds (e.g., Spanish-English individuals might have different patterns of performance than French-English individuals).

The recruitment of participants from a college community and the lack of variability in participants' acculturation profiles hinder the generalizability of the results to other populations, especially given participants' executive functioning, acculturation, and ELP profiles were not consistent with previous research. There were not significant differences between participants'

expressive and receptive English language skills, nor were there differences among their verbal reasoning, inhibition, and set-shifting abilities. Additionally, they reported higher levels of dominant society immersion than has been observed in other studies using the SMAS; all of these findings suggest participants in the current study are not representative of bilingual individuals as a whole. Although the sample size is limited, and with this caveat, the sample may be more representative of bilingual individuals who are highly educated and highly immersed in their ethnic and United States cultures.

The inherent task impurity of the measures that were utilized also limits the study. In assessment, task impurity refers to the notion that no test measures only what it purports to measure (Jackson et al., 2013; Miyake et al., 2000). This is a limitation in the current study because while specific tests were used to measure specific constructs (e.g., the Proverb test was used to measure verbal reasoning, the WIAT-III subtests were used to measure expressive and receptive English language skills), each of these tests also indirectly measure other constructs. For example, one of the WIAT-III subtests involves listening to passages and answering questions about the passages. In addition to being a measure of receptive language skills, this test is also impacted by factors such as attention and working memory; if an individual does not attend to the passages or is unable to remember what was said at the beginning of the passages by the time they get to the end of the passages, answering questions about them will be difficult. Task impurity is problematic because it becomes difficult to determine exactly how the different constructs are related, as well as ensure the intended constructs are actually being measured.

Directions for Future Research

The directions for future research are intended to improve upon the limitations of the current study, as well as provide direction for research to further the understanding of the relationships among acculturation, executive functioning, and ELP.

Environmental Correlates of Executive Functioning

Psychologists, including neuropsychologists, are expected to engage in culturally-competent practices (American Psychological Association [APA], 2006). This includes understanding how individual and cultural factors impact results on standardized assessments. While existing research with bilingual populations implicates the roles of verbal reasoning (e.g., Bialystok et al., 2010; Bialystok et al., 2008), set-shifting, inhibition, and attention (e.g., Bialystok, Craik, & Ryan, 2006; Calvo & Bialystok, 2014; Yang, Yang, & Lust, 2011), less is known about the role acculturation and other environmental variables play in executive functioning development. Future studies should recruit bilingual participants with more diverse acculturation profiles to provide better insight into the nature of the relationship between acculturation and executive functioning. These studies should examine other environmental factors that may be related to executive functioning development in bilingual ELLs, such as parents' level of education, income, and ethnic language reading and writing abilities. They should also be longitudinal, given the development of executive functioning varies across the lifespan (Best & Miller, 2010; Kray et al., 2004).

The Relationship between Executive Functioning and English Language Proficiency

Future research targeted at understanding factors that contribute to bilingual ELLs' English language proficiency may want to examine other executive functioning constructs that could be related to ELP. In the current study, Oral Expression scores were significantly related

to both Proverb and Color-Word Interference Test scores, and Proverb Test scores were significantly related to OLC scores; these findings suggest there is a relationship between executive functioning and ELP that is worthy of further exploration. Executive functioning tasks such as the Verbal Fluency Test on the D-KEFS and the *Wisconsin Card Sorting Test* (WCST; Grant & Berg, 1981), which measure constructs such as verbal fluency, set-shifting, and organization, could provide additional insight into the nature of this relationship and should be included in future studies. The Color-Word Interference Test and oral word fluency task on the Oral Expression subtest both require speeded verbal responses, thus suggesting verbal fluency may play a role in these tasks. Further, the Verbal Fluency Test on the D-KEFS includes a semantic inhibition/switching task that is arguably more context-embedded than the switching/inhibition condition on the Color-Word Interference Test. ELP development is contingent upon understanding linguistic information in context (Roessingh, 2006), so the Verbal Fluency Test could be a better predictor of ELP than the Color-Word Interference Test. The WCST measures inhibition and set-shifting at a higher level than the Verbal Fluency and Color-Word Interference Tests because it also requires organizational and learning skills. These components could help further explain the relationship between executive function and ELP because in order to learn a second language, individuals need to be able to organize and integrate English with their ethnic language.

Consideration of Age and Language

Future research should draw from different linguistic and age populations. Given that executive functioning abilities are strongly impacted by age (Best, Miller, & Jones, 2009; Jurado & Rosselli, 2007), understanding the relationship between executive functioning and ELP during different developmental periods could contribute to the development of age-sensitive

intervention practices targeting ELP skills. For example, if inhibition skills are more strongly related to ELP in younger children than older children, younger children may be more likely to benefit from receiving an intervention that targets their inhibition skills as a way to promote ELP, especially given there is research to suggest early intervention services promote development of ELP and related skills, such as reading, in ELL children (e.g., Kamps et al., 2007; Menzies, Mahdavi, & Lewis, 2008). Future research should expand on the current investigation by studying individuals in different age groups to determine if there are age effects regarding the components of executive functioning that contribute to ELP. This research could specifically examine verbal reasoning, inhibition, and set-shifting; it could also expand to include additional components of executive functioning to provide a more comprehensive understanding of the relationship between executive functioning and ELP in different age groups.

Finally, it is possible bilingual ELLs from different linguistic groups have different acculturation, executive functioning, and ELP profiles. Future research should conduct studies with homogenous linguistic groups, such as participants who only speak Spanish and English or participants who only speak Italian and English. If patterns emerge from these studies, this would pave the way for further research regarding more specific linguistic differences, such as examining how individuals who speak English and French and are from Canada differ from French-English speaking individuals from France. If these differences emerge, understanding them is prudent for both practice and research. In research, it would be important to design and implement studies that control for these between-group differences. Clinically, the profile differences could be used to better predict and interpret bilingual ELLs' performance on standardized assessments, which would likely lead to more culturally-sensitive treatments.

Conclusions

Results from the current study indicate within this adult bilingual ELL population, there are significant relationships among acculturation, executive functioning, ELP, and demographic variables. It is important to note that although these relationships were found in the current study, these results likely have limited generalizability due to the small sample size and participants' executive functioning, acculturation, and ELP profiles being different from what has been found in previous research (e.g., Awad, 2010; Bialystok et al., 2010; Gibson et al., 2012; Jiang et al., 2009; Kimbrough Oller et al., 2007; Yang et al., 2011). Specifically, participants did not have higher inhibition and set-shifting than verbal reasoning abilities; their receptive language skills were not stronger than their expressive language skills; and while they reported high levels of ESI, they reported significantly higher levels of DSI, indicating participants were more immersed in United States culture than their ethnic cultures. These findings could be related to the high levels of DSI and ESI reported by participants, which may contribute to them being more similar to monolingual English speakers than bilingual individuals who are not as acculturated in the United States or their ethnic culture; however, further research would need to be conducted before drawing this conclusion. Likely because of these significant profile differences between participants in the current study and what has been found in previous research, many of the research hypotheses were not supported in the current study.

