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English Language Proficiency and General Intellectual Ability: Is There a Relationship?

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This study examined the persistent problem of practice that ELLs are not identified for gifted programs at the same rate as their native English-speaking peers. The purpose of this research study was to investigate the relationship among English language proficiency levels and general intellectual ability of English language learners for gifted identification. In this study English language proficiency and general intellectual ability were defined as the performance on the ACCESS for ELLs language proficiency test and the performance on the NNAT Nonverbal Ability Test respectively. A Pearson product moment correlation was used to examine the strength and direction of the relationship between variables. An ex post facto design was used to collect existing data for investigation of the research questions.

This study had three main goals. The first was to examine the fairness and inclusion of the gifted identification system in Colorado. This study also intended to contribute to the body of knowledge around developmental theories (Cummins, 1979, as cited in Lewis et al., 2012; Krashen, 1982, as cited in Lewis et al., 2012; Piaget, 1952; Vygotsky, 1978). Another intention of this research was to fill in the gap in current research investigating the relationship between English language proficiency and general intellectual ability to supplement the parallel studies that exist to examine the relationship between either general intellectual ability and another measure, or English language proficiency and another measure.

The results of this study suggest that there is a relationship between the variable of general intellectual ability and the variables of English language proficiency, English language growth, and the domains of language. Results of this study will inform gifted educators, policy makers, and researchers around the appropriateness and effectiveness of considerations made for gifted identification.

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Chapter One

Introduction

Overview

Chapter One examines the limitations of gifted and talented identification procedures and the impact that it has on the gifted identification of English language learners (ELLs). Underrepresentation in gifted and talented programs is a critical educational concern (Esquierdo & Arreguín-Anderson, 2012). The core issue is ambiguous identification assessment practices, especially for bilingual students (Esquierdo & Arreguín-Anderson, 2012). In Colorado, a persistent problem is that language proficiency tests cannot be used as data points in the gifted identification of ELLs. Various policies and practices have been put into place to promote access for ELLs into gifted programs including using practice tests prior to cognitive test administration and elimination of test batteries to reduce the language load of ELLs (Colorado Department of Education [CDE], 2016). Additional research is needed to address restrictions of entrance criteria into gifted programs in the form of standardized tests that may inhibit the ability of ELLs to access gifted programs (VanTassel-Baska, 2010).

This research study used a quantitative correlational design to investigate the relationship among English language proficiency and general intellectual ability of ELLs for identification in gifted programs. This was done by correlating test results from Assessing Comprehension and Communication in English State-to-State for English Language Learners (ACCESS for ELLs), a measure of English language proficiency, and the Naglieri Nonverbal Ability Test (NNAT), a test of general intellectual ability commonly used in gifted identification.

This chapter provides an overview of the problem of practice this study seeks to investigate followed by the purpose of the study. A brief summary of how the research will be conducted is included. The research questions designed to align with the problem and purpose of the study are defined. Theories that support the development of the research questions are briefly explained. The target population and geographic location of the study are described, and key terms are defined. Finally, the significance of how this study contributes to existing knowledge is outlined.

Statement of Professional Goals

As I reflect back on my early learning experiences, the memories that stand out are ones of being reserved, inhibited, and reticent. I had not heard of the term ‘introvert’, but I know now that is what I was and am. I have always struggled in large groups of people and enjoy being alone with my own thoughts and feelings. I quickly learned that it is difficult to be an introvert in a world that values extroverted behaviors. In hindsight, I can see the skills that I needed to be explicitly taught to be successful in school. I would

have benefitted from lessons on self-advocacy, confidence, resilience, social competence, and building positive relationships with like-minded peers. I needed to be taught to understand that solitude is just as beneficial as social interaction and to see these characteristics as strengths, not deficits.

As a result of my childhood experiences, I have always felt more comfortable with children. My introverted nature does not impact me speaking in front of them or making connections with them. My tendency to be aware and observant makes me able to recognize and respond quickly to individual student needs and recognize the characteristics of students like myself. As such, my career led me to focus on the area of gifted and talented students, who commonly demonstrate the same characteristics I did as a student. As I came to better understand that the students I loved serving had common gifted and talented characteristics, I began seeking out professional development opportunities that gave me the tools to more readily meet their needs and began to recognize students who were not identified as gifted and would recommend them for identification. I began to wonder why so many students that I served had not been identified previously and made it my goal to learn as much as I could about giftedness to find the answers to my questions.

After researching the criteria for identifying students as gifted, I came to realize the measures used to identify my students had a low success rate with students who were ELLs, the majority of my students. My students were getting an extra opportunity to qualify as gifted and get the services that they needed to be successful because I

recognized their characteristics and was recommending them for individual testing that had a higher success rate for their population. The inequity of this was striking. I began working with and in the district office to make better testing opportunities available for all students in the district.

My educational journey has led me to the compelling interest of investigating and advocating for equitable identification of ELLs. Gifted students are a diverse group of learners and districts should focus their definition of giftedness, identification, programming, and evaluation on the diverse students that they serve (Hertberg-Davis & Callahan, 2018). If this is true, districts should have options for identification that best showcase the strengths and challenges of their individual gifted populations. I want my research findings to impact community decisions, and branch from there to benefit the entire districts or influence state policy.

Role of the Researcher

As a researcher, I have the positivist/postpositivist worldview that "knowledge and reality are universal and measurable" (Jones et al., p. 15). I strive to be positivist in by assumptions. My aim is that any researcher coming into a situation should be able to draw and measure the same knowledge with the same conclusions. It is my belief that "reality is a physical and observable event" (Jones et. al., p. 13) and attempts to explain the world should be made by identifying universal law through solely measurable means (Jones et al., p. 15). Reality is not something that can be constructed rather it is observed and identified as reproducible truth (Jones et al., 2014). If the data discovered is valid,

then it will be able to be duplicated in future research (Jones et al., 2014). Researchers should choose a problem and study it free of influence, value, or bias (Jones et al., 2014). The conclusions should contribute to research as a whole for future researchers to build on knowledge (Jones et al., 2014). The journey is to discover truths that are independent of what anyone thinks or feels, and that facts are more essential than values (Jones et al., 2014). My aim is to neutrally observe the world and make observations that can be turned into claims based on evidence (Jones et al., 2014).

It is important to note that although I endeavor to be unbiased in the search for facts and truths based on evidence, I understand that knowledge is conjectural as in the postpositivist worldview (Creswell & Creswell, 2018). I know that research cannot be perfect, as such my study does not aim to prove my hypotheses instead fail to reject hypotheses (Creswell & Creswell, 2018). I examine validity and reliability in order to ensure my variables are as unbiased as possible (Creswell & Creswell, 2018).

Persistent Problem of Practice

The duty of educators is to ensure that all children are served with an education that helps them develop to their full potential. This responsibility is guaranteed and mandated for students in the Every Student Succeeds Act (ESSA), the primary education law for public schools (Alexander, 2015). Equitable education and achievement are insured for disadvantaged students, including those with limited English language skills (Alexander, 2015).

ESSA also includes provisions for gifted students in the Talent Act (Alexander, 2015). According to the National Association for Gifted Children (NAGC, n.d.-d). in order to reach maximum achievement, students need programs that challenge their intellect and enable them to make continuous progress. ESSA indicates that there should be a commitment to developing high levels of talent in every field and that the failure to support our best students has serious implications for the nation's future (Alexander, 2015). Even though Federal law recognizes that students with gifts and talents have needs that are not served in traditional school settings, there are not specific requirements for serving these children (NAGC, n.d.-d). Gifted education is left to local responsibility and is dependent of the leaders in local sites (NAGC, n.d.-d). The NAGC (n.d.-d) outlines the rationale for gifted programs backed by research studies: "Unfortunately, leaving gifted education up to chance increases variability in the quality of services and creates inequities of access for students in poverty, from racial and ethnic minority groups, English learners, and those with disabilities." Additional reasons outlined include positively influencing students' futures, postsecondary achievements, and more creative accomplishments (NAGC, n.d.-d).

In *National Excellence: The Case for Developing America's Talent*, the authors discuss the implications of not providing challenging work to gifted students (Ross, 1993). The lack of gifted programming discourages them from reaching their full potential (Ross, 1993). In public schools, this problem is pervasive because test scores play a dominant role in the identification and placement of gifted students (Ford &

Harmon, 2001) and standardized tests may inhibit the ability of ELLs to access gifted programs (VanTassel-Baska, 2010). This results in an excellence gap in the differences in student performance at the highest levels of achievement (NAGC, 2015). In the position statement from the NAGC (2015) a number of potential causes have been suggested for the existence and persistence of large excellence gaps, but these challenges can be addressed and overcome with a continued national and state-level focus on both equity and excellence in educational opportunity.

Educational programs and practices should facilitate the achievement of equitable education (Brookover & Lezote, 1981). Data shows that even with the recognized benefits of gifted programs and the assurance of equitable education for ELLs as stated in the ESSA, they do not have adequate access to gifted programs. According to the Education Department's Civil Rights 2013-2014 Data Collection (2016), out of the 3,329,544 total gifted students in the United States 2.8% of those students were ELLs. There is a large discrepancy between that number and the 6.0% of all students in the United States identified as gifted (Civil Rights Data Collection, 2016). There is a disparity in the number of high ability ELLs who reach advanced levels of academic performance compared to their native English-speaking peers (Ross, 1993). More needs to be done to ensure quality and equity in access to services (NAGC, n.d.-d).

There is a concern over the academic performance of the bilingual student population (Esquierdo & Arreguín-Anderson, 2012). This is based on the performance of standardized testing (Esquierdo & Arreguín-Anderson, 2012). According to VanTassel-

Baska (2010), schools typically define giftedness based on the results of standardized testing. Intelligence tests are a measurement of what an individual has learned within a culture (VanTassel-Baska, 2010). For the culturally and linguistically diverse, this reality could be a struggle because the students may have limited familiarity with the type of questioning and vocabulary included in the tests (VanTassel-Baska, 2010). This mindset needs to shift to the knowledge that high-performance capability is present in all cultures, but manifests in different ways (VanTassel-Baska, 2010). According to Van Tassel-Baska (2010), Schools and districts should adopt a multiple-criteria method for identification. These criteria could include student, parent, and teacher interviews, permanent products, gifted rating scales, observations, and performance-based assessments along with the traditional cognitive and achievement assessments (Mirta-Itle & Dirsmith, 2017). Other assessments to add to an equitable body of evidence could be background data and work samples, student, teacher, and parent nominations, and cultural and linguistic behaviors (Bermudez & Marquez, n.d.).

Bilingual students embody characteristics that facilitate or enhance general intellectual ability (Peal & Lambert, 1962; Prior & MacWhinney, 2010; Yow & Li, 2015). Peal and Lambert (1962) gave verbal and nonverbal intelligence tests to bilingual and monolingual students finding bilinguals performed significantly better than monolinguals. They argue that their results suggest a general intellectual advantage of bilingual students are better at concept formation and have greater mental flexibility (Peal & Lambert, 1962). Yow and Li (2015) examined how the degree of bilingualism

influenced executive functioning using task switching. They found that a more balanced level of proficiency in two languages resulted in better executive control skills (Yow & Li, 2015). Prior and MacWhinney (2010) also used the task-switching paradigm to investigate if bilingualism enhanced the ability to shift between mental sets. Their results suggest that being bilingual may contribute to increased efficiency in switching between mental tasks (Prior & MacWhinney, 2010). These studies suggest that bilingualism provides an advantage over monolingualism. If a benefit exists, it should be valued and cultivated in appropriate programming. There needs to be a way to assess these gifts to be used as a qualifying data point in gifted identification.

National and state agencies have invested time and resources into refining the gifted identification process and the factors that should be included as indicators of giftedness (CDE, 2016). Factors include such qualitative and quantitative data as intellectual and achievement tests, measures of talent aptitude, and behaviors and characteristics (CDE, 2016). However, even with the inclusion of qualitative data in the body of evidence, that qualitative data is used in building a student profile and is not able to be used as qualifying data for identification (CDE, 2016). There are only four types of assessments that can be used as qualifying points in gifted identification (CDE, 2016). These assessments are cognitive, creativity, achievement, and behavior observation scales (CDE, 2016). Although language assessments are reliable and valid measures for language proficiency and growth in ELLs (World-Class Instructional Design and

Assessment [WIDA], 2016), they do not have a place on this list because they do not fall into one of these four assessment categories.

Gifted ELLs embody many characteristics related to advanced language ability. Language based characteristics include acquiring a second language rapidly, mature language sense, ability to code switch, advanced awareness of American expressions, and advanced levels of oral translation (Felder et al., 2015). They can also include being able to read two levels above grade level in their native language, advanced language proficiency levels, learning multiple languages at an accelerated pace, the teaching of their native language to others, superior knowledge of phrases and heritage dialects, and the ability to joke in both languages (Felder et al., 2015). Although advanced language characteristics are common traits of gifted ELLs, the platform where they can demonstrate these advanced abilities, the common language proficiency assessment for the state of Colorado, ACCESS for ELLs, is not a qualifying data point for gifted identification outlined by the CDE (2016).

Educational equity theory (Manichander, 2016) was used as a theoretical framework to analyze the educational system of gifted identification in Colorado to put fair and inclusive systems in place ensuring that every child has an equal chance at success. Although adopting a multiple criteria method for identification is ideal and recommended (VanTassel-Baska, 2010), the gifted identification in Colorado is not yet organized in a way that can facilitate the use of assessment methods that are not nationally normed like interviews, products, rating scales, observations, and

performance-based assessments. By investigating the relationship between English language ability and cognitive ability, there is a justification for using language assessments as a data point for gifted identification within the current gifted identification structure. This would use the system that is restricting entrance criteria in the form of standardized tests and modify it to be fair and inclusive for ELLs.

According to prominent developmental theorists, language and cognition are closely related. Cognitive theorist Jean Piaget indicates that cognitive development is influenced by language, and language needs cognition to develop (Slobin, 1979). Piaget also contends that language can amplify or facilitate cognitive growth (Slobin, 1979). Cognitive theorist Lev Vygotsky also found in his research that language serves an intellectual function and drives cognitive development (Vygotsky, 1987). Based on the work of these theorists, since language and cognition are closely related (Slobin, 1979) then a language proficiency assessment could be used to measure cognitive ability. Cummins (1979, as cited in Lewis et al., 2012) and his distinction between BICS and CALP. Cognitive Academic Language Proficiency (CALP) requires cognitively demanding abstract thinking like the writing domain on ACCESS to be demonstrated. Parallel studies exist that assessed the relationship between general intellectual ability and achievement, general intellectual ability and achievement, and English language ability and achievement, there were not studies found that investigate the relationship between English language proficiency and general intellectual ability.

In bilingual education, the bilingual advantage hypothesis states that individuals with high levels of proficiency in two languages experience cognitive advantages over those who have low levels of proficiency (Ravitch, 2007). Although research exists that supports this hypothesis based on the correlation between language proficiency and executive functioning skills (Yow & Li, 2015), there is a dearth of research that correlates language proficiency to general intellectual ability.

Problem Statement

Every child should have the educational opportunity to overcome personal circumstances and home background to fulfill themselves as human beings (Field et al., 2007). As such, gifted ELLs should have access to rigorous coursework and gifted education programs and services (NAGC, n.d.-d). Data shows that ELLs are not identified at the same rate as their non-English speaking peers (Civil Rights Data Collection, 2016). Equitable identification procedures would reduce the underrepresentation of diverse learners in gifted education programs (NAGC, n.d.-d). Various policies and practices have been put into place to promote access for ELLs into gifted programs (CDE, 2016). However, additional research is needed to address the restrictions of entrance criteria into gifted programs in the form of standardized tests that may inhibit the ability of ELLs to access gifted programs (VanTassel-Baska, 2010).

Purpose Statement

The purpose of this study was to investigate the relationship among English language proficiency levels and general intellectual ability of English language learners

for gifted identification. The quantitative correlational design and methodology employed in this study determined the extent of the correlation between growth on the ACCESS for ELLs English language proficiency test and the NNAT on English language learner students. Variables that were examined were the predictor variable of English language proficiency, defined for the purpose of this study as the overall score on the ACCESS for ELLs English language proficiency assessment, and the criterion variable of general intellectual ability which was defined for the purposes of this study as the scale score of a student on the NNAT. The variables were controlled for student race and native language. The variables were further analyzed by years living in the United States.

Research Questions

The persistent problem of practice and problem statement described how additional research is needed to address the problem of standardized tests being used as entrance criteria for admittance into gifted programs. This research investigated how working within the gifted identification system by researching if a standardized test designed for ELLs had a relationship with general intellectual ability in order to be used for identification as gifted. The purpose of this study was to investigate the relationship among English language proficiency levels and general intellectual ability of English language learners for gifted identification.

The research questions were designed to align with the problem by investigating various aspects of ACCESS, an English language proficiency test, to see if there was a relationship with general intellectual ability. The variables of general intellectual ability

and English language proficiency were used in this study. The research questions are listed along with their null hypotheses. Null hypotheses are statements used in quantitative research that postulate that there is either no relationship between the populations studied or that the relationship is in a direction that is opposite from that anticipated by the researcher (Nolan & Heinzen, 2014). The following research questions (RQs) guide this quantitative study:

RQ1: What is the relationship between English language proficiency as measured by the ACCESS for ELLs English language proficiency assessment overall score and general intellectual ability as measured by the NNAT in English language learner students?

H01: There is no statistically significant relationship between the ACCESS for ELLs English language proficiency level overall score and the NNAT scale score in English language learner students.

RQ2: What is the relationship between the four language domains of the ACCESS for ELLs (listening, speaking, reading, and writing) and general intellectual ability as measured by the NNAT in English language learner students?

H02: There is no statistically significant relationship between the four language domains of the ACCESS for ELLs (listening, speaking, reading, and writing) and general intellectual ability as measured by the NNAT in English language learner students.

RQ3: What is the relationship between language proficiency growth as measured by the ACCESS for ELLs English language proficiency assessment and general intellectual ability as measured by the NNAT in English language learner students?

H03: There is no statistically significant relationship between language proficiency growth and general intellectual ability in English language learner students.

RQ4: How do demonstrated relationships among English language proficiency as measured by the ACCESS for ELLs English language proficiency assessment and general intellectual ability as measured by the NNAT inform gifted identification in English language learner students?