Moderated multiple regression and dominance analyses revealed a significant model in which acculturation (i.e., ESI and DSI scores), executive functioning (i.e., Proverb Test: Total Achievement [Free] and Color-Word Interference Test: Condition 4 [Inhibition/Switching]), and demographic variables (i.e., age and years lived in the United States) accounted for approximately 71.7% of the variance of OLC scores. DSI scores, Proverb Test scores, years

lived in the United States, and ESI scores were the only significant individual predictors in that model. As expected, results from this model supported the research hypothesis that both DSI and ESI scores would be significantly related to OLC scores, with DSI scores being more strongly related to OLC scores than ESI scores (Brauer Boone et al., 2007; Razani et al., 2007). Somewhat as expected, partial support was also found for the hypothesis that executive functioning scores would be significantly related to OLC scores (Bialystok et al., 2010; Kray, Eber, & Lindenberger, 2004). While Color-Word Interference Test scores were not related to OLC scores, Proverb Test scores were significantly related to OLC scores. An unexpected finding was that acculturation did not moderate the relationship between executive functioning and ELP. This lack of moderation may be related to lack of variability in participants' acculturation profiles, which could be related to a majority of the participants being enrolled in college in the United States, and thus having ample opportunity to be immersed in United States culture. It is likely participants also had high ethnic society immersion because 70% of the participants were born outside of the United States and 80% indicated they had received some education in their native language. Although the overall moderated regression model accounted for a modest proportion of the variance of OLC scores, the individual contributions of the significant individual predictors were relatively low, suggesting other factors (e.g., parents' level of education, amount of academic instruction in English, verbal fluency, attention, memory) that remained unaccounted for in the model also impacted participants' scores.

Models predicting Proverb Test: Total Achievement (Free) and Color-Word Interference Test: Condition 4 (Inhibition/Switching) test scores from acculturation, demographic, and ELP variables indicated Oral Expression scores were strongly related to both Proverb Test and Color-Word Interference Test scores, which partially supports the hypothesis that English language

proficiency would predict executive functioning scores. While Listening Comprehension scores were not significantly related to executive functioning scores in either model, Oral Expression scores were significantly related to both Color-Word Interference and Proverb Test scores, possibly because of overlap among the constructs measured by these tests (Canivez, 2013; Vaughan-Jensen et al., 2011). This suggests there is some degree of overlap between executive functioning and ELP; however, future research should further examine this relationship and work to determine additional factors that also contribute to the development of verbal reasoning, inhibition, and set-shifting skills in bilingual populations. This research should incorporate tests measuring a variety of executive functioning constructs (e.g., attention, working memory, verbal fluency, planning, organization, problem-solving), in addition to measures of receptive and expressive English language skills (e.g., reading comprehension, reading and writing fluency).

Given that culturally and linguistically-diverse individuals comprise the most rapidly-growing populations in the United States and United States schools, it is especially critical that school psychologists and neuropsychologists are able to engage in culturally-sensitive practices. The current study contributes to the existing literature by providing a preliminary analysis of the ways acculturation, executive functioning, and English language proficiency are related to one another in bilingual, highly bicultural, ELL adults. If practitioners can learn more about how these constructs are related in bilingual ELL individuals, they will be able to engage in more culturally-sensitive assessment and intervention practices when working with this population, which can lead to better academic and long-term outcomes in bilingual ELLs.

References

- Aarts, E., & Roelofs, A. (2011). Attentional control in anterior cingulate cortex based on probabilistic cueing. *Journal of Cognitive Neuroscience*, *23*, 716-727. doi: 10.1162/jocn.2010.21435
- Abedi, J. (2004). The No Child Left Behind act and English language learners: Assessment and accountability issues. *Educational Researcher*, *33*, 4-14. doi: 10.3102/0013189X033001004
- Afable-Munsuz, A., & Brindis, C.D. (2006). Acculturation and the sexual and reproductive health of Latino youth in the United States: A literature review. *Perspectives on Sexual and Reproductive Health*, *38*(4), 208-219. doi: 10.1363/3820806
- Ahmed, F.S., & Miller, L.S. (2011). Executive function mechanisms of theory of mind. *Journal of Autism and Developmental Disorders*, *41*, 667-678. doi: 10.1007/s10803-010-1087-7
- Albrecht, D.E., Mulford Albrecht, C., & Murguia, E. (2005). Minority concentration, disadvantage, and inequality in the nonmetropolitan United States. *The Sociological Quarterly*, *46*, 503-523. doi: 10.1111/j.1533-8525.2005.00024.x
- Altschul, I., Oyserman, D., & Bybee, D. (2006). Racial-ethnic identity in mid-adolescence: Content and change as predictors of academic achievement. *Child Development*, *77*(5), 1155-1169. doi: 10.1111/j.1467-8624.2006.00926.x
- American Psychological Association. (2006). Evidence-based practice in psychology. *American Psychologist*, *61*(4), 271-285. doi:10.1037/0003-066X.61.4.271
- Arnsten, A.F.T., & Li, B.M. (2005). Neurobiology of executive functions: Catecholamine influences on prefrontal cortical functions. *Biological Psychiatry*, *57*, 1377-1384. doi: 10.1016/j.biopsych.2004.08.019
- Aud, S., Wilkinson-Flicker, S., Kristapovich, P., Rathbun, A., Wang, X., & Zhang, J. (2013). *The condition of education 2013* (NCES 2013-037). Washington, D.C: U.S. Department of Education, National Center for Education Statistics.
- Aukerman, M. (2007). A culpable CALP: Rethinking the conversational/academic language proficiency distinction in early literacy instruction. *The Reading Teacher*, *60*, 626-635. doi: 10.1598/RT.60.70.3
- Awad, G.H. (2010). The impact of acculturation and religious identification on perceived discrimination for Arab/Middle Eastern Americans. *Cultural Diversity and Ethnic Minority Psychology*, *16*(1), 59-67. doi: 10.1037/a0016675

- Bailey, T.R., Jenkins, D., & Leinbach, D.T. (2005). *What we know about community college low-income and minority student outcomes*. New York, N.Y.: Community College Research Center, Columbia University.
- Baldo, J.V., & Dronkers, N.F. (2006). The role of inferior parietal and inferior frontal cortex in working memory. *Neuropsychology*, *20*, 529-538. doi: 10.1037/0894-4105.20.5.529
- Barac, R., & Bialystok, E. (2012). Bilingual effects on cognitive and linguistic development: Role of language, cultural background, and education. *Child Development*, *83*(2), 413-422. doi: 10.1111/j.1467-8624.2011.01707.x
- Barth, P. (2006). *Score wars: What to make of state v. NAEP tests*. Retrieved from <http://www.centerforpubliceducation.org/Main-Menu/Evaluating-performance/The-proficiency-debate-At-a-glance/Score-wars-What-to-make-of-state-v-NAEP-tests-.html>
- Bavarian, N., Lewis, K.M., DuBois, D.L., Acock, A., Vuchinich, S., Silverthorn, N., ... Flay, B.R. (2013). Using social-emotional and character development to improve academic outcomes: A matched-pair, cluster-randomized controlled trial in low-income, urban schools. *Journal of School Health*, *83*(11), 771-779. doi: 10.1111/josh.12093
- Bechara, A. (2007). *Iowa gambling task*. Lutz, FL: PAR, Inc.
- Benson, K.A., Marchand-Martella, N.E., Martella, R.C., & Kolts, R.L. (2007). Assessing the effects of the Reading Success Level B program with fifth-grade students at a Title I elementary school. *Journal of Direct Instruction*, *7*(1), 29-44.
- Bernier, A., Carlson, S.M., Deschênes, M., & Matte-Gagné, C. (2012). Social factors in the development of early executive functioning: A closer look at the caregiving environment. *Developmental Science*, *15*, 12-24. doi: 10.1111/j.1467-7687.2011.01093.x
- Berry, J.W. (1980). Acculturation as varieties of adaptation. In A.M. Padilla (Ed.), *Acculturation: Theory, models, and some new findings* (pp. 9-25). Boulder, CO: Westview.
- Berry, J.W., Phinney, J.S., Sam, D.L., & Vedder, P. (2006). Immigrant youth: Acculturation, identity, and adaptation. *Applied Psychology*, *55*(3), 303-332. doi: 10.1111/j.1464-0597.2006.00256.x
- Best, J.R., & Miller, P.H. (2010). A developmental perspective on executive function. *Child Development*, *81*, 1641-1660. doi: 10.1111/j.1467-8624.2010.01499.x
- Best, J.R., Miller, P.H., & Jones, L.J. (2009). Executive functions after age 5: Changes and correlates. *Developmental Review*, *29*, 180-200. doi: 10.1016/j.dr.2009.05.002
- Bialystok, E. (2009). Bilingualism: The good, the bad, and the indifferent. *Bilingualism: Language and Cognition*, *12*(1), 3-11. doi: 10.1017/S1366728908003477