H04: Demonstrated relationships among English language proficiency as measured by ACCESS for ELLs English language proficiency assessment and general intellectual ability as measured by the NNAT do not inform gifted identification in English language learner students.

Context

One context where the problem of under identification of gifted students exists is in a school district in Colorado. This school district was chosen because it exemplified criterion for the study. This included students who had been administered the ACCESS and NNAT and had a large population of ELLs as defined by ESSA (Alexander, 2015). Of the 7,467 students in this district, 83.5% are Hispanic, 11.7% are White, 2.6% are Black or African American, 1.2% are two or more races, and less than one percent are

American Indian or Alaskan Native, Asian, and Native Hawaiian or other Pacific Islander. There is a 19.9% mobility rate and 86.0% of the student population qualifies for free or reduced lunch. There are 2,847 students classified as ELLs which is 38% of the district population. The majority of ELLs in this district, 66%, were in the elementary grades.

Significance of Study

This study is meaningful because of the relationship to prior research, the potential to make a positive contribution to the field of gifted education, and the value it adds to the community of gifted ELLs. Parallel studies exist that investigate the correlation between aptitude and achievement (Edmonds, 2015; Naglieri & Ronning, 2000) English language proficiency and achievement (Grisso, 2018; McFann-Mora, 2016; Parker, et al., 2009; Pearson, 2015; Rios, 2018) and language proficiency and cognition (Peal & Lambert, 1962; Prior & MacWhinney, 2010; Yow & Li, 2015). However, there is an absence of research that investigates the correlation between English language proficiency and cognitive ability. This study aims to fill this gap in the research. This study also aspires to support the theoretical work of Piaget (1952), Vygotsky (1978), Cummins (1979, as cited in Lewis et al., 2012), and Krashen (1982, as cited in Lewis et al., 2012). Validating research behind the conceptions and definitions of giftedness in relationship to gifted ELLs (Felder et al., 2015) is also a goal of this research.

This study also proposes the investigation of the gifted identification process in order to contribute to the field of gifted education. If a relationship between English language development and growth and general intellectual abilities for ELLs exists, the ACCESS for ELLs could be used as a data point for gifted identification. This would increase opportunities for other forms of data that are recognized as better forms of identification for ELLs to be considered as official data points for gifted identification. A mandated assessment that tests ELLs would increase the number of ELLs identified as gifted in the United States.

This study could also bring value to the gifted ELL community by enhancing the instruction they receive. Information from this study could provide support for educators to use the ACCESS for ELLs to inform instruction for gifted ELLs. Further research could replicate the study using future data from ACCESS for ELLs testing. Because of this study, other unanswered questions in the area of language proficiency and general intellectual ability for ELLs may become more focused. The gifted characteristics of ELLs could be further explored.

Definitions

For the purposes of this study, the following definitions were used to ensure consistency:

1. ACCESS for English language learner students: Assessing Comprehension and Communication in English State to State for English Language Learners is an assessment of English language proficiency developed by the WIDA Consortium.

The ACCESS for ELLs is administered to all English language learner students across 38 states annually, with over 2,000,000 students tested in 2018 (WIDA, 2018).

2. Asynchrony: "the degree to which gifted students exhibit a "mismatch" between intellectual, emotional, and psychomotor capabilities" (Silverman, 2002, as cited in Callahan, 2018).
3. Basic Interpersonal Communication Skills (BICS): Basic interpersonal communication skills refer to the level of language required in common, social situations. It is often said to be the everyday, or "playground," language within educational contexts (Lewis et al., 2012).
4. Cognitive Academic Language Proficiency (CALP): Cognitive academic language proficiency is the academic language required to perform grade-level instructional tasks at native speaker parity. This can include tasks that involve speaking, listening, reading, or writing and often requires performance at a higher level of academic skills including comparing, synthesizing, and evaluating (Lewis et al., 2012).
5. English Language Learner (ELL): English language learners are a diverse group of active learners of the English language who may benefit from language support programs (National Council of Teachers of English [NCTE], 2008).
6. English Language Proficiency: the ability of a person to use the English language to perform tasks (WIDA, 2014).

7. General Intellectual Ability: Exceptional capability or potential recognized through cognitive processes (e.g., memory, reasoning, rate of learning, spatial reasoning, ability to find and solve problems, ability to manipulate abstract ideas and make connections) (CDE, 2016).
8. Gifted Students: Those persons between the ages of four and twenty-one whose aptitude or competence in abilities, talents, and potential for accomplishment in one or more domains are so exceptional or developmentally advanced that they require special provisions to meet their educational programming needs (CDE, 2013).
9. NNAT: The Naglieri Nonverbal Ability Test is used as a measure of general ability and a predictor of scholastic achievement (Naglieri, 2018).

Summary

Equitable education is guaranteed for all students through federal law, including ELLs and students with gifts and talents (Alexander, 2015). There are serious implications for not providing appropriate services to these students including negatively influencing students' futures, achievements, and accomplishments (NAGC, n.d.-d). However, data shows that gifted ELLs do not have adequate access to gifted programs (Civil Rights Data Collection, 2016), and as a result, they are not reaching the same levels of achievement as their English-speaking peers (Ross, 1993). In Colorado, this is due to the assessments that provide access to gifted programs being restricted to the four categories of cognitive, creativity, achievement, and behavior observation scales (CDE,

2016). Standardized test results underestimate large numbers of students as learners, especially those who belong to minority groups (Pastor, 2019). Although research from prominent theorists indicate that there is a correlation between language and cognition, more research is needed to investigate the relationship among English language proficiency and general intellectual ability of ELLs for identification in gifted programs. If there is a correlation between language proficiency and general intellectual ability, language proficiency tests have potential to be used as qualifying data points in gifted identification.

Chapter Two

Literature Review

Overview

The previous chapter discussed the need to refine the gifted identification process for ELLs. This chapter includes a review of existing literature that guides this correlational investigation of the relationship among English language proficiency and general intellectual ability of ELLs for identification in gifted programs.

This review of literature covers ten major topics. The first two sections describe the theoretical and conceptual framework defining this study. The third section outlines the developmental theories in language and cognition that provide the background for this study. The fourth section outlines conceptions and definitions of giftedness. The fifth section outlines the characteristics of gifted students and the relationship to the definitions of giftedness. ELLs are defined in the sixth section. The characteristics of gifted ELLs, the students that this study is meant to serve, are described in section seven. The eighth section reviews the academic standards that define the knowledge and skills assessed, in which students are expected to learn providing the path to gaining proficiency in the areas of language acquisition and gifted identification. The ninth section examines the gifted and talented identification process at both the national and state levels. The final section reviews selected literature and related research.

Research examining the exact correlation between the two assessment instruments used in this study ACCESS for ELLs and the NNAT, was not found. However, there are recognized studies using the chosen assessment instruments in correlation with other aptitude and achievement instruments. As a result, the scope of the review is limited to those most closely related to this research project. Parallel studies are reviewed that investigate the correlation between both aptitude and achievement (Edmonds, 2015; Naglieri & Ronning, 2000), as well as English language proficiency and achievement (Grisso, 2018; McFann-Mora, 2016; Parker, et al., 2009; Pearson, 2015; Rios, 2018). Studies are also reviewed that investigate the relationship between language proficiency and cognition (Peal & Lambert, 1962; Prior & MacWhinney, 2010; Yow & Li, 2015).

Theoretical Framework

A theoretical framework provides the structure and support for the rationale for a study, the problem statement, the purpose, the significance, and the research questions (Grant & Osanloo, 2014). The framework serves as the foundation from which all knowledge is constructed for a research study (Grant & Osanloo, 2014). In order to address the persistent problem of practice, Colorado policies in gifted identification for ELLs that could unintentionally be inhibiting student performance, Educational Equity Theory (Manichander, 2016) was used.

"Educational equity, also referred to as equity in education, is a measure of achievement, fairness, and opportunity in education" (Manichander, 2016). Equity in education requires putting systems in place to ensure that every child has an equal chance

for success (Field et al., 2007). These systems require an understanding of the unique challenges and barriers faced by individual or populations of students and providing additional supports to help them overcome those barriers (Field et al., 2007).

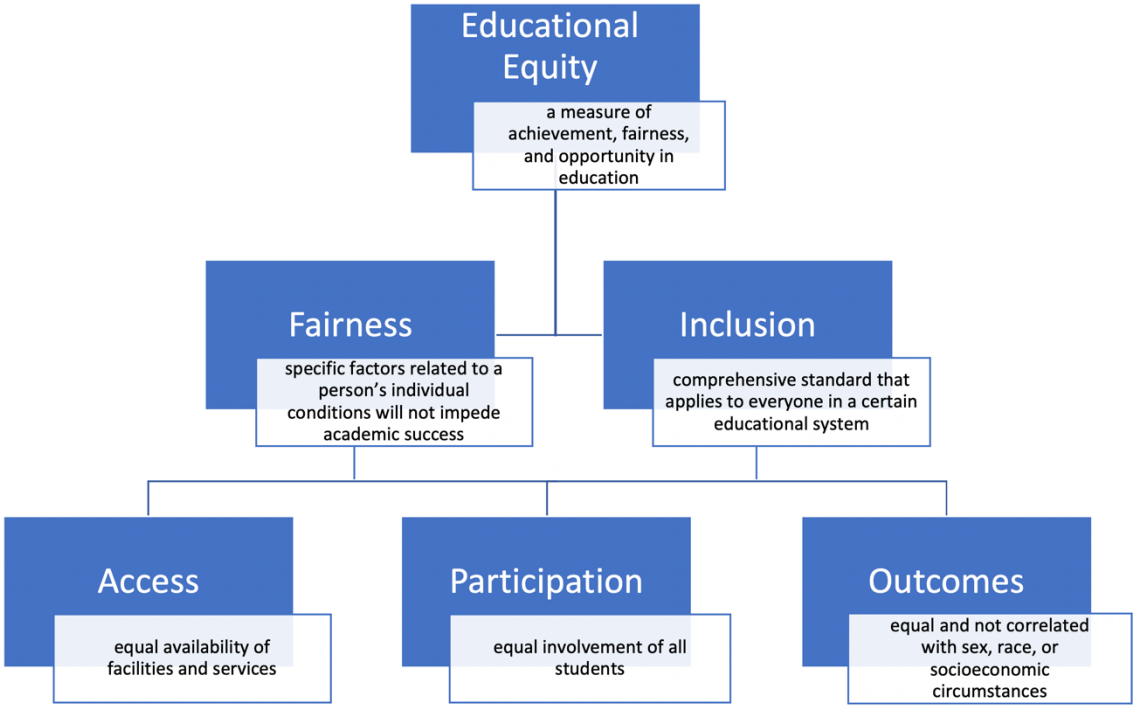
Educational equity depends on fairness and inclusion (Manichander, 2016). A fair and inclusive system that makes the advantages of education available to all is one of the most powerful levers to make society more equitable (Field et al., 2007). Fairness is the idea that specific factors related to a person's individual conditions will not impede academic success (Manichander, 2016). Inclusion is the comprehensive standard that applies to everyone in a certain educational system (Manichander, 2016). Fairness and inclusion are closely related as preventing school failure supports students in overcoming the effects of social circumstances which can cause school failure (Field et al., 2007). Achieving fairness and inclusion requires looking at several aspects of the education system, including the design of education systems, educational practices, and resourcing (Field et al., 2007).

Brookover and Lezote (1981) state that three standards should be applied to state and federal programs to ensure that educational policies are fair and inclusive in advancing educational equity. The three standards are access, participation, and outcomes (Brookover & Lezote, 1981). Access is the equal availability of facilities and services (Brookover & Lezote, 1981). Participation promotes and guarantees equal involvement of all students (Brookover & Lezote, 1981). Outcomes refers to the fact that educational outcomes achieved by minority and nonminority students should be equal and not

correlated with sex, race, or socioeconomic circumstances (Brookover & Lezote, 1981). Applying these standards to an educational policy is essential in ensuring it is meeting the requirements of educational equity (Brookover & Lezote, 1981).

Educational Equity is the overarching theoretical framework for this study because educational equity depends on fairness and inclusion, which is the focus of this study. As stated previously, there are restrictions of entrance criteria into gifted programs in the form of standardized tests that inhibit the ability of ELLs to access gifted programs (VanTassel-Baska, 2010). This restriction violates the standard of fairness because the being a second language learner is impeding the academic success of ELLs (Manichander, 2016). Inclusion is violated because everyone in the education system does not have equal access to participate in gifted programs, thus not receiving the same educational outcome (Brookover & Lezote, 1981). Figure 2.1 illustrates how educational equity, which is dependent on fairness and inclusion, is measured by the standards of equal access, participation, and outcomes in the educational system.

Figure 2.1
Theoretical Framework



The goal of this study was to investigate a standardized test that was constructed to measure the abilities of ELLs, ACCESS, to investigate the correlation of the results with a cognitive ability test, NNAT, in order to increase the fairness and inclusion of the gifted identification process. By using a standardized test, it allows the researcher to work within the constraints of the existing system that places value on standardized tests while simultaneously increasing fairness and inclusion in the system for ELLs by using a test that was formulated for ELLs. This would allow gifted ELLs equal access, participation, and outcomes from the education system.

Conceptual Framework

Miles and Huberman (1994) define a conceptual framework as a visual or written product that "explains, either graphically or in narrative form, the main things to be studied—the key factors, concepts, or variables—and the presumed relationships among them." The conceptual framework for this study illustrates the anticipated outcomes from the research and the relationship between variables. The dependent variable, general intellectual ability, is the variable to be explained (Frankfort-Nachmias & Leon-Guerrero, 2018). The independent variable, English language proficiency, is the variable expected to account for the dependent variable (Frankfort-Nachmias & Leon-Guerrero, 2018).

A moderator and mediator variable are also included in the conceptual framework. A mediating variable and a moderating variable can provide a more illustrative account of how dependent variables are related to independent variables (Tsang, 2015). A moderator variable alters the effect that an independent variable has on a dependent variable on the basis of the moderator's value (Tsang, 2015). The moderator changes the effect component of the relationship between the two variables as its value increases or decreases (Tsang, 2015). The moderator variable increases understanding of how the independent variable is affecting the dependent variable and what is governing that relationship (Tsang, 2015). The moderator variable in this case is the number of years a student is in the United States.

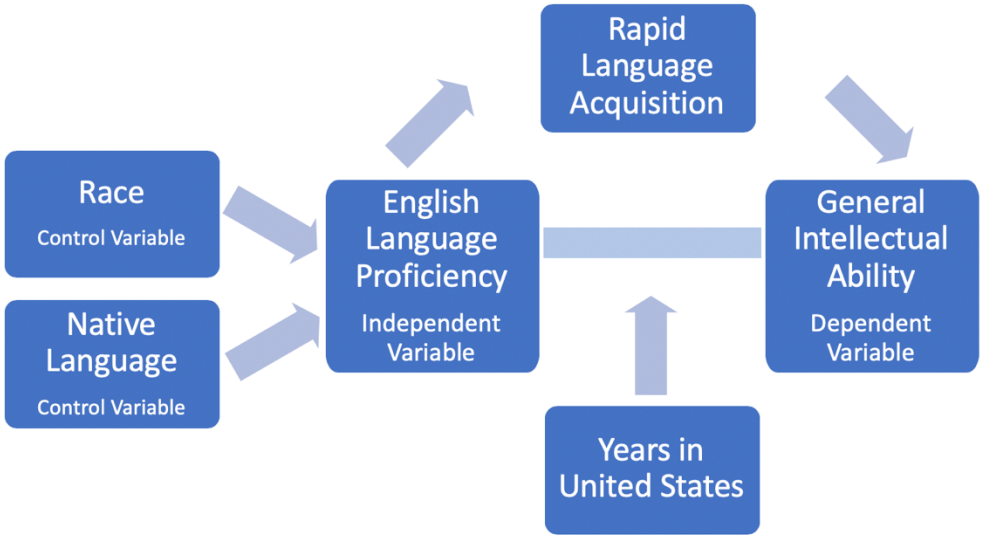
A mediator variable comes between an independent variable and a dependent variable and allows that relationship to be better explained (Tsang, 2015). A mediator can

be a possible mechanism by which an independent variable can produce changes on a dependent variable (Tsang, 2015). In this study, the mediator variable is rapid language acquisition because the rate of language acquisition could produce changes in cognitive ability.

In order to further understand the bivariate relationship between general intellectual ability and English language proficiency, control variables were introduced (Frankfort-Nachmias & Leon-Guerrero, 2018). Control variables are the variables the researcher keeps constant to prevent confounding with the independent variable (Frankfort-Nachmias & Leon-Guerrero, 2018). The control variables in this study were student race and native language.

In this study, the independent and dependent variable have a correlational relationship. Correlation is a measure of association used to determine the strength of the relationship between two variables (Frankfort-Nachmias & Leon-Guerrero, 2018). A cause and effect relationship cannot be inferred in this case because the independent variable did not precede the dependent variable in time and other factors influence the relationship, although there could be an empirical relationship (Frankfort-Nachmias & Leon-Guerrero, 2018). The following figure (2.2) illustrates the relationships between the dependent and independent variables with the influence of the mediator and moderator variables and the control variables.

Figure 2.2
Conceptual Framework



Developmental Theories

Theories of development provide a framework for thinking about human growth and learning. Understanding of child development is essential to understanding the growth and development that children experience. In order to better understand the relationship between the variables of general intellectual ability and language proficiency in this study, it is important to understand how cognition and language develop. These theories also served as the basis for writing the four research questions guiding this study. Developmental theories in cognitive and language development were used. Piaget's

Theory of Cognitive Development (1952) and Vygotsky's Social Development Theory (1978) explain the growth and development in cognition how it is related to language.

Theory of Cognitive Development

Jean Piaget (1952) is a 20th century Swiss biologist and psychologist who studied the nature, origins, and transformations of knowledge. Piaget (1952) observed his children and their process of making sense of the world around them. From his research, he developed a four-stage model of how the mind processes new information encountered called the Theory of Cognitive Development (Piaget, 1952). He posited that children progress through four stages in the same order (Piaget, 1952). These four stages are sensorimotor, preoperational, concrete, and formal (Piaget, 1952). There are differences in the rate that individuals progress through the stages and no stage may be skipped (Piaget, 1952).

In the sensorimotor stage, the infant is building an understanding of himself or herself and reality through interactions with the environment (Piaget, 1952). The main achievement during the sensorimotor stage is object permanence, knowing that an object still exists, even if it is hidden from view (Piaget, 1952). The child is able to differentiate between him or herself and other objects. Learning takes place via assimilation, the organization of information and absorbing it into existing schema, and accommodation, when an object cannot be assimilated and the schemata have to be modified to include the object (Piaget, 1952). This stage takes place from birth to two years.

The preoperational stage is when young children begin to think about things symbolically (Piaget, 1952). They are able to make words or objects stand for things other than themselves (Piaget, 1952). Objects are classified in simple ways, for example, by important features (Piaget, 1952). Children are not yet able to conceptualize abstractly and need concrete physical situations (Piaget, 1952). The preoperational stage takes place from ages two to four (Piaget, 1952).

The concrete operational stage is considered a major turning point in a child's cognitive development (Piaget, 1952). This is the beginning of logical or operational thought, where a child can solve problems internally rather than physically (Piaget, 1952). The child begins to think abstractly and conceptualize, creating logical structures that explain his or her physical experiences (Piaget, 1952). This stage occurs from ages seven to eleven (Piaget, 1952).

The last stage, the formal operational stage, is when people develop the ability to think about abstract concepts and logically test hypotheses (Piaget, 1952). In this stage, people no longer require concrete objects to make rational judgements (Piaget, 1952). People are capable of deductive and abstract thinking, similar to an adult (Piaget, 1952). This stage occurs from ages eleven to fifteen (Piaget, 1952).

Human cognition is influenced by language, and language depends on thought for development (Slobin, 1979). Piaget outlines language as a factor in cognitive development (Slobin, 1979). According to Piaget, cognitive development proceeds on its own, growing through interactions with things and people in the environment (Slobin,

1979). Language development can follow cognitive development, as outlined by Piaget, or cognitive abilities can be reflected through a child's speech (Slobin, 1979). Language can amplify or facilitate cognitive development, but it cannot bring about cognitive growth (Slobin, 1979).

Social Development Theory

Another theorist in the area of cognitive development is Lev Vygotsky. Vygotsky's (1978) primary research was based around the role of social interaction in the development of cognition. Vygotsky (1978) believed that cognitive development varied across cultures or subcultures. As a result, it would not be appropriate to use the developmental experiences of children from one culture as a norm for children from other cultures (Vygotsky, 1978). He also believed that a child's environment influences how they think and what they think about (Vygotsky, 1978). Although Vygotsky (1987) believed that children are involved in their learning and development, he believes that this would not be possible without cooperation and collaboration of a community.

Vygotsky (1987) asserts that the concept of the Zone of Proximal Development (ZPD) is essential in the learning process of children. The ZPD refers to the difference between what is known to a learner and the skills not known to a learner (Vygotsky, 1987). The term proximal refers to the skills that a learner is close to mastering (Vygotsky, 1987). Vygotsky (1987, p. 86) defines ZPD as "the distance between the actual developmental level as determined by independent problem solving and the level

of potential development as determined through problem-solving under adult guidance, or in collaboration with more capable peers."

Children create understanding through the actions or instructions of a parent or teacher (Vygotsky, 1987). According to Vygotsky, children need social interaction and cooperative dialogue with someone who is more skilled, such as a parent, teacher, or peer. He refers to this person as the more knowledgeable other. This person provides scaffolding or temporary support to enable a child to perform a task until they can do so independently (Vygotsky, 1987). The level of scaffolding decreases with the increase of the child's abilities (Vygotsky, 1987).

Vygotsky (1978) is shown to defend the position that there is an important link between nonverbal cognition and language, or between perception and word. He believed that language develops from social interactions as an important tool for the purpose of communication with the world. Language plays a critical role in cognitive development (Vygotsky, 1962). It is the main method by which adults transmit information to children and it is a tool for intellectual adaptation (Vygotsky, 1962). Thought and language are separate systems at the beginning of life and then merge at the age of three (Vygotsky, 1987). Vygotsky (1987) believed that this was because at this age, thought becomes verbal and speech becomes representational.

According to Vygotsky (1987), there are three forms of language: social speech, private speech, and silent inner speech. Social speech is the communication that we use to talk to others (Vygotsky, 1987). Private speech is directed to the self and serves an

intellectual function, allowing students to facilitate their cognitive processes, overcome obstacles, and enhance thinking (Vygotsky, 1987). Private speech also helps children to plan and organize their thought (Vygotsky, 1987). Silent inner speech is when private speech becomes silent communication (Vygotsky, 1987). The internalization of speech drives cognitive development (Vygotsky, 1987).

Both Piaget and Vygotsky found a relationship between cognition and language (Slobin, 1979; Vygotsky, 1987). Piaget indicates that cognitive development is influenced by language, and language needs cognition to develop, as well as amplify or facilitate cognitive growth (Slobin, 1979). Vygotsky (1987) found in his research that language serves an intellectual function and drives cognitive development. This finding is significant for ELLs because if language and cognition are correlated then it is possible that a language proficiency assessment could be considered as representative of cognitive ability.

Language Acquisition

Lewis et al. (2012) outline the nine basic principles of English language acquisition that support understanding of ELLs. These principles are domains of language, stages of second language acquisition, basic interpersonal communication skills and cognitive academic language proficiency, context-embedded/context-reduced language tasks and cognitively demanding-undemanding tasks, input hypothesis, affective filter hypothesis, language transfer theory, contexts of second language acquisition, and sociocultural component of learning (Lewis et al., 2012). The first three

principles focus on language acquisition; principles four through six are the principles that teachers can control and implement; principles seven and eight are theories where teachers should be knowledgeable; and, principle nine incorporates the consideration of linguistic, cultural, academic, cognitive, and social domains (Lewis et al., 2012).

The first two principles are all dual in nature divided into early and late stages of language ability (Lewis et al., 2012). The first principle, domains of language, refers to the receptive domains of listening and reading and the expressive or productive domains of speaking and writing (Lewis et al., 2012). Students are typically proficient in the receptive domains earlier than the productive domains (Lewis et al., 2012). This is explained further in the second principle, the stages of second language acquisition (Lewis et al., 2012). The five stages of language acquisition are pre-production, early production, speech emergence, intermediate fluency, and advanced fluency (Krashen & Terrel, 1983, as cited in Lewis et al., 2012). In the pre-production stage and early production stage ELLs are working on their receptive skills while they work on productive skills during the speech emergence, intermediate fluency, and advanced fluency stages (Lewis et al., 2012). Students require the support of parents and teachers to be challenged and pushed to the next level (Lewis et al., 2012). There is an approximate time frame for each stage of language acquisition, but this is varied based on the student (Hill & Miller, 2013).

The silent or receptive phase is where new language learners spend time learning vocabulary and practice pronouncing new words (Hill & Miller, 2013). At this stage, they

do not typically speak the language with fluency or understanding (Hill & Miller, 2013). They have minimal comprehension and communicate with gestures (Hill & Miller, 2013). This stage may last from several hours to six months (Hill & Miller, 2013). Early production is when language learner typically acquires an understanding of up to 1,000 words (Hill & Miller, 2013). They are speaking some words and short phrases, which typically are not grammatically correct (Hill & Miller, 2013). The student uses key words and familiar phrases to communicate, mainly in the present tense (Hill & Miller, 2013). This stage can last six months to one year (Hill & Miller, 2013).

The stage of speech emergence is when language learners acquire a vocabulary of up to 3,000 words (Hill & Miller, 2013). They are using short phrases, sentences, and questions that may or may not be grammatically correct (Hill & Miller, 2013). They can produce simple sentences with some pronunciation errors (Hill & Miller, 2013). At this stage, learners improve comprehension and begin reading and writing in their second language (Hill & Miller, 2013). This stage can last one to three years (Hill & Miller, 2013). Intermediate fluency is the stage where learners have a vocabulary of up to 6,000 words and excellent comprehension (Hill & Miller, 2013). They are able to communicate in writing and speech and use more complex sentences (Hill & Miller, 2013). Learners also begin thinking in their second language at this stage, which builds speaking proficiency (Hill & Miller, 2013). This stage is typically one to two years (Hill & Miller, 2013). At the advanced stage of fluency, students have an understanding of the complexities of language and its nuances (Hill & Miller, 2013). They have reached a near

native level of speech (Hill & Miller, 2013). It takes two years to reach this stage, and up to ten years for mastery (Hill & Miller, 2013).

Principle three outlines Basic Interpersonal Communication Skills (BICS) and Cognitive Academic Language Proficiency (CALP) which are two types of language proficiency (Cummins, 1979, as cited in Lewis et al., 2012). Proficiency in BICS is shown through social language while CALP is represented through academic language (Lewis et al., 2012). These language proficiencies are built through context, as demonstrated in principle four (Lewis et al., 2012). BICS is acquired though less cognitively demanding environmental context clues and CALP is acquired through more cognitively demanding abstract thinking (Lewis et al., 2012). Visual cues, gestures, role plays, and hands-on experiences provide the context for easier acquisition of cognitively demanding tasks (Lewis et al., 2012).

Krashen (1982, as cited in Lewis et al., 2012) wrote a theory of language acquisition comprised of five hypotheses. Two of these hypotheses are included in the principles outlined by Lewis et al. (2012). Input hypothesis, principle five, asserts that if the classroom environment is purposeful and language-rich, ELLs will be able to make meaning of language for support of emergence of speaking fluency (Lewis et al., 2012). Affective filter hypothesis refers to conditions that impact a student's ability to acquire a second language, like self-esteem and motivation (Lewis et al., 2012).

Language transfer theory is the seventh principle from Lewis et al. (2012), referring to the positive or negative transfer of a student's first language to the second

language. Positive transfer is when the two languages align as in cognates, words that look alike and have the same meaning, and negative structure which is when the two languages do not align well (Lewis et al., 2012). This is closely related to the two contexts in which language can be learned: simultaneously or sequentially (Lewis et al., 2012). Sequential language acquisition is closely related to the positive or negative transfer of language as students relate the two languages (Lewis et al., 2012).

The last principle, the sociocultural component of learning, is a part of the Collier and Thomas' Prism Model (2007, as cited in Lewis et al., 2012). The sociocultural component is part of a holistic approach to teaching ELLs which influence their optimal success (Lewis et al., 2012). This critically supportive sociocultural environment allows natural language, academic, and cognitive development (Lewis et al., 2012).

Since the purpose of this study is to investigate the relationship among English language proficiency levels and general intellectual ability of English language learners for gifted identification, it is important to understand the principles that define and best support this population of students. ELLs that are provided with instruction in a supportive sociocultural environment adequately develop language (Lewis et al., 2012). If ELLs are denied instruction that is rooted in nine basic principles of English language acquisition, they are not getting equal access to services, and as a result, are not guaranteed participation in the same programs (Brookover & Lezote, 1981). For example, the lack of access to language services would impede language growth, which would inhibit cognitive ability. This, in turn, would hinder appropriate gifted services for their

true abilities, as it would keep them from achieving the same outcomes as their native English-speaking peers (Brookover & Lezote, 1981).

Conceptions and Definitions of Giftedness

To get to the root of the relationship between English language proficiency and general intellectual ability in gifted identification, one must first look at the definitions of giftedness. The definitions of giftedness are varied because of the different conceptions of intelligence and values by experts in giftedness (Callahan, 2009). Gifted professionals disagree on a common meaning of giftedness, even with the multitude of definitions put forward by theorists (Callahan, 2009). Definitions can range from broad to very specific (Callahan et al., 2018) and from general to specific intellectual ability, but all agree that there should be high achievement, distinction, or extraordinary ability present (Callahan, 2009). Defining giftedness continues to evolve from theory and research (Callahan, 2009).

There are several underlying issues relating to the agreement on a conception of giftedness (Callahan, 2009). One example is whether giftedness is innate or developed by genetics or the environment (Callahan, 2009). The consensus is that there is an interaction between these two factors, the innate and the environment (Callahan, 2009). Innate characteristics include rapid learning, excellent memory, and unusual alertness among others (Clark, 2008). These environmental factors include family, school, peers, early recognition of talent, and high expectations (Callahan, 2009).

Another underlying issue related to the conception of giftedness is whether giftedness should be defined achievement or potential (Callahan, 2009). The identification of giftedness based on achievement measures includes standardized achievement tests, grades, or performance measures (Callahan, 2009). Definitions based on potential refer to the development of talent (Callahan, 2009). Critics of achievement-based definitions argue that measures of current performance are biased and will not identify giftedness in students from groups, while critics of the definitions based on potential contend that existing assessments do not predict gifted performance (Callahan, 2009).

One of the most widely accepted definitions is summarized in the Marland Report (1971). The Marland Report (1971) provided the first national report to Congress on gifted education. The definition of giftedness outlined suggests an interaction of multiple factors involved in the development of giftedness over time (Marland, 1971). The definition states that gifted and talented children are those with demonstrated achievement and/or potential ability in general intellectual ability, specific academic aptitude, creative and productive thinking, leadership ability, visual and performing arts, and psychomotor ability (Marland, 1971). This definition exemplifies the agreement that giftedness is the result of high achievement, distinctive performance, or extraordinary accomplishment that can be combined with potential ability (Callahan, 2009).

Three of the most prominent theoretical conceptions of giftedness are authored by Francoys Gagné, Joseph Renzulli, and Robert Sternberg (Callahan, 2009). Gagné (1985,

p. 108) defines giftedness as “the possession and use of untrained and spontaneously expressed natural abilities in at least one ability domain to a degree that places a child among the top 10% of his or her age peers.” He defines talent as “the superior mastery of systematically developed abilities and knowledge in at least one field of human activity to a degree that places a child's achievement within the upper 10% of age-peers who are active in that field or fields” (Gagné, 1985, p. 104). Renzulli (1978, p. 180) defines giftedness as “an interaction among three basic clusters of human traits: above-average general and/or specific abilities, high levels of task commitment, and high levels of creativity.” Sternberg states that students show exceptional ability in the areas of analytic, synthetic, or practical domains when they are matched with appropriate curriculum (Callahan, 2009). All of these definitions support the claim that there is an interaction of innate and environmental factors to create a development of gifts and talents over time (Johnson, 2012b).

The definition from the NAGC (n.d.-a) states

> Gifted individuals are those who demonstrate outstanding levels of aptitude (defined as exceptional ability to reason and learn) or competence (documented performance or achievement in top 10% or rarer) in one or more domains.

Recently, the NAGC published considerations of giftedness proposing that existing conceptions focused too narrowly on cognitive ability and that the definition needed to include that talent development is a lifelong process (Callahan et al., 2018). Achievement, motivation, and students from underrepresented populations are included (Callahan et al., 2018). This includes using multifaceted systems of identification to find

all students with advanced potential from all income, racial, and cultural groups, identifying and serving students with advanced potential, and measuring performance of advanced students (NAGC, n.d.-a). This again stresses the importance of the of the interaction of innate and environmental factors in the definition of giftedness (Johnson, 2012b).

CDE (2013) and The Exceptional Children's Educational Act (ECEA) defines gifted children as:

> Those persons between the ages of four and twenty-one whose aptitude or competence in abilities, talents, and potential for accomplishment in one or more domains are so exceptional or developmentally advanced that they require special provisions to meet their educational programming needs. Gifted children are hereafter referred to as gifted students. Children under five who are gifted may also be provided with early childhood special educational services. Gifted students include gifted students with disabilities (i.e. twice exceptional) and students with exceptional abilities or potential from all socio-economic, ethnic, and cultural populations. Gifted students are capable of high performance, exceptional production, or exceptional learning behavior by virtue of any or a combination of these areas of giftedness:
>
> - General or specific intellectual ability
> - Specific academic aptitude
> - Creative or productive thinking
> - Leadership abilities
> - Visual arts, performing arts, musical or psychomotor abilities 12.01(16)

Colorado's inclusion of the additional areas of giftedness suggests that giftedness is the interaction of multiple factors (areas of giftedness and population characteristics) that develop into giftedness over time. This inclusion is beneficial for gifted identification of students from diverse populations.

For this study the researcher used the Colorado definition of gifted students. This definition includes gifted students as having both exceptional abilities and potential

(ECEA, 2013). Including both aspects is important because this study investigated whether ability measured by standardized achievement tests, which are used in current practice in Colorado, correlate with general intellectual ability in order to make the gifted identification process fair and inclusive for ELLs.

Characteristics of Gifted Students

In the previous section, the multifaceted conceptions and definitions of giftedness were introduced. As there is an interaction of multiple factors in the definitions of giftedness, the same is true of the characteristics of gifted students. The range of gifted identification areas and multiple factors influencing giftedness results in multiple characteristics of gifted students. The characteristics of gifted students significant to this study are outlined below.

General Intellectual Ability

Students gifted in the area of general intellectual ability have characteristics that can be described by cognitive, affective, and physical characteristics (Callahan, 2018). Cognitively, these students are able to retain an unusually large amount of information allowing them to master content quickly (Callahan, 2018). They also have a greater depth of comprehension (Callahan, 2018). These gifted students have quick processing speeds and they learn new content quickly (Callahan, 2018). As a result, they do not need repetition of concepts and make quick progress (Callahan, 2018). Students gifted in general intellectual ability also have advanced language development and complex

verbalization accompanied by a large vocabulary (Callahan, 2018). They show persistent, goal-directed behavior and have intense concentration (Callahan, 2018).

In the affective or social and emotional domain, students gifted in the area of general intellectual ability are highly sensitive to the feelings and expectations of adults and peers (Callahan, 2018). This makes them vulnerable to criticism, and they need to feel successful and accepted (Callahan, 2018).They also have a highly developed sense of humor (Callahan, 2018). They have an elevated level of expectations for themselves and others and have strong reactions to failures and perceived injustices (Callahan, 2018).

Physically, these gifted students have a discrepancy between their intellectual and physical development (Callahan, 2018).For example, a student may have advanced language skills but be average in their physical abilities (Callahan, 2018). This mismatch between intellectual, emotional, and psychomotor abilities, referred to as asynchrony, is typical of gifted students who do not necessarily show gifted characteristics in all domains (Callahan, 2018).