- Bialystok, E., Barac, R., Blaye, A., & Poulin-Dubois, D. (2010). Word mapping and executive functioning in young monolingual and bilingual children. *Journal of Cognition and Development, 11*, 485-508. doi: 10.1080/15248372.2010.516420
- Bialystok, E., Craik, F.I.M., Green, D.W., & Gollan, T.H. (2009). Bilingual minds. *Psychological Science in the Public Interest, 10*, 89-129. doi: 10.1177/1529100610387084
- Bialystok, E., Craik, F., & Luk, G. (2008). Cognitive control and lexical access in younger and older bilinguals. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 34*, 859-873. doi: 10.1037/0278-7393.34.4.859
- Bialystok, E., Luk, G., Peets, K.F., & Yang, S. (2010). Receptive vocabulary differences in monolingual and bilingual children. *Bilingualism: Language and Cognition, 13*(4), 525-531. doi: 10.1017/S1366728909990423
- Bifuh-Ambe, E. (2011). Postsecondary learning: Recognizing the needs of English language learners in mainstream university classrooms. *Multicultural Education, 18*(3), 13-19.
- Birdsong, D. (2006). Age and second language acquisition and processing: A selective overview. *Language Learning, 56*(1), 9-49. doi: 10.1111/j.1467-9922.2006.00353.x
- Bleakley, H., & Chin, A. (2010). Age at arrival, English proficiency, and social assimilation among U.S. immigrants. *American Economic Journal: Applied Economics, 2*, 165-198. doi: 10.1257/app.2.1.165
- Brauer Boone, K., Victor, T.L., Wen, J. Razani, J., & Pontón, M. (2007). The association between neuropsychological scores and ethnicity, language, and acculturation variables in a large patient population. *Archives of Clinical Neuropsychology, 22*(3), 355-365. doi: 10.1016/j.acn.2007.01.010
- Brickman, A.M., Cabo, R., & Manly, J.J. (2006). Ethical issues in cross-cultural neuropsychology. *Applied Neuropsychology, 13*(2), 91-100. doi: 10.1207/s15324826an1302_4
- Brookes, R.L., & Stirling, J. (2005). The cerebellar deficit hypothesis and dyslexic tendencies in a non-clinical sample. *Dyslexia, 11*, 174-185. doi: 10.1002/dys.293
- Bunge, S.A., Hazeltine, E., Scanlon, M.D., Rosen, A.C., & Gabrieli, J.D.E. (2002). Dissociable contributions of prefrontal and parietal cortices to response selection. *Neuroimage, 17*, 1526-1571. doi: 10.1006/nimg.2002.1252
- Burt, M.K., Dulay, H.C., & Hernandez-Chavez, E. (1980). *Bilingual syntax measure II*. New York, NY: Psychological Corporation.

- Canivez, G.L. (2013). Incremental criterion validity of WAIS-IV factor index scores: Relationships with WIAT-II and WIAT-III subtest and composite scores. *Psychological Assessment, 25*, 484-495. doi: 10.1037/a0032092
- Carlson, S.M., & Meltzoff, A.N. (2008). Bilingual experience and executive functioning in young children. *Developmental Science, 11*, 282-298. doi: 10.1111/j.1467-7687.2008.00675.x
- Carson, E.A., & Sabol, W.J. (2012). *Prisoners in 2011*. Washington, D.C.: U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics.
- Castro-Olivo, S.M. (2014). Promoting social-emotional learning in adolescent Latino ELLs: A study of the culturally adapted *Strong Teens* program. *School Psychology Quarterly, 29*(4), 567-577. doi: 10.1037/spq.0000055
- Chamorro-Premuzic, T., & Furnham, A. (2008). Personality, intelligence and approaches to learning as predictors of academic performance. *Personality and Individual Differences, 44*, 1596-1603. doi: 10.1016/j.paid.2008.01.003
- Chan, R.C.K., Shum, D., Touloupoulou, T., & Chen, E.Y.H. (2008). Assessment of executive functions: Review of instruments and identification of critical issues. *Archives of Clinical Neuropsychology, 23*(2), 201-216. doi: 10.1016/j.acn.2007.08.010
- Cleveland, M., & Laroche, M. (2007). Acculturation to the global consumer culture: Scale development and research paradigm. *Journal of Business Research, 60*(3), 249-259. doi: 10.1016/j.jbusres.2006.11.006
- Colzato, L.S., Bajo, M.T., van den Wildenberg, W., Paolieri, D., Nieuwenhuis, S., Hiej, W.L., & Hommel, B. (2008). How does bilingualism improve executive control? A comparison of active and reactive inhibition mechanisms. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 34*(), 302-312. doi: 10.1037/0278-7393.34.2.302
- Cook, B.J., & Cordova, D.L. (2007). *Minorities in higher education*. Twenty-second annual status report. Washington, D.C.: American Council on Education.
- Cormier, D.C., McGrew, K.S., & Ysseldyke, J.E. (2014). The influences of linguistic demand and cultural loading on cognitive test scores. *Journal of Psychoeducational Assessment, 32*, 610-623. doi: 10.1177/0734282914536012
- Costigan, C.L., & Dokis, D.P. (2006). Similarities and differences in acculturation among mothers, fathers, and children in immigrant Chinese families. *Journal of Cross-Cultural Psychology, 37*(6), 723-741. doi: 10.1177/0022022106292080
- Crisp, R.J., & Turner, R.N. (2011). Cognitive adaptation to the experience of social and cultural diversity. *Psychological Bulletin, 137*(2), 242-266. doi: 10.1037/a0021840

- Cuellar, I., Arnold, B., & Maldonado, R. (1995). Acculturation Rating Scale for Mexican Americans: II. A revision of the original ARSMA scale. *Hispanic Journal of Behavioral Sciences, 17*, 275-304. doi: 10.1177/07399863950173001
- Cummins, J. (1976). *The influence of bilingualism on cognitive growth: A synthesis of research findings and explanatory hypotheses. Working papers on bilingualism, no. 9.* Toronto, ON: Ontario Institute for Studies in Education.
- Cummins, J. (1979). *Cognitive/academic language proficiency, linguistic interdependence, the optimum age question and some other matters.* Working Papers on Bilingualism, No. 19, 121-129. Toronto: Ontario Institute for Studies in Education.
- Cummins, J. (1994). The acquisition of English as a second language. In K. Spangenberg-Urbschat & R. Pritchard (Eds.), *Kids come in all languages: Reading instruction for ESL students* (pp. 36-62). Newark, DE: International Reading Association.
- Cummins, J. (2000). *Language, power and pedagogy: Bilingual children in the crossfire.* Buffalo, NY: Multilingual Matters.
- Cummins, J. (2008). BICS and CALP: Empirical and theoretical studies of the distinction. In Street, B., & Hornberger, N.H., (Eds.). (2008). *Encyclopedia of Language and Education, 2nd Edition, Volume 2: Literacy* (pp. 71-83). New York, NY: Springer Science + Business Media LLC.
- Dalley, J.W., Cardinal, R.N., & Robbins, T.W. (2004). Prefrontal executive and cognitive functions in rodents: Neural and neurochemical substrates. *Neuroscience & Behavioral Reviews, 28*, 771-784. doi: 10.1016/j.neubiorev.2004.09.006
- Delis, D.C., Kaplan, E., & Kramer, J.H. (2001). *Delis-Kaplan Executive Function System.* San Antonio, TX: Pearson.
- Delis, D.C., Kramer, J., Kaplan, E., & Ober, B.A. (2000). *California Verbal Learning Test (2nd ed.).* San Antonio, TX: The Psychological Corporation.
- DeLong, M.R., & Georgopoulos, A.P. (2011). Motor functions of the basal ganglia. *Comprehensive Physiology, 1*, 1017-1061. doi: 10.1002/cphy.cp010221
- Dennis, J., Basañez, T., & Farahmand, A. (2010). Intergenerational conflicts among Latinos in early adulthood: Separating values conflicts with parents from acculturation conflicts. *Hispanic Journal of Behavioral Sciences, 32*(1), 118-135. doi: 10.1177/0739986309352986
- DeRosier, M.E., & Lloyd, S.W. (2010). The impact of children's social adjustment on academic outcomes. *Reading & Writing Quarterly, 27*(1-2), 25-47. doi: 10.1080/10573569.2011.532710

- Dow, H.D. (2010). The acculturation processes: The strategies and factors affecting the degree of acculturation. *Home Health Care Management & Practice*, 23, 221-227. doi: 10.1177/1084822310390877
- Edelsky, C., Hudelson, S., Flores, B., Barkin, F., Altweger, B., & Jilbert, K. (1983). Semilingualism and language deficit. *Applied Linguistics*, 4, 1-22. doi: 10.1093/applin/4.1.1
- Elliot, C.D. (2007). *Differential Ability Scales* (2nd ed.). San Antonio, TX: Pearson.
- Esparza Brown, J., & Doolittle, J. (2008). A cultural, linguistic, and ecological framework for Response to Intervention with English language learners. *Teaching Exceptional Children*, 40(5), 66-72.
- Every Student Succeeds Act of 2015, Pub. L. No. 114-95, § 129, Stat. 1802 (2015).
- Flanagan, D.P., Fiorello, C.A., & Ortiz, S.O. (2010). Enhancing practice through application of Cattell-Horn-Carroll theory and research: A “third method” approach to specific learning disability identification. *Psychology in the Schools*, 47, 739-760. doi: 10.1002/pits.20501
- Flannery, W.P., Reise, S.P., & Yu, J. (2001). An empirical comparison of acculturation models. *Personality and Social Psychology Bulletin*, 27, 1035-1045. doi: 10.1177/0146167201278010
- Flores, S.M., Batalova, J., & Fix, M. (2012). *The educational trajectories of English language learners in Texas*. Washington, D.C.: Migration Policy Institute. Retrieved from <http://cccie.org/images/stories/TexasELLs.pdf>
- Frey, W.H. (2014, December 12). New projections point to a majority minority nation in 2044. *The Avenue*. Retrieved from <https://www.brookings.edu/blog/the-avenue/2014/12/12/new-projections-point-to-a-majority-minority-nation-in-2044/>
- Gibson, T.A., Kimbrough Oller, D., Jarmulowicz, L., & Ethington, C.A. (2012). The receptive-expressive gap in the vocabulary of young second-language learners: Robustness and possible mechanisms. *Bilingualism: Language and Cognition*, 15(1), 102-116. doi: 10.1017/S1366728910000490
- Giessman, J.A., Gambrell, J.L., & Stebbins, M.S. (2013). Minority performance on the Naglieri Nonverbal Ability Test, Second Edition, versus the Cognitive Abilities Test, Form 6: One gifted program’s experience. *Gifted Child Quarterly*, 57, 101-109. doi: 10.1177/0016986213477190
- Greene, T.G., Marti, C.N., & McClenney, K. (2008). The effort-outcome gap: Differences for African American and Hispanic community college students in student engagement and academic achievement. *The Journal of Higher Education*, 79, 513-539. doi: 10.1353/jhe.0.0018

- Golden, C.J., Purisch, A.D., & Hammeke, T.A. (1985). *Luria-Nebraska Neuropsychological Battery Forms I & II* (Manual). Los Angeles, CA: Western Psychological Services.
- Gort, M. (2006). Strategic codeswitching, interliteracy, and other phenomena of emergent bilingual writing: Lessons from first grade dual language classrooms. *Journal of Early Childhood Literacy*, 6(3), 323-354. doi: 10.1177/1468798406069796
- Grant, D.A., & Berg, E.A. (1981). *Wisconsin Card Sorting Test*. Torrance, CA: WPS.
- Gutiérrez-Clellen, V.F., Calderón, J., & Ellis Weismer, S. (2004). Verbal working memory in bilingual children. *Journal of Speech, Language, and Hearing Research*, 47, 863-876. doi: 10.1044/1092-4388(2004/064)
- Hakuta, K., Butler, Y.G., & Witt, D. (2000). *How long does it take English learners to attain proficiency?* (Policy Report 2000-1). Santa Barbara, CA: The University of California Linguistic Minority Research Institute.
- Halle, T., Hair, E., Wandner, L., McNamara, M., & Chien, N. (2011). Predictors and outcomes of early versus later English language proficiency among English language learners. *Early Childhood Research Quarterly*, 27, 1-20. doi: 10.1016/j.ecresq.2011.07.004
- Hartman, M., Bolton, E., & Fehnel, S.E. (2001). Accounting for age differences on the Wisconsin Card Sorting Test: Decreased working memory, not flexibility. *Psychology and Aging*, 16, 385-399. doi: 10.1037/0882-7974.16.3.385
- Hemphill, F.C., Vanneman, A., & Rahman, T. (2011). *Achievement gaps: How Hispanic and White students in public schools perform in reading and mathematics on the National Assessment of Educational Progress*. Retrieved from: <http://nces.ed.gov/nationsreportcard/pdf/studies/2011459.pdf>
- Homack, S., Lee, D., & Riccio, C.A. (2005). Test review: Delis-Kaplan Executive Function System. *Journal of Clinical and Experimental Neuropsychology*, 27, 599-609. doi: 10.1080/13803390490918444
- Hoover, G.A., & Yaya, M.E. (2010). Racial/ethnic differences in income inequality across US regions. *Review of Black Political Economy*, 37, 79-114. doi: 10.1007/s12114-010-9057-z
- Jackson, M.L., Gunzelmann, G., Whitney, P., Hinson, J.M., Belenky, G., Rabat, A., & Van Dongen, H.P.A. (2013). Deconstructing and reconstructing cognitive performance in sleep deprivation. *Sleep Medicine Reviews*, 17(3), 215-225. doi: 10.1016/j.smr.2012.06.007
- Jeynes, W.H. (2005). A meta-analysis of the relation of parental involvement to urban elementary school student academic achievement. *Urban Education*, 40(3), 237-269. doi: 10.1177/0042085905274540