Many conceptions and definitions of giftedness include the characteristic of general intellectual ability such as in the following examples. The definition from the Marland Report states that gifted and talented children have demonstrated achievement in general intellectual ability (Marland, 1971). Gagné's (1985) definition of giftedness includes expressed natural ability. Renzulli's (1978) definition includes above-average general and/or specific abilities. Sternberg states that students should show exceptional ability in analytic, synthetic, or practical domains (Callahan, 2009). The NAGC

definition includes exceptional ability to reason and learn (NAGC, n.d.-a) and the Colorado definition states that gifted students are capable of high performance, exceptional production, or exceptional learning behavior by virtue of any or a combination of thirteen areas of giftedness, one of which is general or specific intellectual ability (ECEA, 2013).

Specific Academic Aptitude

In the category of specific academic aptitude, students can show gifted characteristics in the areas of mathematics, language arts, social studies, science, and foreign language (Callahan, 2018). Most related to this study are characteristics of students gifted in language arts. Students gifted in the specific academic aptitude of language arts show proficiency in reading, writing, and communication skills (Sousa, 2009). They show an awareness of language features such as rhyme, accent, intonation, grammar, and written text (Sousa, 2009). Additionally, they understand the nuances of language and have a large vocabulary (Callahan, 2018). These students have a talent for humor, drama, and creative use of metaphors and poetry (Sousa, 2009). They also show reasoning abilities at abstract and hypothetical levels and are able to justify their arguments while questioning the point of view of others (Sousa, 2009).

The characteristic of academic aptitude is also present in the following conceptions and definitions of giftedness. The Marland Report includes demonstrated achievement in the definition (Marland, 1971). The definition put forth by Gagné (1985) and the NAGC includes ability domains that place a child in the top 10% of his or her

peers. Renzulli (1978) includes specific abilities in his definition. Finally, the state of Colorado includes specific academic aptitude as an area of giftedness (ECEA, 2013).

It is important to understand the characteristics of giftedness as they relate to the conceptions and definitions of giftedness. Since the dependent variable for this study is general intellectual ability, the characteristics of those learners is significant to the research. Additionally, understanding the characteristics of students in specific academic aptitude is paramount as well as the characteristics of students gifted in the specific academic aptitude of language arts closely relate to abilities tested in language proficiency assessments.

English Language Learners (ELLs)

In the United States, the number of ELLs has steadily grown over the past decades (National Center for Education Statistics [NCES], 2018). In 2000, there were an estimated 3.8 million students in public schools identified as ELLs. By 2015 that number had increased to an estimated 4.8 million students (NCES, 2018).

Title III of the ESSA Section 8101 (20) (Alexander, 2015) defines English language learner students, also referred to as Limited English Proficient students, as a student:

> (A) who is aged 3 through 21;
> (B) who is enrolled or preparing to enroll in an elementary school or secondary school;
> (C) (i) who was not born in the United States or whose native language is a language other than English;
> (ii) (I) who is a Native American or Alaska Native, or a native resident of the outlying areas; and

(II) who comes from an environment where a language other than English has had a significant impact on the individual's level of English language proficiency; or
(iii) who is migratory, whose native language is a language other than English, and who comes from an environment where a language other than English is dominant; and
(D) whose difficulties in speaking, reading, writing, or understanding the English language may be sufficient to deny the individual—
(i) the ability to meet the challenging State academic standards;
(ii) the ability to successfully achieve in classrooms where the language of instruction is English; or
(iii) the opportunity to participate fully in society. (Alexander, 2015)

ELLs are a diverse group of active learners of the English language who may benefit from language support programs (NCTE, 2008). Colorado has one of the highest percentages of ELLs at 11.6 percent (NCES, 2018). The English Language Proficiency Act (ELPA) (General Assembly of the State of Colorado, 2014) in Colorado ensures that these learners are identified and provided with programs that enable them to develop English language proficiency and educators that can effectively support their language development.

Gifted English Language Learners

A special population of ELLs are those who are gifted. Because of their designation as ELLs and gifted learners, they require special consideration and attention in an educational setting (Special populations, n.d.). Gifted ELLs have many of the same general abilities of gifted students along with diverse attributes, perspectives, and values (Felder et al., 2015). This population of students exhibits characteristics including acquiring a second language rapidly, high ability in mathematics, mature sense of culture and language, ability to code switch, advanced awareness of American expressions,

advanced levels of oral translation, and the ability to navigate in both cultures (Felder et al., 2015).

In addition to these general characteristics, ELLs exhibit characteristics in school, culture, and language-based domains (Felder et al., 2015). School-based characteristics include being able to read two levels above grade level in their native language, advanced creativity, and leadership (Felder et al., 2015). Culture-based characteristics are the balance of heritage and new culture behaviors, willingness to share heritage culture, pride in culture and ethnic background, and a global sense of community and respect for cultural differences (Felder et al., 2015). Language-based characteristics include advanced language proficiency levels, learning multiple languages at an accelerated pace, the teaching of their native language to others, superior knowledge of phrases and heritage dialects, and the ability to joke in both languages (Felder et al., 2015).

Academic Standards

All students need to have access to a rich and challenging curriculum to support and motivate them to achieve at high levels (Gandal, 1995). Clear and specific academic standards are needed to make the process fair and inclusive for all students (Gandal, 1995). Special populations of students need standards to provide a basis for policies, rules, and procedures that provide systematic programs and services (NAGC, n.d.-c). Standards set clear and measurable goals, inform instruction, and help measure achievement (Gandal, 1995). Standards not only guide and improve student learning but will also improve instruction (NAGC, n.d.-c). No matter how standards are addressed or

implemented, they provide the direction and focus for gifted education (NAGC, n.d.-c). This section describes the two sets of standards that have the largest impact on the special population of gifted ELLs and this research study.

World-Class Instructional Design and Assessment (WIDA) Standards

The No Child Left Behind Act of 2001 required that states adopt English Language Development standards to support the increasing student population of ELLs in schools across the country (No Child Left Behind, 2001). The assessment had to be aligned to the content area assessment adopted by the State Department of Education and assess ELLs on an annual basis in the language modalities of listening, speaking, reading, writing, comprehension, and provide an overall composite proficiency level score (No Child Left Behind, 2001).

English Language Proficiency Standards are also required by Colorado law (CDE, 2019a). The Colorado State Board of Education adopted the WIDA standards in 2009 as the Colorado English Language Proficiency Standards (CELP) (CDE, 2019a).

The five English language development standards as defined by WIDA and CELP are:

1. English language learners communicate for social and instructional purposes with the school setting
2. English language learners communicate information, ideas and concepts necessary for academic success in the content area of Language Arts
3. English language learners communicate information, ideas, and concepts necessary for academic success in the content area of Mathematics
4. English language learners communicate information, ideas and concepts necessary for academic success in the content area of Science
5. English language learners communicate information, ideas and concepts necessary for academic success in the content area of Social Studies. (WIDA, 2014)

These five standards encompass all content concepts of language social academic language (WIDA, 2014). The standards are organized into grade level clusters which correspond with language proficiency levels on a scale of 1.0, with little to no English language skills, to 6.0, native English parity (WIDA, 2014). The standards, performance definitions, and proficiency levels and types of language, encompass the core of the WIDA framework of English language development (WIDA, 2014).

National Association for Gifted Children (NAGC) Standards

The NAGC developed gifted education programming standards with a variety of stakeholders to ensure recognition, referral, and services of high-ability students (NAGC, n.d.-c). These standards aid school districts by providing a framework for the evaluation of the programs and services for gifted learners and have student outcomes for goals (NAGC, n.d.-c). They are based on gifted theory, research, and practice (NAGC, n.d.-c). There are six gifted education programming standards: learning and development, assessment, curriculum and instruction, learning environments, programming, and professional development (NAGC, n.d.-c). Although all the NAGC standards are imperative in gifted education, the one most relevant to this doctoral research project is standard two: assessments.

The second standard is the incorporation of all types of assessments, specifically that which provide information about identification, learning progress and outcomes, and evaluation of programming for students with gifts and talents in all domains (Johnson, 2012a). The assessment process gathers information using tests, instruments, and

techniques for screening, classification, selection, curriculum planning, progress, and program evaluation (Johnson, 2012b). Within this standard, the three student outcomes are establishing equal access, using and interpreting a variety of assessment evidence, and representing students from diverse backgrounds (Johnson, 2012b).

The first student outcome, establishing equal access, creates environments that encourage students to express characteristics and behaviors associated with giftedness (Johnson, 2012b). The second student outcome, using and interpreting a variety of assessment evidence allows students to reveal their exceptionalities in multiple ways (Johnson, 2012b). The last student outcome, representing students from diverse backgrounds ensures that gifted underrepresented students are representative of the total student population (Johnson, 2012b).

If one of the three standards for ensuring that educational policies are fair and inclusive is equal access to facilities and services (Brookover & Lezote, 1981) and equal access is outlined in the standards as being a focus in education (Johnson, 2012b), then there needs to be an investigation into the root cause of why 2.8 percent of ELLs are identified as gifted out of the total six percent of the entire gifted student population (Civil Rights Data Collection, 2016). If this practice was in place, then the demographics should match the identifications. There is a disconnect between the standard of using multiple assessments to ensure equal representation (Johnson, 2012b) and the practice of only being able to use specific assessments in the areas of cognitive, creativity,

achievement, and behavior that have been determined as valid and reliable (CDE, 2016). More research is needed to include other assessments in this list.

Gifted and Talented Identification

The Marland Report (1971) states that it is important to identify gifted students so they can reach their intellectual potential and make outstanding contributions to society.

> Gifted and Talented children are, in fact, deprived and can suffer psychological damage and permanent impairment of their abilities to function well which is equal to or greater than the similar deprivation suffered by any other population with special needs served by the Office of Education. (Marland, 1971)

Identification should not only use the areas of general intellectual ability, specific academic aptitude, creative and productive thinking, leadership ability, visual and performing arts, and psychomotor ability included in the federal definition, but it should encompass a minimum of 3 to 5 percent of the population (Marland, 1971). Gifted identification can occur in multiple ways and with professional and objective measures (Marland, 1971). The Marland Report (1971) provides the basis for national, state, and local identification practices.

National Identification Procedures

The NAGC (n.d.-b) provides general recommendations in the area of identification. Although there are many similarities between gifted students, multiple concerns must be addressed in gifted identification (NAGC, n.d.-b). Issues to address in the identification process are the dynamic nature of giftedness, making sure all racial, ethnic, income levels, and exceptionality groups are represented, recognition that examples of giftedness must be gathered from multiple categories, and the importance of

early identification (NAGC, n.d.-b). Identification should include both nomination and screening processes (NAGC, n.d.-b).

The NAGC (n.d.-b) also addresses the use of both objective and subjective identification instruments. Examples of objective identification instruments are intelligence tests, achievement tests, and cumulative records (NAGC, n.d.-b). Subjective instruments are checklists, inventories, nomination forms, teacher observation and rating scales, portfolios and performances, and student educational profiles (NAGC, n.d.-b). It is important to note that the NAGC states that "relying on IQ or performance results alone may overlook certain gifted populations" (NAGC, n.d.-b).

State Identification Procedures

CDE (2016) outlines their recommendations for the identification of gifted students in their Gifted Identification Guidebook and reflects the national recommendations. The Exceptional Children's Educational Act (ECEA, 2013) rules require Colorado districts to identify and serve gifted students in relation to the ECEA definition of giftedness.

Assessment is the methods, tools, and data collected to build a body of evidence (CDE, 2016). The body of evidence includes multiple sources of data including quantitative data such as norm- and criterion-referenced tests and qualitative data such as rubrics, performances, observations, checklists, and interviews (CDE, 2016). Nationally normed instruments at the 95th percentile serve as criterion for demonstration of exceptionality (CDE, 2016).

CDE (2016) provides a matrix of commonly used assessments that have been reviewed for reliability and validity. There are four types of assessments used. Cognitive tests measure general intellectual ability (CDE, 2016). Creativity tests observe creative characteristics (CDE, 2016). Achievement tests are criterion- and norm-referenced tests that demonstrate exceptional abilities in the areas of reading, writing, math, science, social studies, and world language (CDE, 2016). Behavior observation scales are norm-referenced measures filled out by educators and parents that measure characteristics such as leadership, motivation, memory, reasoning, creativity, and sense of humor (CDE, 2016). Performance evaluations could be juried performances, contests, competitions, portfolios, and classroom performance (CDE, 2016). Language assessments do not have a place on this list.

A referral for gifted education can come from multiple sources (CDE, 2016). These could be interviews, questionnaires, anecdotal records, checklists, performance, observations, test data, Response to Intervention (RtI), or universal screening (CDE, 2016). Universal screenings are an assessment of all students within a grade level for the purpose of identifying students of exceptional abilities or potential, especially those from underrepresented populations (CDE, 2016). These could be in the form of cognitive or observational instruments (CDE, 2016).

There are multiple pathways to gifted identification which are specific academic aptitude, creative or productive thinking, leadership and specific talent aptitudes, and general intellectual ability (CDE, 2016). Specific academic aptitude is determined by the

95th percentile or above on one or more batteries of a cognitive test a demonstration of aptitude on two specific academic measures (CDE, 2016). This pathway can also be determined by three or more academic measures if a cognitive measure is absent (CDE, 2016). The creative or productive thinking, leadership and specific talent aptitudes pathway is achieved through a performance evaluation, observation scale, and a criterion- or norm-referenced test at the 95th percentile (CDE, 2016). The pathway for general intellectual ability is achieved by scoring in the 95th percentile or above on a cognitive measure (CDE, 2016).

Parallel Studies

Literature related to general intellectual ability and language proficiency exists, but it is limited in many areas. No studies were found that were identical to the methods and measures proposed in this study, but parallel ones were discovered. When exact studies do not exist in the literature, parallel studies can form a solid foundation for research (Pyrczak & Bruce, 2000). These studies create a footprint that can be used to provide a relevant research pattern.

Since research was not found examining the correlation between the general intellectual ability and English language proficiency assessments being explored, parallel studies were examined. These parallel studies examine the relationship between either general intellectual ability and another measure, or English language proficiency and another measure. Studies contain similar methodology, subject matter, specialized groups

of students, or assessments. These parallel studies were helpful for finding patterns within the literature and field for both further study and missing components.

English Language Proficiency and Cognitive Ability

Research exists that shows that being bilingual positively affects cognitive abilities (Marian & Shook, 2012). Bilingual Advantage Hypothesis, also known as threshold hypothesis, is the belief among advocates of bilingual education that individuals with high levels of proficiency in two languages experience cognitive advantages in language skills and intellectual growth over those who have low levels of proficiency in two languages, who have significant cognitive deficits (Ravich, 2007). Research has shown that the bilingual brain can have better attention and task-switching capacities than the monolingual brain, thanks to its developed ability to inhibit one language while using another (Marian & Shook, 2012). Maintaining balance between two languages requires a regulatory system of cognitive abilities is always active and strengthens regions of the brain including the ones related to attention, inhibition and cognitive control (Marian & Shook, 2012).

Several examples of research exemplify the findings that ELLs have better attention, inhibition, and cognitive control. Peal and Lambert (1962) gave verbal and nonverbal intelligence tests to bilingual and monolingual students and found that bilinguals performed significantly better than monolinguals. They argue that their results suggest a general intellectual advantage of bilingual students, are better at concept formation, and have greater mental flexibility (Peal, & Lambert, 1962). Yow and Li

(2015) examined how the degree of bilingualism influenced executive functioning using task switching. They found that a more balanced use and a more balanced level of proficiency in two languages resulted in better executive control skills (Yow & Li, 2015). Prior and MacWhinney (2010) also used the task-switching paradigm to investigate if bilingualism enhanced the ability to shift between mental sets. Their results suggest that being bilingual may contribute to increased efficiency in switching between mental tasks (Prior & MacWhinney, 2010).

General Intellectual Ability and Achievement

Edmonds (2015) compared performance on the Cognitive Abilities Test (CogAT) and the NNAT to see which test's nonverbal scores provided the largest minority representation and predicted academic performance on the Virginia Standards of Learning (SOL) tests. The data analysis demonstrated that neither the CoGAT7 nor the NNAT-2 had statistically conclusive validity over the other in terms of the similarity of the nonverbal mean scores or in providing minority representation (Edmonds, 2015). The nonverbal scores on the CogAT7 were better predictors of performance on the third-grade Virginia SOL (Edmonds, 2015).

Naglieri and Ronning (2000) assessed the relationship between general intellectual ability as measured by the NNAT and reading ability as measured by the Stanford Achievement Test, Ninth Edition (SAT-9). A sample of 22,600 children were assessed to provide data for analysis (Naglieri & Ronning, 2000). The purpose of the study was to see if ability and reading correlation changed significantly across grade

levels (Naglieri & Ronning 2000). The results did not prove the hypothesis but provided evidence that there is a strong relationship between general intellectual ability and reading achievement (Naglieri & Ronning, 2000).

English Language Proficiency and Achievement

Parker, Louie, and O'Dwyer (2009) explored how English language proficiency measures may be related to performance outcomes on content assessments for 5th and 8th graders in New Hampshire. The research centered around how performance in four language domains on an English language proficiency assessment predict ELL students' performance on a state content assessment after accounting for student and school characteristics (Parker, et al., 2009). The English language proficiency assessment used was the ACCESS for ELLs and the content assessment used was the New England Common Assessment Program (NECAP) (Parker et al., 2009). The four language domains used from ACCESS for ELLs were reading, writing, listening, and speaking (Parker et al., 2009). Parker et al. (2009) controlled for individual student characteristics including gender, poverty status, disability status, race/ethnicity, age for grade, and years in English language learner programs. They also controlled for school characteristics including school size, school poverty, racial composition, English language learner school density, geography (Parker et al., 2009). Parker et al. (2009) found that English language proficiency scores as measured by ACCESS for ELLs were significant predictors of content assessment outcomes as measured by NECAP.

Pearson (2015) compared results of the Missouri Assessment Program (MAP) and the ACCESS for ELLs to see if ELLs scored as well as their non-English language learner (non-ELL) peers. Pearson (2015) completed a quantitative analysis of the relationship between the MAP math achievement, MAP reading achievement, and overall achievement on ACCESS for ELLs. The results of students in third through eighth grade were compared and found a strong positive effect size which indicates that if ELLs reached level 5 on the ACCESS for ELLs then they did as well on the MAP as non-ELLs (Pearson, 2015).