- Jia, F., Gottardo, A., Koh, P.W., Chen, X., & Pasquarella, A. (2014). The role of acculturation in reading a second language: Its relation to English literacy skills in immigrant Chinese adolescents. *Reading Research Quarterly*, 49, 251-261. doi: 10.1002/rrq.69
- Jiang, M., Green, R.J., Henley, T.B., & Masten, W.G. (2009). Acculturation in relation to the acquisition of a second language. *Journal of Multilingual and Multicultural Development*, 30, 481-492. doi: 10.1080/01434630903147898
- Joffe, V.L., & Black, E. (2012). Social, emotional, and behavioral functioning of secondary school students with low academic and language performance: Perspectives from students, teachers, and parents. *Language, Speech, and Hearing Services in Schools*, 43, 461-473. doi: 10.1044/0161-1461(2012/11-0088)
- Johnson, J.S., & Newport, E.L. (1989). Critical period effects in second language learning: The influence of maturational state on the acquisition of English as a second language. *Cognitive Psychology*, 21, 60-99. doi: 10.1016/0010-0285(89)90003-0
- Judd, T., Capetillo, D., Carrión-Baralt, J., Mármol, L.M., San Miguel-Montes, L., Navarrete, M.G. ... NAN Policy and Planning Committee. (2009). Professional considerations for improving the neuropsychological evaluation of Hispanics: A National Academy of Neuropsychology education paper. *Archives of Clinical Neuropsychology*, 24, 127-135. doi: 10.1093/arclin/acp016
- Jun-Aust, H. (1985, March). *Individual differences in second language learning of Korean immigrant students*. Paper presented at the International Conference on Second/Foreign Language Acquisition by Children. Oklahoma City, OK.
- Jurado, M.B., & Rosselli, M. (2007). The elusive nature of executive functions: A review of our current understanding. *Neuropsychology Review*, 17, 213-233. doi: 10.1007/s11065-007-9040-z
- Kamps, D., Abbot, M., Greenwood, C., Arreaga-Mayer, C., Wills, H., Longstaff, J., ... Walton, C. (2008). Use of evidence-based, small-group reading instruction for English language learners in elementary grades: Secondary-tier intervention. *Learning Disability Quarterly*, 30(3), 153-168. doi: 10.2307/30035561
- Kann, L., McManus, T., Harris, W.A., Shanklin, S.L., Flint, K.H., Hawkins, J. ... Zaza, S. (2016). Youth risk behavior surveillance – United States, 2015. Centers for Disease Control and Prevention, Morbidity and Mortality Weekly Report. *Surveillance Summaries*, 65(6). Retrieved from http://www.cdc.gov/healthyouth/data/yrbs/pdf/2015/ss6506_updated.pdf
- Kanno, Y., & Cromley, J.G. (2013). English language learners' access to and attainment in postsecondary education. *TESOL Quarterly*, 47(1), 89-121. doi: 10.1002/tesq.49

- Katsiyannis, A., Ryan, J.B., Zhang, D., & Spann, A. (2008). Juvenile delinquency and recidivism: The impact of academic achievement. *Reading & Writing Quarterly: Overcoming Learning Difficulties*, 24(2), 177-196. doi: 10.1080/10573560701808460
- Kena, G., Hussar, W., McFarland, J., de Brey, C., Musu-Gillette, L., Wang, X. ... Dunlop Velez, E. (2016). *The condition of education 2013* (NCES 2016-144). Washington, D.C.; U.S. Department of Education, National Center for Education Statistics.
- Kiang, M., Light, G.A., Prugh, J., Coulson, S., Braff, D.L., & Kutas, M. (2007). Cognitive, neurophysiological, and functional correlates of proverb interpretation abnormalities in schizophrenia. *Journal of the International Neuropsychological Society*, 13, 653-663. doi: 10.1017/S1355617707070816
- Kimbrough Oller, D., Pearson, B.Z., & Cobo-Lewis, A.B. (2007). Profile effects in early bilingual language and literacy. *Applied Psycholinguistics*, 28(2), 191-230. doi: 10.1017/S0142716407070117
- King, R.D., & Wheelock, D. (2007). Group threat and social control: Race, perceptions of minorities and the desire to punish. *Social Forces*, 85, 1255-1280. doi: 10.1353/sof.2007.0045
- Klingner, J.K., Artiles, A.J., & Barletta, L.M. (2006). English language learners who struggle with reading: Language acquisition or LD? *Journal of Learning Disabilities*, 39, 108-128. doi: 10.1177/00222194060390020101
- Kohnert, K.J., Bates, E., & Hernandez, A.E. (1999). Balancing bilinguals: Lexical-semantic production and cognitive processing in children learning Spanish and English. *Journal of Speech, Language, and Hearing Research*, 42, 1400-1413.
- Kohut, A., Ketter, S., Doherty, C., Suro, R., & Escobar, G. (2006). *America's immigration quandary: No consensus on immigration problem or proposed fixes*. Washington, D.C.: Pew Research Center for the People & the Press, Pew Hispanic Center.
- Korkman, M., Kirk, U., & Kemp, S. (2007). *NEPSY* (2nd ed.). San Antonio, TX: Pearson.
- Kotz, S.A., Schwartze, M., & Schmidt-Kassow, M. (2009). Non-motor basal ganglia functions: A review and proposal for a model of sensory predictability in auditory language perception. *Cortex*, 45, 982-990. doi: 10.1016/j.cortex.2009.02.010
- Kranzler, J.H., Flores, C.G., & Coady, M. (2010). Examination of the cross-battery approach for the cognitive assessment of children and youth from diverse linguistic and cultural backgrounds. *School Psychology Review*, 39, 431-446.
- Krashen, S., & Brown, C.L. (2005). The ameliorating effects of high socioeconomic status: A secondary analysis. *Bilingual Research Journal*, 29, 185-196. doi: 10.1080/15235882.2005.10162830

- Kravitz, A.V., Freeze, B.S., Parker, P.R.L., Kay, K., Thwin, M.T., Deisseroth, K., & Kreitzer, A.C. (2010). Regulation of parkinsonian motor behaviours by optogenetic control of basal ganglia circuitry. *Nature*, *466*, 622-626. doi: 10.1038/nature09159
- Kray, J., Eber, J., & Lindenberger, U. (2004). Age differences in executive functioning across the lifespan: The role of verbalization in task preparation. *Acta Psychologica*, *115*, 143-165. doi: 10.1016/j.actpsy.2003.12.001
- Krizman, J., Marian, V., Shook, A., Skoe, E., & Kraus, N. (2012). Subcortical encoding of sound is enhanced in bilinguals and relates to executive function advantages. *PNAS*, *109*(20), 7877-7881. doi: 10.1073/pnas.1201575109
- Kulkarni, V.S., & Hu, X. (2014). English language proficiency among the foreign born in the United States, 1980-2007: Duration, age, and cohort effects. *International Migration Review*, *48*(3), 762-800. doi: 10.1111/imre.12060
- Ladson-Billings, G. (2014). Culturally relevant pedagogy 2.0: A.K.A. the remix. *Harvard Educational Review*, *84*(1), 74-84. doi: 10.17763/haer.84.1.p2rj131485484751
- Laidra, K., Pullmann, H., & Allik, J. (2007). Personality and intelligence as predictors of academic achievement: A cross-sectional study from elementary to secondary school. *Personality and Individual Differences*, *42*(3), 441-451. doi: 10.1016/j.paid.2006.08.001
- Lakin, J.M. (2012). Assessing the cognitive abilities of culturally and linguistically diverse students: Predictive validity of verbal, quantitative, and nonverbal tests. *Psychology in the Schools*, *49*, 756-758. doi: 10.1002/pits.21630
- Lakin, J.M., & Lai, E.R. (2012). Multigroup generalizability analysis of verbal, quantitative, and nonverbal ability tests for culturally and linguistically diverse students. *Educational and Psychological Measurement*, *72*, 139-158. doi: 10.1177/0013164411408074
- Latzman, R.D., & Markon, K.E. (2010). The factor structure and age-related factorial invariance of the Delis-Kaplan Executive Function System (D-KEFS). *Assessment*, *17*, 172-184. doi: 10.1177/1073191109356254
- Lau, A.S., Fung, J.J., Ho, L.Y., Liu, L.L., & Gudiño, O.G. (2011). Parent training with high-risk immigrant Chinese families: A pilot group randomized trial yielding practice-based evidence. *Behavior Therapy*, *42*(3). doi: 10.1016/j.beth.2010.11.001
- Lau, H., Rogers, R.D., & Passingham, R.E. (2006). Dissociating response selection and conflict in the medial frontal surface. *Neuroimage*, *29*, 446-451. doi: 10.1016/j.neuroimage.2005.07.050
- Lee, D.S., & Padilla, A.M. (2014). Acculturative stress and coping: Gender differences among Korean and Korean American university students. *Journal of College Student Development*, *55*(3), 243-262. doi: 10.1353/csd.2014.0025

- Lee, M.T., Martinez, Jr., R., & Rosenfeld, R. (2001). Does immigration increase homicide? Negative evidence from three border cities. *The Sociological Quarterly*, *42*, 559-580. doi: 10.1111/j.1533-8525.2001.tb01780.x
- Lems, K. (2012). The effect of L1 orthography on the oral reading of adult English language learners. *Writing Systems Research*, *4*(1), 61-71. doi: 10.1080/17586801.2011.635951
- Lezak, M.D., Howieson, D.B., Bigler, E.D., & Tranel, D. (2012). *Neuropsychological assessment* (5th ed.). New York, NY: Oxford University Press.
- Lichter, D.T., Parisi, D., & Taquino, M.C. (2012). The geography of exclusion: Race, segregation, and concentrated poverty. *Social Problems*, *59*, 364-388. doi: 10.1025/sp.2012.59.3.364
- Lippa, S.M., & Davis, R.N. (2010). Inhibition/switching is not necessarily harder than Inhibition: An analysis of the D-KEFS Color-Word Interference Test. *Archives of Clinical Neuropsychology*, *25*, 146-152. doi: 10.1093/arclin/acq001
- Locke, C.D. (1998). *Increasing multicultural understanding: A comprehensive model* (2nd ed.). Thousand Oaks, CA: Sage.
- Lohman, D.F., & Hagen, E.P. (2001). *Cognitive Abilities Test (Form 6)*. Itasca, IL: Riverside.
- Lopez, K.M., & Miller, H.V. (2011). Ethnicity, acculturation, and offending: Findings from a sample of Hispanic adolescents. *The Open Family Studies Journal*, *4*, 27-37. doi: 10.2174/1874922401104010027
- Lopez-Class, M., Castro, F.G., & Ramirez, A.G. (2011). Conceptions of acculturation: A review and statement of critical issues. *Social Science & Medicine*, *72*, 1555-1562. Doi: 10.1016/j.socscimed.2011.03.011
- Lorenzo-Blanco, E.I., Unger, J.B., Ritt-Olson, A., Soto, D., & Baezconde-Garbanati, L. (2013). Acculturation, gender, depression, and cigarette smoking among U.S. Hispanic youth: The medicating role of perceived discrimination. *Journal of Youth and Adolescence*, *40*, 1519-1533. doi: 10.1007/s10964-011-9633-7
- Lorenzo-Seva, U., & Ferrando, P.J. (2011). FIRE: An SPSS program for variable selection in multiple linear regression analysis via the relative importance of predictors. *Behavior Research Methods*, *43*(1), 1-7. doi: 10.3758/s13428-010-0043-y
- MacSwan, J. (2000). The threshold hypothesis, Semilingualism, and other contributions to a deficit view of linguistic minorities. *Hispanic Journal of Behavioral Sciences*, *22*(1), 3-45. doi: 10.1177/0739986300221001

- MacSwan, J., & Pray, L. (2005). Learning English bilingually: Age of onset of exposure and rate of acquisition among English language learners in a bilingual education program. *Bilingual Research Journal*, 29, 653-678. doi: 10.1080/15235882.2005.10162857
- Mansouri, F.A., Tanaka, K., & Buckley, M.J. (2009). Conflict-induced behavioural adjustment: A clue to the executive functions of the prefrontal cortex. *Nature Reviews Neuroscience*, 10, 141-152. doi: 10.1038/nrn2538
- Marín, G., & Gamba, R.J. (1996). A new measurement of acculturation for Hispanics: The Bidimensional Acculturation Scale for Hispanics (BAS). *Hispanic Journal of Behavioral Science*, 18, 297-316. doi: 10.1177/07399863960183002
- Martin-Jones, M., & Romaine, S. (1986). Semilingualism: A half-baked theory of communicative competence. *Applied Linguistics*, 7, 26-38. doi: 10.1093/applin/7.1.26
- Melrose, R.J., Poulin, R.M., & Stern, C.E. (2007). An fMRI investigation of the role of the basal ganglia in reasoning. *Brain Research*, 1142, 146-158. doi: -10.1016/j.brainres.2007.01.060
- Menzies, H.M., Mahdavi, J.N., & Lewis, J.L. (2008). Early intervention in reading: From research to practice. *Remedial and Special Education*, 29(2), 67-77. doi: 10.1177/0741932508315844
- Miller, H.V. (2012). Correlates of delinquency and victimization in a sample of Hispanic youth. *International Criminal Justice Review*, 22, 153-170. doi: 10.1177/105767712444922
- Miyake, A., Friedman, N.P., Emerson, M.J., Witzki, A.H., Howerter, A., & Wager, T.D. (2000). The unity and diversity of executive functions and their contributions to complex “frontal lobe” tasks: A latent variable analysis. *Cognitive Psychology*, 41, 49-100. doi: 10.1006/cogp.1999.0734
- Monchi, O. Petrides, M., Strafella, A.P., Worsley, K.J., & Doyon, J. (2006). Functional role of the basal ganglia in the planning and execution of actions. *Annals of Neurology*, 59I, 257-264. doi: 10.1002/ana.20742
- Morgan, G. (2014). Critical period in language development. In the *Encyclopedia of Language Development*. (pp. 115-118). Thousand Oaks, CA: SAGE Publications.
- Moshrefi, F. (2012). *Personality, coping, & acculturation among Iranians* (Doctoral dissertation). Retrieved from UMI Dissertations Publishing. (3525914)
- Motivans, M. (2013). *Federal justice statistics 2010 – Statistical tables*. Washington, D.C.: U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics.
- Mozayan, M.R. (2015). BICS & CALP revisited: A critical appraisal. *International Journal of Educational Investigations*, 2(9), 103-111.

- Muñoz-Sandoval, A.F., Cummins, J., Alvarado, G., & Ruef, M.L. (2005). *Bilingual verbal ability test* (normative update). Rolling Meadows, IL: The Riverside Publishing Company.
- Naglieri, J.A. (2008). *Naglieri Nonverbal Ability Test*. San Antonio, TX: Psychological Corporation.
- Nakayama, S., Kamagata, K., Sano, T., Shimada, Y., Tanaka, Y., Fukui, T., ... & Motoi, Y. (2013). Verbal dysfluency as a consequence of basal ganglia infarction with selective involvement of dorsolateral prefrontal fiber tract. *Journal of Neurology*, 260, 2427-2429. doi: 10.1007/s00415-013-7066-0
- National Center for Education Statistics. (n.d.). *National Education Longitudinal Study of 1988 (NELS:88)*. Retrieved from <https://nces.ed.gov/surveys/nels88/index.asp>
- Nelson, A., & Infante, M. (2014). Integrating the best of both worlds: Details from Mexican-origin college students about their bicultural identities and adjustment experiences. *International and Multidisciplinary Journal of Social Sciences*, 3, 36-60. doi: 10.4471/rimcis.2014.28
- Nguyen, A.-M.T.D., & Benet-Martínez, V. (2013). Biculturalism and adjustment: A meta-analysis. *Journal of Cross-Cultural Psychology*, 44(1), 122-159. doi: 10.1177/0022022111435097
- Niehaus, K., & Adelson, J.L. (2014). School support, parental involvement, and academic and social-emotional outcomes for English language learners. *American Educational Research Journal*, 51, 810-844. doi: 10.3102/0002831214531323
- Nix, R.L., Bierman, K.L., Domitrovich, C.E., & Gill, S. (2013). Promoting children's social-emotional skills in preschool can enhance academic and behavioral functioning in Kindergarten: Findings from Head Start REDI. *Early Education and Development*, 24, 1000-1019. doi: 10.1080/10409289.2013.825565
- No Child Left Behind (NCLB) Act of 2001, Pub. L. No. 107-110, § 115, Stat. 1452 (2002).
- O'Brien, R.M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality & Quantity*, 2007(41), 673-690. doi: 10.1007/s11135-006-9018-6
- O'Bryon, E.C., & Rogers, M.R. (2010). Bilingual school psychologists' assessment practices with English language learners. *Psychology in the Schools*, 47, 1018-1034. doi: 10.1002/pits.20521
- Padilla, A.M. (2008). Social cognition, ethnic identity, and ethnic specific strategies for coping with threat due to prejudice and discrimination. In C. Willis-Esqueda (Ed.), *Motivational Aspects of Prejudice and Racism* (pp. 7-42). New York, NY: Springer-Verlag.