McFann-Mora (2016) completed research to determine whether there was a relationship between the Delaware Comprehensive Assessment System (DCAS) reading and math scores and the ACCESS for ELLs four language domains and overall scores (McFann-Mora, 2016). The correlation for the assessments was positive and significant and that there were meaningful relationships between the ACCESS for ELLs and the DCAS tests scores (McFann-Mora, 2016). The results suggested that when ACCESS for ELLs overall scores increased, the reading and math scores increased with the strongest correlation between the ACCESS for ELLs writing domain score and the DCAS math score (McFann-Mora, 2016).

Quantitative, correlational research was completed by Grisso (2018) to discover the relationship among English language proficiency and academic achievement. Grisso (2018) examined the relationship between the Oklahoma Core Curriculum Test (OCCT) in third grade reading and the ACCESS for ELLs. She analyzed the relationship between

the two assessment measures, as well as determining if the relationship was influenced by the number of years in which the student had been receiving English language development services (Grisso, 2018). Grisso's (2018) review of the literature suggested that the more proficient a student is in the English language, the more effectively they will be able to demonstrate content knowledge. Her data analysis showed that there is a strong positive relationship between English language proficiency and academic achievement (Grisso, 2018). However, the number of years that a student participated in English language development instruction did not predict achievement performance (Grisso, 2018).

Rios (2018) investigated the relationship between English language assessments and academic performance of ELLs. This was a quantitative, longitudinal study that studied the predictive relationship between ACCESS for ELLs subscale scores in the language domains of speaking, listening, reading, and writing and course semester grades in English 9, English 10, and English 11 (Rios, 2018). The ACCESS for ELLs subscale scores in listening, reading, and writing significantly predicted English course grades but speaking scores did not (Rios, 2018).

Summary

This literature review provides a foundation of relevant, timely, appropriate, and essential research for this doctoral research project. Educational Equity Theory is used to frame the study in the pursuit of making gifted identification fair and inclusive for ELLs. Multiple conceptions and definitions are outlined to illustrate the multiple characteristics

of this population of students. Giftedness is defined for the purposes of this study. An overview of the basic principles of language acquisition will assist in appropriately defining giftedness for ELLs. ELLs are defined at the national and state level followed by a narrower definition of gifted ELLs. Academic standards in the areas of English language acquisition and giftedness have overlap and provide guidance in educating and assessing students.

Parallel studies are reviewed that use similar assessment instruments, although no studies exist that correlate the exact assessment instruments in this study. Studies are also reviewed that indicate a relationship between language and cognitive abilities in executive functioning. This study contributed to filling this gap in the research by using the ACCESS for ELLs and NNAT as instruments to correlate language proficiency and general intellectual ability. It furthers the research on language and cognition by going beyond executive functioning to general intellectual ability. Various policies and practices have been put into place to promote access for ELLs into gifted programs (CDE, 2016), but additional research is needed to address restrictions of entrance criteria into gifted programs in the form of standardized tests that may inhibit the ability of ELLs to access gifted programs (VanTassel-Baska, 2010). This study addresses this problem by investigating the correlation between the ACCESS for ELLs language proficiency test and the NNAT general intellectual abilities test in order for the ACCESS for ELLs to be used as a qualifying data point for gifted identification.

Chapter Three

Methodology

Overview

The previous section provided the background in literature by defining the theories grounding this study and information on parallel studies. The purpose of Chapter Three was to provide the details and research framework which was used in the study. By providing an overview of the procedures design, and analysis steps, the study could be replicated for validation or for the purpose of further research.

The purpose of this study was to investigate the relationship among English language proficiency levels and general intellectual ability of English language learners for gifted identification. Every child should have access to rigorous coursework provided by gifted education programs and services (NAGC, n.d.-d). Data shows that ELLs are not identified at the same rate as their non-English speaking peers (Civil Rights Data Collection, 2016). Equitable identification procedures would reduce the underrepresentation of diverse learners in gifted education programs (NAGC, n.d.-d). Various policies and practices have been put into place to promote access for ELLs into gifted programs (CDE, 2016). However, additional research is needed to address the restrictions of entrance criteria into gifted programs in the form of standardized tests that may inhibit the ability of ELLs to access gifted programs (VanTassel-Baska, 2010).

This chapter outlines the research questions and the developmental theories that ground each question. The null hypotheses for each research question are presented. The instruments are described that answer each research question. The research methodology and design are defined along with the rationale for their selection. The general population, target population, and study sample are described using the setting, sampling procedures, and number of participants. The types of data including sources and instruments are listed confirming their validity and reliability, their collection and management, and procedures for data management and analysis. Finally, limitations of the study are outlined.

Research Questions

The research questions for this study were chosen guided by a theoretical framework. Educational Equity Theory (Manichander, 2016) provided the theoretical framework for this study as discussed in Chapter Two. Equity in education requires putting fair and inclusive systems in place to ensure that every child has an equal chance for success (Field et al., 2007). This system that this study is striving to make fair and inclusive is the gifted identification process in Colorado. CDE (2016) requires that students score in the 95th percentile or above on a combination of assessments to be able to qualify for gifted programs. Although CDE (2016) uses a matrix of commonly valid and reliable assessments for gifted identification including cognitive, creativity, achievement, and observation, language assessments are not on this list. The criteria that excludes language assessments is considered by the researcher as restricting ELLs from

the entrance into gifted programs. In order for gifted programs to be fair and inclusive, language assessments should be included as a data point for gifted identification.

ACCESS for ELLs, an assessment used to measure English language proficiency, is a standards-based and criterion referenced assessment (Fox & Fairbairn, 2011). It is aligned with the WIDA standards (WIDA, 2014) outlined in Chapter Two which are tied to the four domains of language, listening, speaking, reading, and writing, as described by Cummins (1979, as cited in Lewis et al., 2012) theories. Because ACCESS is tied to standards and theory, it was chosen as the assessment to challenge the notions of fairness and inclusion as stated in Educational Equity (Manichander, 2016) in this study by being the independent variable. The research questions are structured to examine the relationship among English language proficiency levels as measured by ACCESS and general intellectual ability of ELLs as measured by NNAT for gifted identification because general intellectual ability is recognized by CDE as an area of gifted identification measurable by cognitive tests.

The first research question in this study (RQ1) was "What is the relationship between English language proficiency as measured by the ACCESS for ELLs English language proficiency assessment overall score and general intellectual ability as measured by the NNAT in English language learner students?" This research question is supported by the Theory of Cognitive Development (Piaget, 1952) and Social Development Theory (Vygotsky, 1978). Language, as outlined by Piaget, can follow, amplify, or facilitate cognitive development (Slobin, 1979). Vygotsky (1962) also

believed that language plays a critical role in driving cognitive development. For this question, the ACCESS overall scale score was the independent variable and the NNAT percentile rank was the dependent variable. A relationship between these two variables reinforces the theories of Piaget (1952) and Vygotsky (1978) that language can facilitate or drive cognitive development. The null hypothesis for this question (H01) was "There is no statistically significant relationship between the ACCESS for ELLs English language proficiency level overall score and the NNAT scale score in English language learner students."

The second research question (RQ2) was "What is the relationship between the four language domains of the ACCESS for ELLs (listening, speaking, reading, and writing) and general intellectual ability as measured by the NNAT in English language learner students?" This research question was derived by from the work of Cummins (1979, as cited in Lewis et al., 2012), and his distinction between BICS and CALP. Cognitive Academic Language Proficiency (CALP) requires cognitively demanding abstract thinking like the writing domain on ACCESS to be demonstrated. Writing is considered a more cognitively demanding task by other theorists as well (Carillo, 2017; Tinberg, 2015). To investigate this research question, the variable of the ACCESS language domains of listening, speaking, reading, and writing were used as the independent variables and the NNAT percentile rank was again used as the dependent variable. The ACCESS for ELLs assessed the English language proficiency of ELLs in the four language domains of speaking, listening, reading, and writing (WIDA, 2014).

Establishing the strongest relationship between the language domain of writing would support Cummins' (1979, as cited in Lewis et al., 2012) claim that more cognitively abstract thinking is demonstrated through the language domain of writing. The null hypothesis (H02) for RQ2 was "There is no statistically significant relationship between the four language domains of the ACCESS for ELLs (listening, speaking, reading, and writing) and general intellectual ability as measured by the NNAT in English language learner students."

The third research question (RQ3) was "What is the relationship between language proficiency growth and general intellectual ability in English language learner students?" This research question is based on the second language acquisition work of Krashen (1987). Krashen's (1987) Input Hypothesis explains that second language acquisition takes place when the learner receives input that is one step beyond the learner's current language learning level. According to Krashen (1987) this input needs to be comprehensible, interesting, relevant, not grammatically sequenced, and provided in sufficient quantity. Because ELPA (General Assembly of the State of Colorado, 2014) in Colorado ensures that ELLs are provided with programs and educators that support their English language development, ELLs in Colorado are receiving instruction rooted in Krashen's (1987) Input Hypothesis. Growth in language has a relationship with cognitive ability because ELLs are being provided with an environment to adequately develop language (Lewis et al., 2012), language can facilitate or drive cognitive development (Piaget, 1952; Vygotsky,1978), and a characteristic of gifted ELLs is rapid second

language acquisition (Felder et al., 2015). The variables of language growth on ACCESS was used as the independent variable and the NNAT percentile rank was again the dependent variable for this research question. The null hypothesis (H03) was "There is no statistically significant relationship between language proficiency growth and general intellectual ability in English language learner students."

The fourth research question (RQ4) was "How do demonstrated relationships among English language proficiency as measured by the ACCESS for ELLs English language proficiency assessment and general intellectual ability as measured by the NNAT inform gifted identification in English language learner students?" If there is a significant statistical relationship between the variables of English language proficiency and cognitive ability, English language domains and cognitive ability, and English language growth and cognitive ability, then language proficiency assessments inform gifted identification. According to Cohen (1988, as cited in Nolan & Heinzen, 2014) a correlation coefficient of 0.50 is considered a large correlation. The correlation coefficient of $r \geq 0.50$ and a significance of $p \leq 0.001$ is the standard used to determine if there is a significant statistical relationship between variables in research questions one, two, and three. The null hypothesis (H04) for this research question was "Demonstrated relationships among English language proficiency as measured by ACCESS for ELLs English language proficiency assessment and general intellectual ability as measured by the NNAT do not inform gifted identification in English language learner students."

Research Methodology

The methodology chosen for this study was quantitative research. Quantitative research is "an approach for testing objective theories by examining the relationship among variables" (Creswell & Creswell, 2018, p. 4). Quantitative research is distinguished by using numbers as variables, closed-ended questions, collecting data using instruments that can be analyzed using statistical procedures, and hypothesis testing (Creswell & Creswell, 2018). Quantitative researchers test theories deductively, work to protect against bias, and strive for reproducible findings (Creswell & Creswell, 2018).

A quantitative research methodology was chosen for this study for several reasons. First, this particular methodology aligns with the purpose of this study. The purpose of this study was to investigate the relationship among the two variables of English language proficiency levels and general intellectual ability and quantitative research examines the relationship among variables (Creswell & Creswell, 2018). As such, quantitative research also aligns with the research questions as they are also examining the relationship among two variables. Quantitative research is rooted in the testing of theories (Creswell & Creswell, 2018), and each research question is grounded in language development or acquisition theory.

Quantitative research also aligns with the postpositivist worldview of the researcher. The scientific method is an accepted research approach by both post positivists and quantitative researchers (Creswell & Creswell, 2018). Quantitative research seeks to reject a null hypothesis, which is an assumption of the position of a

postpositivist (Creswell & Creswell, 2018). Postpositivist research seeks to make and refine claims as a test of theory, which is a characteristic of quantitative research (Creswell & Creswell, 2018). Data, evidence, and rational considerations shape knowledge, an objective of both post positivists and quantitative researchers (Creswell & Creswell, 2018). Being objective is an essential aspect of inquiry for post positivists, and validity and reliability are an important aspect of quantitative research (Creswell & Creswell, 2018).

Research Design

A quantitative correlational design was used to investigate the relationship among English language proficiency levels and general intellectual ability of ELLs for identification in gifted programs. Correlation is a measure of association used to determine the strength of the relationship between two variables (Frankfort-Nachmias & Leon-Guerrero, 2018). In this study the two variables are the predictor variable was English language proficiency and the criterion variable was general intellectual ability. English language proficiency is the ability of a person to use the English language to perform tasks (WIDA, 2014). General intellectual ability is exceptional capability or potential recognized through cognitive processes (e.g., memory, reasoning, rate of learning, spatial reasoning, ability to find and solve problems, ability to manipulate abstract ideas and make connections) (CDE, 2016). The units of analysis for each research question are the ACCESS for English language proficiency and the NNAT for general intellectual ability.

A correlational design was chosen as the quantitative methodology for several reasons. Since this study did not manipulate or describe variables but was seeking a relationship between variables, a correlational approach was appropriate (Nolan & Heinzen, 2014). This is further evidenced in the purpose of this study being to investigate the relationship among English language proficiency levels and general intellectual ability of ELLs for gifted identification. The units of analysis are existing test data. As such, data collection was completed using existing student databases.

The NNAT is taken in the fall of each school year, and ACCESS is taken in January of each year. The study examined the ex post facto data of assessment scores collected from the 2011-2012 school year to the 2018-2019 school year. The data from these school years was chosen because 2011-2012 was the first school year that the NNAT was given to students in this district, and the 2018-2019 school year had the most recent data from assessments given. A correlation analysis was applied to the study using numerical percentile rank scores from the NNAT and numerical scale scores from the ACCESS for ELLs.

Participants

The population included in this study was a convenience sample based on specific criterion relevant to the study. The criterion for the study was students who had been administered the ACCESS and NNAT. The target population was students who had been administered the ACCESS and NNAT from a school district in Colorado. The sample was drawn from students in Paradise Public Schools (pseudonym) which is a small

school district in the Colorado. Paradise public schools consists of seven elementary schools, two middle schools, and two high schools. The data was drawn from the elementary and middle schools. Of the 7,467 students in this district, 83.5% are Hispanic, 11.7% are White, 2.6% are Black or African American, 1.2% are two or more races, and less than one percent are American Indian or Alaskan Native, Asian, and Native Hawaiian or other Pacific Islander. There is a 19.9% mobility rate and 86.0% of the student population qualifies for free or reduced lunch. There are 2,847 students classified as ELLs which is 38% of the district population. The majority of ELLs in this district, 66%, were in the elementary grades, where the sample for this research was drawn.

Data from 4,395 students was received for use in this study. Students included in the sample had either ACCESS for ELLs English language proficiency overall scores and/or NNAT percentile rank scores. After receiving, the data was cleaned. Data cleaning is the process of preparing data for analysis by removing or modifying data that is incorrect, incomplete, irrelevant, duplicated, or improperly formatted (Sisense, 2020). In the overall data set, spelling and syntax errors were fixed and formatted uniformly. Then students were removed who were missing either an ACCESS for ELLs overall score or NNAT score for RQ1 and RQ3, and further students were removed who did not have the four language domain scores for RQ2. Finally, duplicate data sets were removed with the result of 13 duplicate data sets found.

ESSA mandates that states are responsible for setting the minimum number of students needed to form a student subgroup for federal accountability and reporting

purposes referred to by the state as the "n-size" (Alexander, 2015). The minimum n-size for the state where the data was collected is 20 students (U.S. Department of Education, 2017). Since the n-size of the race/ethnicity subgroups of students with the identified races of African American, American Indian, Asian, Native Hawaiian/Pacific Islander, White, and students identifying with multiple races was less than 20, these subgroups were suppressed to limit the inadvertent disclosure of personally identifiable information in reporting.

The final sample population was 1,741 students for RQ1, 1,120 students for RQ2, and 165 students for RQ3. The sample size number of participants for each RQ exceeded 66 students, which is the required minimum for a medium effect size with the statistical power of .7 at the .05 alpha level (Frankfort-Nachmias & Leon-Guerrero, 2018). Since this threshold was met in the collected sample of data, alternate districts did not need to be approached for data that includes both the ACCESS for ELLs and NNAT, which was anticipated.

The participants in this study met the definition of ELLs outlined in ESSA (Alexander, 2015). This was guaranteed by CDE (2019a) who states that all learners that meet this definition must participate in the English language proficiency assessment system. All students for this sample were between the ages of three and twenty-one, they had a native language other than English, and came from an environment where a language other than English had a significant impact on the student's level of English language proficiency (Alexander, 2015).

Instrumentation

The correlational design studied the extent and direction of the correlation between the English language proficiency overall score on the ACCESS for ELLs assessment and the general intellectual ability on the NNAT. The extent and direction of the correlation between the four language domain scores on the ACCESS for ELLs and general intellectual ability on the NNAT was also studied. The construct, standards alignment, and scoring of the two assessments are described below. The reliability and validity of the respective assessments are also detailed.

Assessing Comprehension and Communication in English State-to-State (ACCESS)

ACCESS for ELLs is an assessment used to annually measure English language proficiency in ELLs (CDE, 2019b). ACCESS for ELLs is standards-based, and criterion referenced (Fox & Fairbairn, 2011). CDE (2019b) directs districts to administer this assessment during January and February of each academic year.

The purpose of this test is to assess "social and general academic English in reading, speaking, listening, and writing, as well as language used in language arts, mathematics, science, and social studies" (Fox & Fairbairn, 2011, p. 425). The question items are designed to show mastery of the WIDA Consortium English Language Proficiency Standards (WIDA, 2014). The four domains of language, reading, writing, speaking, and listening are tied to the five WIDA standards (Fox & Fairbairn, 2011). The three types of scores reported are raw scores, or number correct, scale scores that relate the raw score to student grade level in relation to the continuum of language

development, and proficiency level, which is an interpretation of the scale score (Fox & Fairbairn, 2011). Confidence levels are reported as well (Fox & Fairbairn, 2011). There are six levels of proficiency starting at 'entering', which is level 1, and ending with 'reaching', which is level 6 (Fox & Fairbairn, 2011).

To establish proficiency levels to align with the increased rigor of the academic language requirements in College and Career Ready standards, CDE convened the state's Culturally and Linguistically Diverse Education (CLDE) stakeholder group (CDE, 2018). Colorado criteria for identifying a student as eligible to be redesignated as fluent-English proficient is outlined in a 6-year timeline broken down into interim periods of 1, 2, and 3 years (CDE, 2018). According to CDE (2018), a student scoring an overall ACCESS proficiency level of 1 will have 1-year to move to level 2 or higher, 2-years to move from level 2 to level 3 or higher, and then 3-years to move from level 3 to level 4. A school or district will analyze ACCESS data yearly to determine if a student is on track to meet their proficiency targets whether they start at the first proficiency level or start at higher levels of proficiency with a shorter timeline (CDE, 2018).