- Padolsky, D. (2004). *How many school-aged English language learners (ELLs) are there in the U.S.?* Washington, D.C.: National Clearinghouse for English Language Acquisition.
- Páez, M.M., Tabors, P.O., & López, L.M. (2007). Dual language and literacy development of Spanish-speaking preschool children. *Journal of Applied Developmental Psychology*, 28(2), 85-102. doi: 10.1016/j.appdev.2006.12.007
- Paris, D. (2012). Culturally sustaining pedagogy: A needed change in stance, terminology, and practice. *Educational Research*, 41, 93-97. doi: 10.3102/0013189X12441244
- Parrado, E.A., & Kandel, W.A. (2010). Hispanic population growth and rural income inequality. *Social Forces*, 88, 1421-1450. doi: 10.1353/sof.0.0291
- Pieter Van Oudenhoven, J., Ward, C., & Masgoret, A.-M. (2006). Patterns of relations between immigrants and host societies. *International Journal of Intercultural Relations*, 30(6), 637-651. doi: 10.1016/j.ijintrell.2006.09.001
- Price, D. (2004). Defining the gaps: Access and success at America's community colleges. In K. Boswell & C. Wilson (Eds.), *Keeping America's promise: A report on the future of the community college*. Denver, CO: Education Commission of the States.
- Raberger, T., & Wimmer, H. (2003). On the automaticity/cerebellar deficit hypothesis of dyslexia: Balancing and continuous rapid naming in dyslexic and ADHD children. *Neuropsychologia*, 41, 1493-1497. doi: 10.1016/S0028-3932(03)00078-2
- Rayle, A.D., & Myers, J.E. (2004). Counseling adolescence towards wellness: The roles of ethnic identity, acculturation, and mattering. *Professional School Counseling*, 8, 81-90.
- Razani, J., Burciaga, J., Madore, M., & Wong, J. (2007). Effects of acculturation on tests of attention and information processing in an ethnically diverse group. *Archives of Clinical Neuropsychology*, 22(3), 333-341. doi: 10.1016/j.acn.2007.01.008
- Reitan, R.M., & Wolfson, D. (1993). *The Halstead-Reitan neuropsychology test battery: Theory and clinical interpretation* (2nd ed.). Tucson, AZ: Neuropsychology Press.
- Ridler, K., Veijola, J.M., Tanskanen, P., Miettunen, J., Chitnis, X., Suckling, J., ... Bullmore, E.T. (2006). Fronto-cerebellar systems are associated with infant motor and adult executive functions in healthy adults but not in schizophrenia. *PNAS*, 103, 15651-15656. doi: 10.1073/pnas.0602639103
- Rinehart, N.J., Tonge, B.J., Iannsek, R., McGinley, J., Brereton, A.V., Enticott, P.G., & Bradshaw, J.L. (2006). Gait function in newly diagnosed children with autism: Cerebellar and basal ganglia related motor disorder. *Developmental Medicine & Child Neurology*, 48, 819-824. doi: 10.1017/S0012162206001769

- Roessingh, H. (2006). BICS-CALP: An introduction for some, a review for others. *TESL Canada Journal*, 23, 91-96.
- Roessingh, H., & Douglas, S.R. (2012). Educational outcomes of English language learners at university. *Canadian Journal of Higher Education*, 42(1), 80-97.
- Rolstad, K. (2005). Rethinking academic language in second language instruction. Proceedings from the 4th *International Symposium on Bilingualism*. Somerville, MA: Cascadilla Press.
- Ruiz Soto, A.G., Hooker, S., & Batalova, J. (2015). *Top languages spoken by English language learners nationally and by state*. Retrieved from <http://www.migrationpolicy.org/research/top-languages-spoken-english-language-learners-nationally-and-state>
- Rumbaut, R.G. (2008). Reaping what you sow: Immigration, youth, and reactive ethnicity. *Applied Developmental Science*, 12, 108-111. doi: 10.1080/10888690801997341
- Ryder, A.G., Alden, L.E., & Paulhus, D.L. (2000). Is acculturation unidimensional or bidimensional? A head-to-head comparison in the prediction of personality, self-identity, and adjustment. *Journal of Personality and Social Psychology*, 79, 49-65. doi: 10.1037/0022-3514.79.1.49
- Sáenz, L.M., Fuchs, L.S., & Fuchs, D. (2005). Peer-assisted learning strategies for English language learners with learning disabilities. *Exceptional Children*, 71(3), 231-247. doi: 10.1177/001440290507100302
- Scarcella, R. (2003). *Academic English: A conceptual framework*. Santa Barbara: The University of California Linguistic Minority Research Institute Technical Report 2003-1. Retrieved from <http://escholarship.org/uc/item/6pd082d4 - page-1>
- Scheffner Hammer, C., Lawrence, F.R., Miccio, A.W. (2008). Exposure to English before and after entry into Head Start: Bilingual children's receptive language growth in Spanish and English. *International Journal of Bilingual Education and Bilingualism*, 11(1), 30-56. doi: 10.2167/beb376.0
- Schmahmann, J.D., & Sherman, J.C. (1998). The cerebellar cognitive affective syndrome. *Brain*, 121, 561-579. doi: 10.1093/brain/121.4.561
- Schrank, F.A., Wendling, B.J., Alvarado, C.G., & Woodcock, R.W. (2010). *Woodcock-Muñoz language survey* (revised normative update). Rolling Meadows, IL: The Riverside Publishing Company.
- Schwartz, S.J., Unger, J.B., Zamboanga, B.L., & Szapocznik, J. (2010). Rethinking the concept of acculturation: Implications for theory and research. *American Psychologist*, 65, 237-251. doi: 10.1037/a0019330