Reliability is the accuracy, consistency, and dependability of test scores (Best & Kahn, 2017). The reliability of the ACCESS for ELLs overall score using Cronbach's alpha is 0.79 for grades 1-2 and 0.75 for grades 3-5 (WIDA, 2012). This is regarded as acceptable reliability as optimal values of Cronbach's alpha range between .7 and .9 (Creswell & Creswell, 2018). Validity, regarding a test, ensures that the test measures what it was designed to measure (Best & Kahn, 2017). To establish validity, WIDA

examined content, construct, and concurrent validity (WIDA, 2016). Qualitative evaluation by content experts was conducted to ensure that the construct of English language proficiency as represented by the WIDA standards was covered by the tests (WIDA, 2016). For construct validity, Rasch analysis, a model used to measure the probability of an individual getting a correct response on a test item (Frankfort-Nachmias & Leon-Guerrero, 2018), was completed to make sure test items were measuring the construct (WIDA, 2016). Concurrent validity was determined by completing a Pearson correlation analysis with The WIDA Measure of Developing English Language (MODEL) scale scores (WIDA, 2016). Pearson's correlation coefficient (r) measures the association of variables reflecting the strength and direction of the linear association between the two variables (Frankfort-Nachmias & Leon-Guerrero, 2018). This association ranges from 0.0 to ± 1.0 (Frankfort-Nachmias & Leon-Guerrero, 2018). The closer the correlation to ± 1.0, the stronger the association (Frankfort-Nachmias & Leon-Guerrero, 2018). Overall correlation for ACCESS was 0.768 (WIDA, 2016) indicating a strong positive relationship (Frankfort-Nachmias & Leon-Guerrero, 2018).

Naglieri Nonverbal Ability Test (NNAT)

The NNAT is suggested as a measure of general ability and a predictor of scholastic achievement (Naglieri, 2018). Normed for ages 5 to 11, it can be administered on the computer or in paper format in about 30 minutes (Naglieri, 2018). The more questions scored as correct indicate a higher general intellectual ability (Naglieri, 2018). Naglieri (2018) indicates that it is accessible for students with limited educational

experiences, those who come from diverse cultural, socioeconomic, or linguistic backgrounds, and those who have language disabilities, autism spectrum disorder, or are deaf or hard of hearing.

The NNAT Third Edition (NNAT3) items consist of geometric shapes that are universal and have no verbal content and the directions are pictorial with minimal verbal instructions (Naglieri, 2018). The NNAT3 measures student ability to look at a pattern that has a missing section, understand the relationship, and choose the option that fills the gap (Naglieri, 2018). Because of this, the NNAT3 has been widely used as part of the process of identifying students for gifted and talented educational programs, especially for members of groups that have been underrepresented (Naglieri, 2018).

The reliability of the NNAT3 was 0.88, assessed using Rasch item response theory (Naglieri, 2018). This is regarded as good reliability as optimal values of Cronbach's alpha range between .7 and .9 (Creswell & Creswell, 2018). In order to assess the validity of the NNAT3, studies were conducted during two other measures of cognitive ability: NNAT2 and the Otis-Lennon School Ability Test, eighth edition (OLSAT 8) (Naglieri, 2018). The average correlation between the NNAT2 and the NNAT3 was 0.79 (Naglieri, 2018) which is a strong positive correlation (Frankfort-Nachmias & Leon-Guerrero, 2018). The average correlation between the OLSAT3 and the NNAT3 was 0.55 (Naglieri, 2018) which is a moderate positive correlation (Frankfort-Nachmias & Leon-Guerrero, 2018).

Data Collection and Management

The students involved in this study were enrolled in Paradise Public Schools during the 2019-2020 school year. The students were assessed on both NNAT and ACCESS, their tests were scored, and their data results were saved into district databases. Paradise Public School District was approached with the possibility of this study and they verbally expressed their intention to provide data for this study, pending a data use agreement. The research project proposal was presented and approved at the proposal hearing, and following approval, permission was requested from the Institutional Review Board (IRB) at the University of Denver. When IRB granted approval, a data use agreement was submitted to the Paradise Public School District. Once approval from the school district was awarded, the researcher requested access to the data from the Paradise Public Schools. All data was made available to the researcher in one password protected excel document. District identification numbers, state student identification numbers, first names, last names, middle names, and birthdates were removed. The data was masked for anonymity with students identified by sequential numbers beginning with 001 and continuing through the remainder of the matched student files. The researcher used SPSS version 26, a statistical software platform (IBM Corp., 2017), to analyze student data files.

Data was collected using documents and records in the form of student databases. The Pearson Online Platform and Infinite Campus platform was used to gather the NNAT data. The data points that were requested from Paradise Public Schools for the NNAT

were the raw scores (the number of items correct), the scaled score (which gives point value based on the difficulty of items), and the percentile rank (indicating the percentage of students of that age in the norm sample who scored at or below the scaled score). Not all data requested was available for all the years the NNAT was administered based on what the district stored in Infinite Campus. The common data point stored for all years of administration was the percentile rank.

The Infinite Campus platform was used to pull a report with ACCESS for ELLs overall scale score and the scale scores for each of the language domains of reading, writing, speaking, and listening. All scores were not available for all years requested based on what was stored in Infinite Campus by the district. There was also no existing ACCESS data before 2013 because that is the first year the ACCESS test was administered. The Infinite Campus platform also reported demographic data including gender, race/ethnicity, current grade, current school, language acquisition level, and years in the United States.

To increase the level of confidentiality of data, the researcher had limited access to identifiable information when data was collected. All data documents were securely stored within locked locations and security codes were assigned to computerized records. At the end of the study, the researcher properly stored study data and documents. In accordance with IRB, data will be maintained for a minimum of three years after which the data will be cleared from the hard drive by overwriting the media.

Data Analysis

Although the NNAT and ACCESS test were used as instrumentation for this study, specific scores were used in the analysis of each research question. The scores from each data collection instrument for all research questions is listed in Table 3.1.

Table 3.1

Research Questions and Data Collection Instruments

Research Questions	Data collection Instrument
RQ1: What is the relationship between English language proficiency as measured by the ACCESS for ELLs English language proficiency assessment overall score and general intellectual ability as measured by the NNAT in English language learner students?	ACCESS overall scale score NNAT percentile rank
RQ2: What is the relationship between the four language domains of the ACCESS for ELLs (listening, speaking, reading, and writing) and general intellectual ability as measured by the NNAT in English language learner students?	ACCESS scale score for each language domain (reading, writing, speaking, listening) NNAT percentile rank
RQ3: What is the relationship between language proficiency growth and general intellectual ability in English language learner students?	ACCESS residual gain score NNAT percentile rank
RQ4: How do demonstrated relationships among English language proficiency as	Results of statistical analyses of RQs 1-3

measured by the ACCESS for ELLs English language proficiency assessment and general intellectual ability as measured by the NNAT inform gifted identification in English language learner students?

For each research question, a Pearson product-moment correlation was used to examine the correlation between the ACCESS for ELLs proficiency level and the NNAT for ELLs. The Pearson linear correlation is a test of statistical significance (Frankfort-Nachmias & Leon-Guerrero, 2018). Tests of statistical significance are intended to determine whether a null hypothesis can be rejected (Frankfort-Nachmias & Leon-Guerrero, 2018). Pearson's correlation coefficient (r) measures the association of variables reflecting the strength and direction of the linear association between the two variables (Frankfort-Nachmias & Leon-Guerrero, 2018). This association ranges from 0.0 to ± 1.0 (Frankfort-Nachmias & Leon-Guerrero, 2018). The closer the correlation to ± 1.0, the stronger the association (Frankfort-Nachmias & Leon-Guerrero, 2018). The Pearson correlation coefficient is the most widely used correlation coefficient and is considered the best method of measuring association between variables because it is based on the method of covariance (Nolan & Heinzen, 2014).

For the first research question, the variables of ACCESS overall scale score and NNAT percentile rank were correlated in order to determine the strength and direction of their association. There was also an analysis of each language domain on ACCESS,

listening, speaking, reading, and writing, to determine statistical significance of the relationship using the Pearson correlation for research question two. For the third research question, the two variables examined were language growth on ACCESS as the independent variable and NNAT percentile and as the dependent variable and a Pearson correlation measured the strength and direction of their correlation. Scatter plots were used in the data analysis to determine the direction of the correlation is either positive or negative (Frankfort-Nachmias & Leon-Guerrero, 2018).

Since research question three measures growth or change, a residual gain score was determined to be the best method for representing language growth on ACCESS. A gain is residualized by expressing the second time point as a deviation from what is predicted from the first time point (Cronbach & Furby, 1970). This uses the linearly predictable information from time point one to partial out the information from time point two (Cronbach & Furby, 1970). The two time points used for research question three were the first and second time point students were administered the ACCESS in second and sixth grade. The residual gain score was calculated by running a linear regression using the second time point as the dependent variable and the first time point as the independent variable.

A residual gain score was chosen over a difference score, which is calculated by subtracting the difference between time point two and time point one, because a residual gain score has several advantages over a difference score (Rankin & Tracy, 1965). Difference scores can lead to misleading conclusions because these scores are related to

any random error of measurement (Cronbach & Furby, 1970). Difference scores can also be influenced by test variances may result in a spurious correlation (Cronbach & Furby, 1970). Individuals coming from different backgrounds and levels of experiences causes individuals to have different levels of proficiencies on assessments, which also creates difficulties in statistical analysis (Cronbach & Furby, 1970). A residual gain score is more reliable, reduces spurious correlations, and reduces contamination of initial student status on assessments (Cronbach & Furby, 1970). It is also a more appropriate statistic for use in correlation with other criteria (Cronbach & Furby, 1970) which is the data analysis procedure in research question three.

Limitations

One limitation of the study is the age of the data in the analysis as compared to current protocols. ACCESS assessments have undergone multiple changes and updates in the past few years. The data that was analyzed for this study was from the 2011-2019 school years. In 2016, the ACCESS for ELLs was retired and the ACCESS for ELLs 2.0 was launched in an online testing format. Prior to the 2017 ACCESS for ELLs 2.0 testing, the scoring alignment was revised to increase the rigor of the assessment and the 2017 scores were released on a new standards scoring framework.

The use of standardized tests as variables is another limitation because of the factors that can influence test performance. There is evidence that standardized test results underestimate large numbers of students as learners, especially those who belong to minority groups (Pastor, 2019). The results of standardized tests can be affected by

moderator variables that cannot be controlled such as illness, hunger, sleep deprivation, unfamiliar forms of a test, or a limited command of English (Pastor, 2019). Certain aspects of a student's life including physical, mental, or situational aspects can have a negative effect on a student's score. Poverty, ethnicity, class size, and teacher experience are three examples of student aspects present in Paradise Public Schools.

As stated before, Paradise has a 19.9% mobility rate and an 86.0% free and reduced lunch statistic, both indicators of poverty. The Hispanic students represent 83.5% of the student population and Hispanic students historically score lower on standardized tests than their White and Asian peers. In Paradise, 34.1% of teachers are in their first or second year of teaching which indicates a lower level of experience for teachers than in other districts. Other factors that could impact test performance of students could include carelessness, lack of focus, anxiety, inadequate diet, lack of exercise, low motivation, lack of sleep, or poor attitude. Researchers struggle to predict which variables have the most impact on individual students taking standardized tests (Pastor, 2019). These factors were not measured in relation to the ACCESS or NNAT testing. Since current practice involves measuring the success of learning by students' standardized test results, these were chosen as variable in this study.

Summary

Chapter Three provided the details and research framework which was used in the study. To align with the purpose of this study, to investigate the relationship among English language proficiency levels and general intellectual ability of ELLs for gifted

identification. This chapter outlined the research questions and the developmental theories that ground each question. The null hypotheses for each research question were presented. The instruments and variables were defined as are English language proficiency, the independent or predictor variable, the overall score on the ACCESS for ELLs English language proficiency assessment and General intellectual ability, the dependent or criterion variable, the percentile rank of a student on the NNAT. The research methodology and design were defined as an ex post facto correlational design allowing existing data to be examined to determine the extent of the correlation between the English language proficiency and general intellectual ability of ELLs in Colorado for gifted identification. The general population, target population, and study sample were described using the setting, sampling procedures, and number of participants. The data collection instruments, ACCESS and NNAT, are described confirming their validity and reliability, their collection, and procedures for data management and analysis. Finally, limitations of the study are outlined.

Chapter Four

Findings

Overview

This chapter provides the research results from data collection and analysis to investigate the relationship among English language proficiency levels and general intellectual ability of English language learners for gifted identification. In order to make the gifted identification process in Colorado fair and inclusive to ensure that every child has a chance at success (Field et al., 2007) this study is examining the relationship between the ACCESS English language proficiency test and the NNAT test of general intellectual ability to investigate if language proficiency tests are a valid data point for gifted identification.

Each research question is grounded in theory. For research question one, the literature suggests that language serves an intellectual function and can amplify or facilitate cognitive growth (Piaget, 1952; Vygotsky, 1978). Research question two is supported by the claim that that more cognitively abstract thinking is demonstrated through the language domain of writing (Cummins, 1979, as cited in Lewis et al., 2012). The third research question is based on the theory that comprehensible, interesting, relevant language instruction that is not grammatically sequenced and is provide in sufficient quantity facilitates language acquisition (Krashen, 1987). As such, the data

analysis in this chapter examines the correlation between the variables for each research question to determine if theories are evident in the data.

This chapter lists the statement of purpose, research questions, and null hypotheses. A review of data analysis procedures is provided. Each research question was reviewed in terms of demographic sample information, descriptive statistics, data screening, assumptions testing, and results of data analyses performed as a part of this study. Where appropriate, tables were inserted and for additional clarity to aid statistical results reports.

Statement of Purpose

The purpose of this study was to investigate the relationship among English language proficiency levels and general intellectual ability of English language learners for gifted identification.

Research Questions

The research questions (RQs) for this study were:

RQ1: What is the relationship between English language proficiency as measured by the ACCESS for ELLs English language proficiency assessment overall score and general intellectual ability as measured by the NNAT in English language learner students?

RQ2: What is the relationship between the four language domains of the ACCESS for ELLs (listening, speaking, reading, and writing) and general intellectual ability as measured by the NNAT in English language learner students?

RQ3: What is the relationship between language proficiency growth as measured by the ACCESS for ELLs English language proficiency assessment and general intellectual ability as measured by the NNAT in English language learner students?

RQ4: How do demonstrated relationships among English language proficiency as measured by the ACCESS for ELLs English language proficiency assessment and general intellectual ability as measured by the NNAT inform gifted identification in English language learner students?

Null Hypotheses

The null hypotheses (H0s) for this study were:

H01: There is no statistically significant relationship between the ACCESS for ELLs English language proficiency level overall score and the NNAT scale score in English language learner students.

H02: There is no statistically significant relationship between the four language domains of the ACCESS for ELLs (listening, speaking, reading, and writing) and general intellectual ability as measured by the NNAT in English language learner students.

H03: There is no statistically significant relationship between language proficiency growth and general intellectual ability in English language learner students.

H04: Demonstrated relationships among English language proficiency as measured by ACCESS for ELLs English language proficiency assessment and general

intellectual ability as measured by the NNAT do not inform gifted identification in English language learner students.

Data Analysis Procedures

Descriptive statistics were used to draw conclusions from the sample population included in the analyses. The data was analyzed using the statistical software of SPSS, version 26 (IBM Corp., 2017). Descriptive statistics were analyzed for variables including mean, median, mode, standard deviation, variance, skewness, kurtosis, and range in order to examine the consistency of the data. Pearson's product moment correlation analysis was used to determine correlation coefficients. Histograms, box plots, and scatter dot plots were generated using SPSS (IBM Corp., 2017). All analyses were tested to a significance level of 0.05. The research questions were addressed using correlation analyses.

The study used both Pearson's product-moment correlation analysis to address the null hypotheses. For null hypothesis one, a Pearson's product correlation analysis was used to determine the significance of the relationship between the NNAT percentile rank and the ACCESS overall scale score. For null hypothesis two, a Pearson's product correlation analysis was used to determine the significance of the relationship between the NNAT percentile rank and the ACCESS language domains scale scores. For null hypothesis three, a bivariate linear regression model was used to determine the residual gain score for two time points on the ACCESS for ELLs. The two time points were ACCESS scores from the students' second grade year and from the students' sixth grade

year. Then, a Pearson's product moment correlation was used to determine the significance of the relationship between the NNAT percentile rank and the ACCESS residual gain score.

The criterion variable in hypothesis one was the NNAT percentile rank. The predictor variable in hypothesis one was the ACCESS overall scale score. In hypothesis two the criterion variable was also the NNAT percentile rank. The ACCESS language domain scale scores were the predictor variables in hypothesis two. The criterion variable in hypothesis three was NNAT percentile rank score and the predictor variable was ACCESS overall scale score residual gain score. Table 4.1 Lists the criterion variable, predictor variable, statistical test, and significance level for research questions one, two, and three. Because research question four is an analysis of the first three research questions, it is not included in this table.

Table 4.1

Variables and Statistical Tests Used to Examine Research Questions One through Three

Research question	Criterion variable	Predictor variable	Statistical test	Significance
One	NNAT Percentile Rank	ACCESS Overall Scale Score	Pearson moment correlation	≤ 0.001
Two	NNAT Percentile Rank	ACCESS Language Domain Scale Score	Pearson moment correlation	≤ 0.001
Three	NNAT Percentile Rank Residual Gain Score	ACCESS Overall Scale Score Residual Gain Score	Bivariate Regression / Pearson moment correlation	≤ 0.001

Research Question One

Research question one investigated if there was a statistically significant relationship between the ACCESS for ELLs English language proficiency level overall score and the NNAT scale score English language learner students.

Descriptive Statistics

For research question one, 1,741 students had data analyzed, 780 female and 961 male with a 10% difference between male and female. All 1,741 students had Hispanic listed as their race/ethnicity. The number of students by grade listed for students in the 2018-2019 school year was 267 (15.3%) students in 2nd grade, 275 (15.8%) of students in 3rd grade, 225 (12.9%) of students in 4th grade, 214 (12.3%) of students in 5th grade, 399 (22.9%) of students in 6th grade, and 361 (20.7%) of students in 7th grade. The amount of students by grade is comparable in the elementary grades ranging from 12.3% to 15.3% with a 3% difference between the lowest and highest amount of students. The amount of students by grade is also comparable in the middle school grades with 22.9% of students in 6th grade and 20.7% of students in 7th grade. These demographic results are reported in Table 4.2.

Table 4.2

Frequencies of Descriptive Statistics for RQ1

	Gender		2018-2019 Grade						Race
Descriptive	Female	Male	2	3	4	5	6	7	Hispanic
Frequency	780	961	267	275	225	214	399	361	1,741
Percent	44.8	55.2	15.3	15.8	12.9	12.3	22.9	20.7	100.0

Research question one resulted in one correlation coefficient. The independent variable was the overall scale score on ACCESS. The dependent variable was the NNAT percentile rank score.

In order to examine the consistency and normality of the data, the mean, median, mode, standard deviation, variance, skewness, kurtosis, and range for both NNAT and ACCESS data were analyzed. The statistic for each test in relation to the NNAT Percentile Rank is illustrated in Table 4.3.

Table 4.3
Descriptive Statistics for NNAT Percentile Rank

Statistic		NNAT Percentile Rank
N Statistic		1741
Range Statistic		98
Minimum Statistic		1
Maximum Statistic		99
Mean Statistic		44.73
Std. Deviation Statistic		26.139
Variance Statistic		683.242
Skewness	Statistic	.122
	Std. Error	.059
Kurtosis	Statistic	1.098
	Std. Error	.117

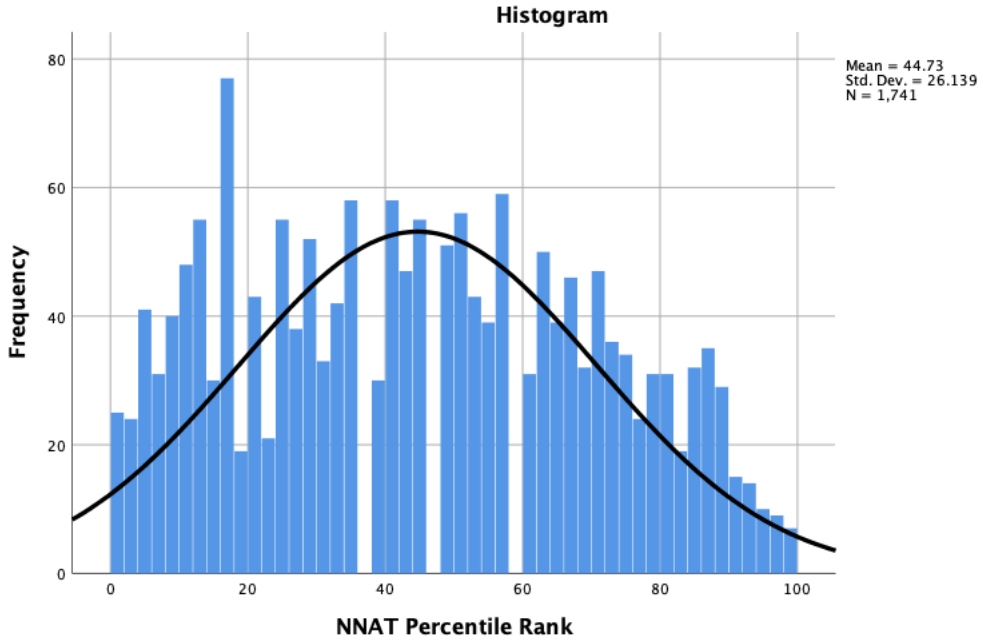
The minimum student score on the NNAT was 1 and the maximum score was 99. The mean of the NNAT is 44.73, the median is 45.00, and the mode is 57. Because the mean is positioned to the left of the median, the distribution is negatively skewed (Frankfort-Nachmias & Leon-Guerrero, 2018). This indicates that there is a greater number of values above the mean (George & Mallery, 2017). A skewness of ±1.0 is considered excellent for psychometric purposes, and the skewness of the NNAT data

(.122) is in that range (George & Mallery, 2017). NNAT has a standard deviation of 26.139 which indicates test scores are spread out over a large range (98). Variance is 683.242 which indicates that the data are very spread out from the mean. Skewness (.122) is approximately symmetric since the skewness is between -0.5 and 0.5 (Frankfort-Nachmias & Leon-Guerrero, 2018). Kurtosis (-1.098) indicates that the distribution is flatter than a normal curve and light-tailed, which indicates that the data does not have outliers. A kurtosis of ±2.0 is considered acceptable for psychometric purposes, and the kurtosis of -1.098 is in that range (George & Mallery, 2017).

The following histogram (Figure 4.1) provides a visual analysis of the relationships between the variables on the NNAT. The histogram reflects normal distribution and skewness is not extreme and as a result is unlikely to affect correlations. For the NNAT, the data was found to be consistent and is evidenced by the standard deviation remaining consistent among the variables.

Figure 4.1

Histogram of NNAT Percentile Rank by Frequency



The ACCESS Scale Score was also examined for the consistency and normality of the data using the mean, median, mode, standard deviation, variance, skewness, kurtosis, and range. The statistics listed above are illustrated in Table 4.4.

Table 4.4

Descriptive Statistics for ACCESS Overall Scale Score

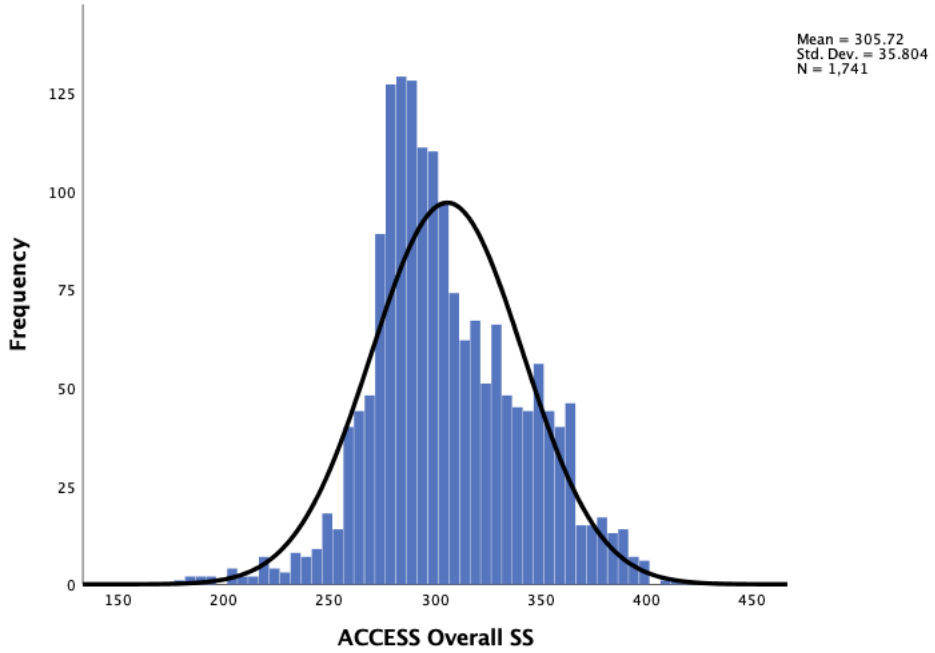
Statistic		ACCESS Overall Scale Score
N Statistic		1741
Range Statistic		241
Minimum Statistic		179
Maximum Statistic		420
Mean Statistic		305.72
Std. Deviation Statistic		35.804
Variance Statistic		1281.959
Skewness	Statistic	.225
	Std. Error	.059
Kurtosis	Statistic	.205
	Std. Error	.117

The minimum student scale score on the ACCESS was 179 and the maximum score was 420. The mean of the ACCESS is 305.72, the median is 300.00, and the mode is 290. Because the mean is positioned to the right of the median, the distribution is positively skewed (Frankfort-Nachmias & Leon-Guerrero, 2018). This indicates that there is a greater number of values below the mean (George & Mallery, 2017). A skewness of ±1.0 is considered excellent for psychometric purposes, and the skewness of the NNAT data (.225) is in that range (George & Mallery, 2017). ACCESS has a standard deviation of 35.804 which indicates test scores are spread out over a large range (241). Variance is 1281.959 which indicates that the data are very spread out from the mean. Skewness (.225) indicates that the data is approximately symmetric since the skewness is between -0.5 and 0.5 (George & Mallery, 2017). Kurtosis (.205) indicates that the distribution has a higher peak than a normal curve and has slightly heavier tails which is an indication of outliers (George & Mallery, 2017). Since the kurtosis is close to a normal curve (0) the indication is that there are few outliers.

The following histogram (Figure 4.2) provides a visual analysis of the relationships between variables on the ACCESS. The histogram reflects normal distribution and skewness and kurtosis are not extreme. As a result, skewness and kurtosis are unlikely to affect correlations. For the ACCESS, the data was found to be consistent and is evidenced by the standard deviation remaining consistent among the variables.

Figure 4.2

Histogram of ACCESS Scale Score Rank by Frequency



Data Screening

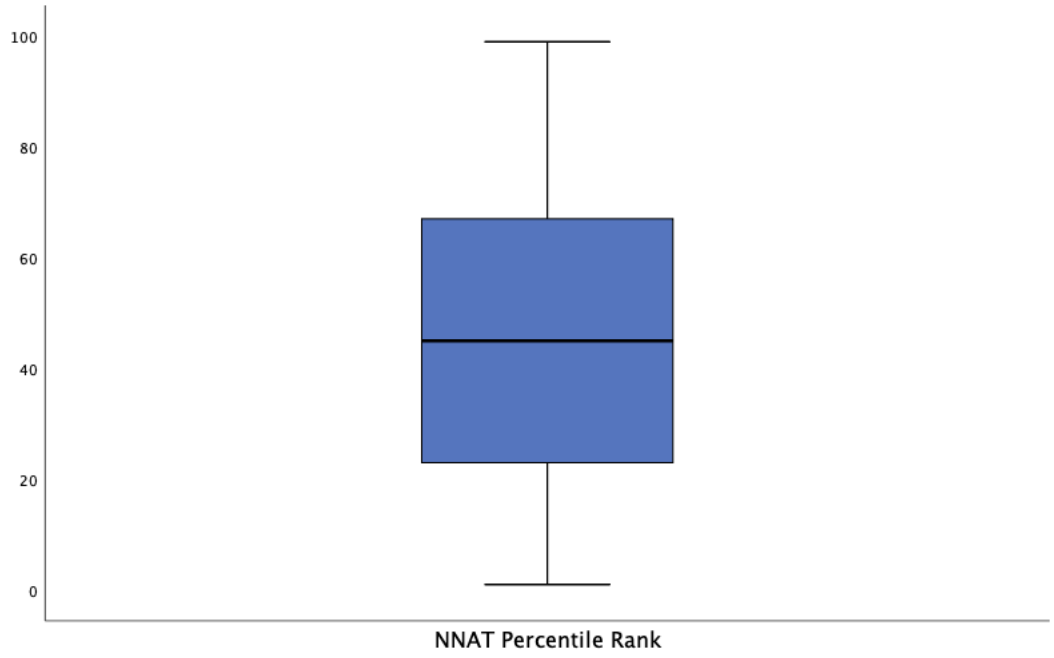
Prior to testing the hypothesis, the data was screened for missing data and univariate outliers. Both the NNAT test data and ACCESS test data and was provided in anonymized data sets. The NNAT data was provided in percentile rank form and the ACCESS data was provided in scale score form. SPSS version 26 (IBM Corp., 2017) uses a boxplot to identify outliers. The boundaries of the box are Tukey's hinges. The median is identified by a line inside the box. The length of the box is the interquartile range (IQR) computed from Tukey's hinges. Values more than three IQRs from the end of a box are labeled as extreme, denoted with an asterisk (*). Values more than 1.5 IQRs

but less than 3 IQRs from the end of the box are labeled as outliers with a circle (o) (Frankfort-Nachmias & Leon-Guerrero, 2018).

The NNAT assessment set did not have any outliers as shown in Figure 4.3. This is evident are there are not values denoted with either an asterisk or a circle. This indicates that none of the cases are considered to be abnormal test scores for this population of students.

Figure 4.3

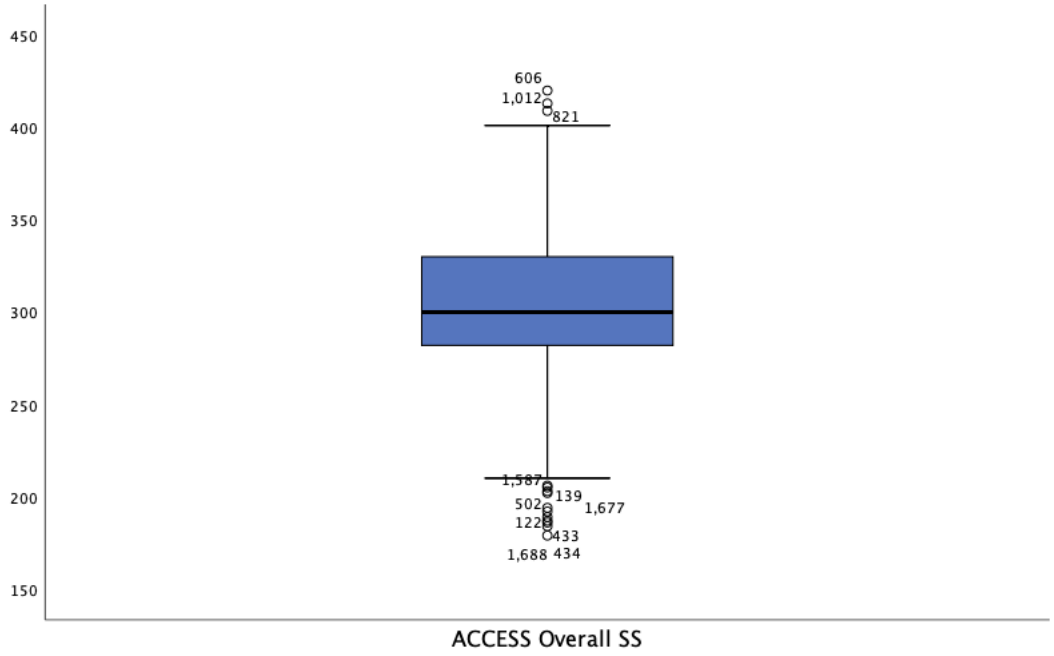
Box and Whisker Plot of NNAT Outliers



Outliers were present in the ACCESS assessment set as shown in Figure 4.4. The outliers are denoted in the boxplot with a circle (o). Cases were researched and found to contain valid and matched data for both assessments that fell into the extreme scoring ranges causing them to be identified as outliers. Although outliers were found that were more than 1.5 IQRs but less than 3 IQRs from the end of the box, no outliers were found

that were outside of the absolute value of three standard deviations from the mean (Frankfort-Nachmias & Leon-Guerrero, 2018). This resulted in no student records being excluded from the sample population studied.

Figure 4.4
Box and Whisker Plot of ACCESS Outliers



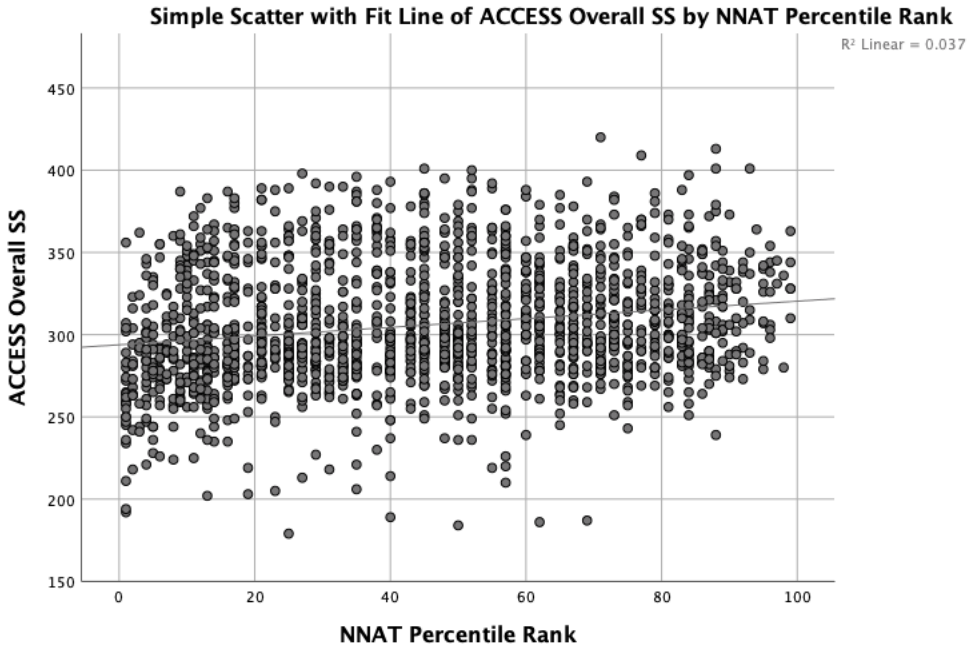
Assumptions Testing

To address the research questions, appropriate statistical assumption testing was completed to ensure that a Pearson correlation could be used to analyze the data for null hypothesis one. Assumptions are the required characteristics from a sampled population in order to make accurate inferences (Nolan & Heinzen, 2014). The variables were assessed for univariate linearity, normality, and homoscedasticity.

Test for Linearity. Because the Pearson correlation coefficient quantifies a linear relationship between two variables, a scatterplot is first constructed to ensure that the association between the two variables is linear (Nolan & Heinzen, 2014). Figure 4.5 shows the results of the linearity test for the variables of NNAT percentile rank and ACCESS overall scale score. The figure shows that the assumption of linearity was met due to the linear movement of the data along the line of best fit (Warner, 2013). This representation confirms bivariate normal distribution with a strong presence of homoscedasticity. Pearson's product-moment correlation provides the necessary stability for valid data interpretation and analyses to address hypothesis one (Gall et al., 2007).