- Scientific Learning Corporation (2004). Improved language skills by children with low reading performance who used Fast ForWord Language. *MAPS for Learning: Product Report*, 3(1), 1-13.
- Shore, L.M., Chung-Herrera, B.G., Dean, M.A., Holcombe Ehrhart, K., Jung, D.I., Randel, A.E., & Singh, G. (2009). Diversity in organizations: Where are we now and where are we going? *Human Resource Management Review*, 19(2), 117-133. doi: 10.1016/j.hrmr.2008.10.004
- Shunk, A.W., Davis, A.S., & Dean, R.S. (2006). Test review: Dean C. Delis, Edith Kaplan & Joel H. Kramer, *Delis Kaplan Executive Function System (D-KEFS)*, The Psychological Corporation, San Antonio, TX, 2001. \$415.00 (complete kit). *Applied Neuropsychology*, 13, 275-279. doi: 10.1207/s15324826an1304_9
- Sirin, S.R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research*, 75, 417-453. doi: 10.3102/00346543075003417
- Slavin, R.E., Madden, N., & Calderón, M. (2011). Reading and language outcomes of a multiyear randomized evaluation of transitional bilingual education. *Educational Evaluation and Policy Analysis*, 33(1), 47-58. doi: 10.3102/0162373711398127
- Smith, C.R., Marchand-Martella, N.E., & Martella, R.C. (2011). Assessing the effects of the Rocket Math program with a primary elementary school student at risk for school failure: A case study. *Education and Treatment of Children*, 34(2), 247-258.
- Sotelo-Dynega, M., Ortiz, S.O., Flanagan, D.P., & Chaplin, W.F. (2013). English language proficiency and test performance: An evaluation of bilingual students with the Woodcock-Johnson III Tests of Cognitive Abilities. *Psychology in the Schools*, 50, 781-797. doi: 10.1002/pits.21706
- Spenader, A.J. (2011). Language learning and acculturation: Lessons from high school and gap-year exchange students. *Foreign Language Annals*, 44, 381-398. doi: 10.1111/j.1944-9720.2011.01134.x
- Stephenson, M. (2000). Development and validation of the Stephenson Multigroup Acculturation Scale (SMAS). *Psychological Assessment*, 12, 77-88. doi: 10.1037/1040-3590.12.1.77
- Stevens, G. (1999). Age at immigration and second language proficiency among foreign-born adults. *Language in Society*, 28(4), 555-578.
- Stocco, A., Yamasaki, B., Natalenko, R., & Prat, C.S. (2014). Bilingual brain training: A neurobiological framework of how bilingual experience improves executive function. *International Journal of Bilingualism*, 18, 67-92. doi: 10.1177/1367006912456617

- Stroop, J.R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology*, 18, 643-662. doi: 10.1037/h0054651
- Suárez-Orozco, C., Suárez-Orozco, M., & Todorova, I. (2008). *Learning a new land: Immigrant students in American society*. Cambridge, MA: Harvard University Press.
- Sung, Y. (2014). Differential effect of social-emotional behaviors on academic achievement of language-minority students. *Child & Youth Care Forum*, 43(3), 393-416. doi: 10.1007/s10566-014-9245-2
- Tadmor, C.T., & Tetlock, P.E. (2006). Biculturalism: A model of the effects of second-culture exposure on acculturation and integrative complexity. *Journal of Cross-Cultural Psychology*, 37(2), 173-190. doi: 10.1177/0022022105284495
- Troia, G.A. (2004). Migrant students with limited English proficiency: Can Fast ForWord Language make a difference in their language skills and academic achievement? *Remedial and Special Education*, 25(6), 353-366. doi: 10.1177/07419325040250060301
- United States Census Bureau (2006). *America speaks: A demographic profile of foreign-language speakers for the United States: 2000* [Data file]. Retrieved from http://www2.census.gov/programs-surveys/decennial/2000/phc/phc-t-42/tab01a_us.pdf
- United States Census Bureau (2012). *U.S. Census Bureau projections show a slower growing, older, more diverse nation a half century from now*. Retrieved from <https://www.census.gov/newsroom/releases/archives/population/cb12-243.html>
- United States Census Bureau. (2013). *Characteristic of the foreign-born population by year of entry* [Data file]. Retrieved from <https://www2.census.gov/programs-surveys/demo/tables/foreign-born/2013/cps2013/2013-asec-tables-year-of-entry.pdf>
- Vance, A., Silk, T.J., Casey, M., Rinehart, N.J., Bradshaw, J.L., Bellgrove, M.A., & Cunningham, R. (2007). Right parietal dysfunction in children with attention deficit hyperactivity disorder, combined type: A functional MRI study. *Molecular Psychiatry*, 12, 826-832. doi: 10.1038/sj.mp.4001999
- Vaughan-Jensen, J., Adame, C., McLean, L., & Gámez, B. (2011). Test review: D. Wechsler Individual Achievement Test (3rd ed.). San Antonio, TX: Pearson, 2009. *Journal of Psychoeducational Assessment*, 29, 286-291. doi: 10.1177/073422910385645
- Velleman, S.L., & Mervis, C.B. (2011). Children with 7q11.23 duplication syndrome: Speech, language, cognitive, and behavioral characteristics and their implications for intervention. *Perspectives on Language, Learning, and Education*, 18, 108-116. doi: 10.1055/1le18.3.108

- Wang, M., Gamo, N.J., Yang, Y., Jin, L.E., Wang, X.-J., Laubach, M., ... Arnsten, A.F.T. (2011). Neuronal basis of age-related working memory decline. *Nature*, *476*, 210-213. doi: 10.1038/nature10243
- Wechsler, D. (2001). *Wechsler Individual Achievement Test* (2nd ed.). San Antonio, TX: Pearson.
- Wechsler, D. (2003). *Wechsler Intelligence Scale for Children* (4th ed.). San Antonio, TX: Pearson.
- Wechsler, D. (2008). *Wechsler Adult Intelligence Scale* (4th ed.). San Antonio, TX: Pearson.
- Wechsler, D. (2009). *Wechsler Individual Achievement Test* (3rd ed.). San Antonio, TX: Pearson.
- Winsler, A., Díaz, R.M., Espinosa, L, & Rodriguez, J.L. (1999). When learning a second language does not mean losing the first: Bilingual language development in low-income, Spanish-speaking children attending bilingual preschool. *Child Development*, *70*(2), 349-362. doi: 10.1111/1467-8624.t01-1-00026
- Wodka, E.L., Loftis, C., Mostofsky, S.H., Prahme, C., Gidley Larson, J.C., Denckla, M.B., & Mahone, E.M. (2008). Prediction of ADHD in boys and girls using the D-KEFS. *Archives of Clinical Neuropsychology*, *23*, 283-293. doi: 10.1016/j.acn.2007.12.004
- Wolin, K.Y., Colditz, G., Stoddard, A.M., Emmons, K.M., & Sorenson, G. (2008). Acculturation and physical activity in a working class multiethnic population. *Preventive Medicine*, *42*(4), 266-272. doi: 10.1016/j.ypmed.2006.01.005
- Woodcock, R.W., Muñoz-Sandoval, A.F., Ruef, M.L., & Alvarado, C.G. (2005). *Woodcock-Muñoz language survey* (revised). Rolling Meadows, IL: The Riverside Publishing Company.
- Xu, Y., & Drame, E. (2008). Culturally appropriate context: Unlocking the potential of Response to Intervention for English language learners. *Journal of Early Childhood Education*, *35*, 305-311. doi: 10.1007/s10643-007-0213-4
- Yang, S., Yang, H., & Lust, B. (2011). Early childhood bilingualism leads to advances in executive attention: Dissociating culture and language. *Bilingualism: Language and Cognition*, *14*(3), 412-422. doi: 10.1017/S1366728910000611
- Yi, S.S., Beasley, J.M., Kwon, S.C., Huang, K-Y, Trinh-Shevrin, C., & Wylie-Rosett, J. (2016). Acculturation and activity behaviors in Chinese American immigrants in New York City. *Preventive Medicine Reports*, *4*, 404-409. doi: 10.1016/j.pmedr.2016.08.007
- Ying, Y.-W., & Han, M. (2007). The longitudinal effect of intergenerational gap in acculturation on conflict and mental health in Southeast Asian American adolescents. *American Journal of Orthopsychiatry*, *77*(1), 61-66. doi: 10.1037/0002-9432.77.1.61

Yoon, E., Lee, R.M., & Goh, M. (2008). Acculturation, social connectedness, and subjective well-being. *Cultural Diversity and Ethnic Minority Psychology, 14*(3), 246-255. doi: 10.1037/1099-9809.14.3.246