Figure 4.5

Test for Linearity Between ACCESS Overall Scale Score and NNAT Percentile Rank



Test for Normality. As stated previously, histogram 4.1 indicated normal distribution for the NNAT data and histogram 4.2 indicated normal distribution for the ACCESS data for research question one. In addition to the histograms displayed in Figures 4.1 and 4.2, a Shapiro Wilk test of normality was also used to test the normality of the data. The Shapiro Wilk test of normality showed that the *p*-value was less than the alpha level ($p \leq 0.005$) for normality in the analysis of the NNAT percentile rank and ACCESS overall scale score. A *p*-value of less than the stated alpha level indicates that the population violates the null hypothesis that the data is normally distributed (Warner, 2013). The results of the Shapiro Wilk tests are displayed in Table 4.5.

Table 4.5
Shapiro Wilk Tests of Normality for NNAT Percentile Rank and ACCESS Overall Scale Score

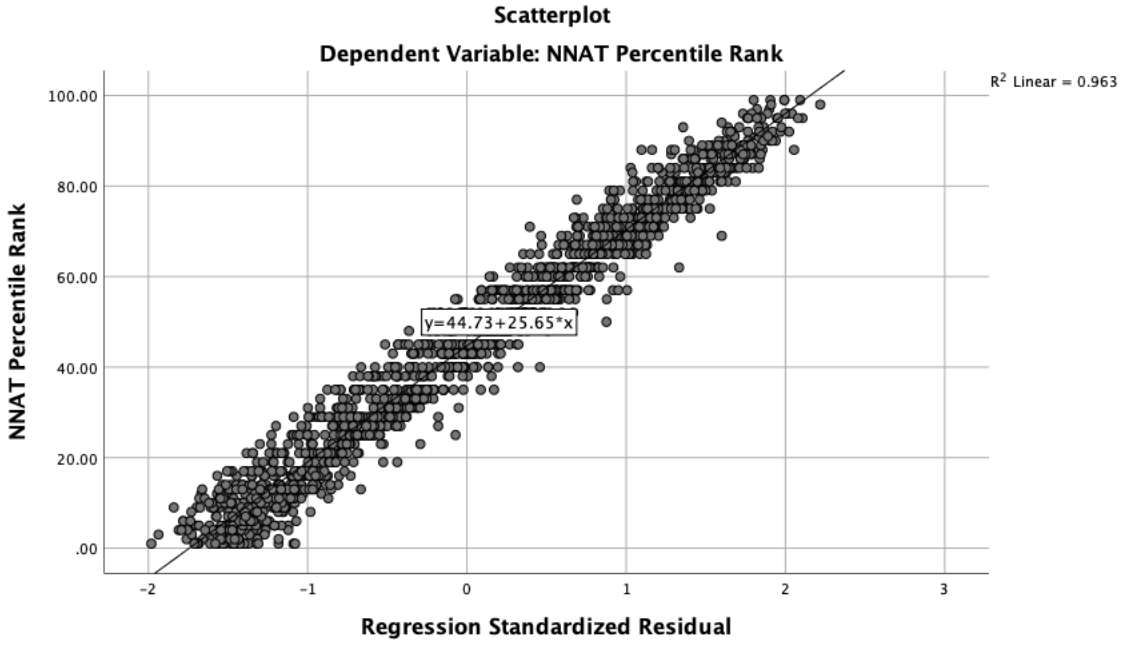
Variable	Shapiro Wilk	df	Sig.
NNAT percentile rank	.963	1741	.000
ACCESS overall scale score	.981	1741	.000

Following a cumulative review of the histograms with the outcomes of the Shapiro Wilk tests in regard to the assumption of normality show the analyses to meet assumptions and normality distributions were not violated.

Test for Homoscedasticity. In statistics, a sequence of random variables is homoscedastic if all its random variables have the same finite variance. This is also known as homogeneity of variance. The complementary notion is called heteroscedasticity. Data should show homoscedasticity to run a Pearson product-moment

correlation. Homoscedasticity is shown in Figure 4.6 because the variances along the line of best fit remain similar as the data moves along the line.

Figure 4.6
Test for Homoscedasticity



Homoscedasticity was also tested using Levene's Test of Homogeneity of Variances. Population variances are not equal if Sig. ≤ 0.05. Levene's test showed that the variances for NNAT scores and ACCESS scores were not equal, $F = 1.299$, $p = 0.011$. After analyzing skewness and kurtosis and finding nothing unusual, the assumption of homoscedasticity was met (George & Mallery, 2017).

Results for Null Hypothesis One

Null hypothesis one stated, "There is no statistically significant relationship between the ACCESS for ELLs English language proficiency level overall score and the NNAT percentile rank score English language learner students." As assumption tests

were satisfied, the analyses of relationships between the NNAT percentile rank and the ACCESS for ELLs overall scale score were studied using the Pearson product-moment correlation in the statistical software SPSS version 26 (IBM Corp., 2017). The results of the analyses are listed in Table 4.6. Results indicated there was a weak positive relationship between the NNAT and the ACCESS for ELLs. This relationship was determined to be a statistically weak positive relationship, Pearson's $r = .193$, $p \leq 0.001$ (Table 4.6).

Table 4.6
Correlational Analysis of NNAT and ACCESS

Variables	Pearson Correlation	Sig. (2-tailed)	N
NNAT percentile rank and ACCESS scale score	.193**	.000	1741

Based on these analyses, the null hypothesis for research question one was rejected. The data analysis showed a statistically weak positive relationship between the variables. This study has shown that there is a statistically positive correlation between the performance of English language learner students on the NNAT and the ACCESS for ELLs.

Research Question Two

RQ2: What is the relationship between the four language domains of the ACCESS for ELLs (listening, speaking, reading, and writing) and general intellectual ability as measured by the NNAT in English language learner students?

Descriptive Statistics

For research question two, 1,120 students had data analyzed, 505 female and 615 male with approximately a 10% difference between male and female. All 1,120 students had Hispanic listed as their race/ethnicity. The number of students by grade listed for students in the 2018-2019 school year was 267 (23.8%) students in 2nd grade, 275 (24.6%) of students in 3rd grade, 225 (20.1%) of students in 4th grade, 0 (0.0%) of students in 5th grade, 194 (17.3%) of students in 6th grade, and 159 (14.2%) of students in 7th grade. The amount of students by grade is comparable in the elementary grades ranging from 20.1% to 24.6% with a 4.5% difference between the lowest and highest amount of students. The amount of students by grade is also comparable in the middle school grades with 17.3% of students in 6th grade and 14.2% of students in 7th grade. The demographic data is reported in Table 4.7.

Table 4.7

Frequencies of Descriptive Statistics

	Gender		2018-2019 Grade						Race
Descriptive	Female	Male	2	3	4	5	6	7	Hispanic
Frequency	505	615	267	275	225	0	194	159	1,120
Percent	45.1	54.9	23.8	24.6	20.1	0.0	17.3	14.2	100.0

Research question two had four correlation coefficients. The four independent variables were the language domains scale scores of listening, speaking, reading, and writing. The dependent variable for each language domain was the NNAT percentile rank score.

In order to examine the consistency and normality of the data, the mean, median, mode, standard deviation, variance, skewness, kurtosis, and range were analyzed for each domain of language tested on the ACCESS including listening, speaking, reading, and writing. The following Table (4.8) and the subsequent paragraphs describe each statistic analyzed and the resulting determination relating to consistency and normality of the data.

Table 4.8

Descriptive Statistics for ACCESS Language Domains Scale Score (SS)

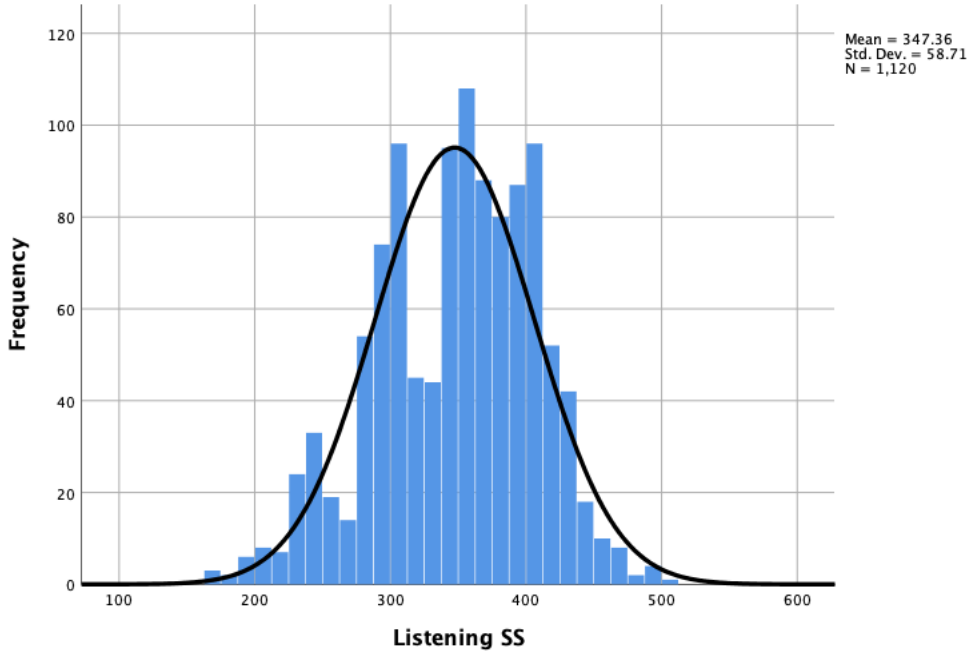
Statistic		Listening SS	Speaking SS	Reading SS	Writing SS
N Statistic		1120	1120	1120	1120
Range Statistic		342.00	342.00	209.00	282.00
Minimum Statistic		163.00	112.00	214.00	122.00
Maximum Statistic		505.00	454.00	423.00	404.00
Mean Statistic		347.36	287.56	322.14	307.93
Std. Deviation Statistic		58.71	54.90	36.62	45.57
Variance Statistic		3446.92	3014.13	1341.14	2077.07
Skewness	Statistic	-.335	-.632	.050	-.791
	Std. Error	.073	.073	.073	.073
Kurtosis	Statistic	-.188	.953	-.413	1.612
	Std. Error	.146	.146	.146	.146

For the listening domain, the minimum student scale score was 163 and the maximum score was 505. The mean of the listening domain was 347.36, the median is 354.00, and the mode is 355. Because the mean is positioned to the left of the median, the distribution is negatively skewed with the left side of the distribution longer and fatter than the tail on the right side (Frankfort-Nachmias & Leon-Guerrero, 2018). The ACCESS listening domain has a standard deviation of 58.710 which indicates test scores are spread out over a large range (342). Variance is 3446.920 which indicates that the

data are very spread out from the mean. Skewness (-.335) indicates that the data is approximately symmetric since the skewness is between -0.5 and 0.5, with a slight left skew (George & Mallery, 2017). Kurtosis (-.188) indicates that the distribution has less tails and a flatter peak than a normal distribution (George & Mallery, 2017). A skewness and kurtosis of ±1.0 is considered excellent for psychometric purposes, and the ACCESS listening data is in that range (George & Mallery, 2017). Since the kurtosis is close to a normal curve (0) the indication is that there are few outliers.

The following histogram (Figure 4.7) provides a visual analysis of the relationships on the listening domain of the ACCESS. The histogram reflects normal distribution of variables as described above and skewness and kurtosis are not extreme. As a result, skewness and kurtosis are unlikely to affect correlations.

Figure 4.7
Histogram of ACCESS Listening Domain Scale Score by Frequency



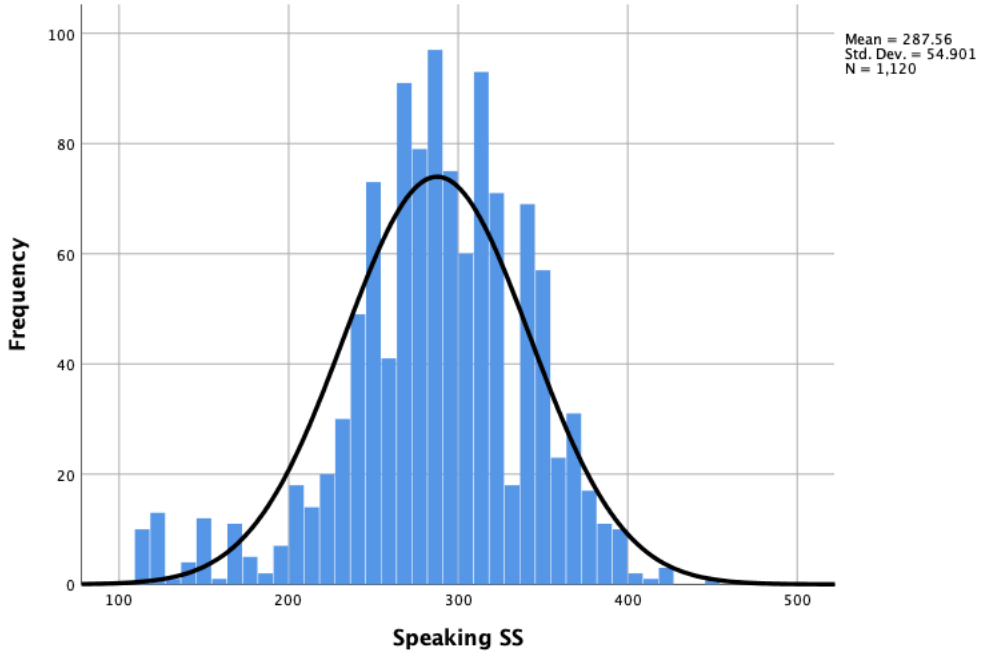
For the speaking domain, the minimum student scale score was 112 and the maximum score was 454. The mean of the listening domain was 287.56, the median was 290.00, and the mode is 266. Because the mean is positioned to the left of the median, the distribution is negatively skewed with the left side of the distribution longer and fatter than the tail on the right side (Frankfort-Nachmias & Leon-Guerrero, 2018). The ACCESS speaking domain has a standard deviation of 54.901 which indicates test scores are spread out over a large range (342). Variance is 3014.134 which indicates that the data are very spread out from the mean. Skewness (-.631) indicates that the data is negatively skewed (George & Mallery, 2017). Kurtosis (.953) is positive which indicates that the distribution has a sharper peak than a normal curve and has slightly heavier tails

which is an indication of outliers (George & Mallery, 2017). Since the kurtosis is close to a normal curve (0) the indication is that there are few outliers. A skewness and kurtosis of ±1.0 is considered excellent for psychometric purposes, and the ACCESS speaking data is in that range (George & Mallery, 2017).

The following histogram (Figure 4.8) provides a visual analysis of the relationships on the speaking domain of the ACCESS. The histogram reflects normal distribution of variables as described above and skewness and kurtosis are not extreme. As a result, skewness and kurtosis are unlikely to affect correlations.

Figure 4.8

Histogram of ACCESS Speaking Domain Scale Score by Frequency



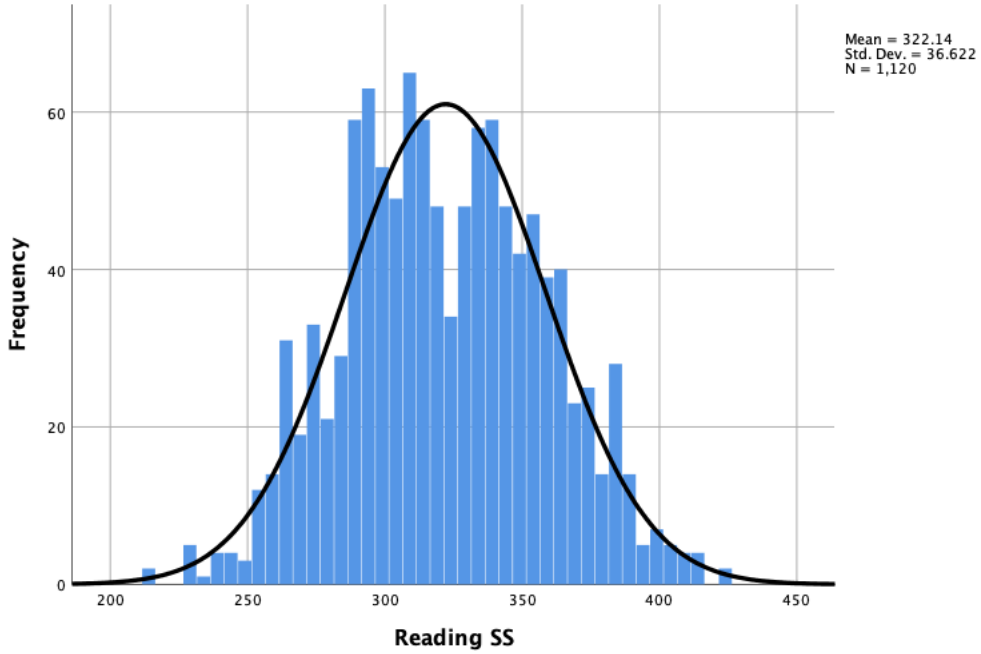
For the reading domain, the minimum student scale score was 214 and the maximum score was 423. The mean of the listening domain was 322.14, the median is 320.00, and the mode is 291. Because the mean is positioned to the right of the median,

the distribution is positively skewed with the right side of the distribution longer and fatter than the tail on the left side (Frankfort-Nachmias & Leon-Guerrero, 2018). The ACCESS reading domain has a standard deviation of 36.622 which indicates test scores are spread out over a small range (342). Variance is 1341.136 which indicates that the data are not very spread out from the mean. Skewness (.050) indicates that the data is approximately symmetric since the skewness is between -0.5 and 0.5, and is close to 0 (George & Mallery, 2017). Kurtosis (-.413) indicates that the distribution has a flatter peak than a normal curve and has less tails which is an indication of few outliers (George & Mallery, 2017). Since the kurtosis is close to a normal curve (0) the indication is that there are few outliers. A skewness and kurtosis of ±1.0 is considered excellent for psychometric purposes, and the ACCESS listening data is in that range (George & Mallery, 2017).

The following histogram (Figure 9) provides a visual analysis of the relationships on the reading domain of the ACCESS. The histogram reflects normal distribution of variables as described above and skewness and kurtosis are not extreme. As a result, skewness and kurtosis are unlikely to affect correlations.

Figure 4.9

Histogram of ACCESS Reading Domain Scale Score by Frequency



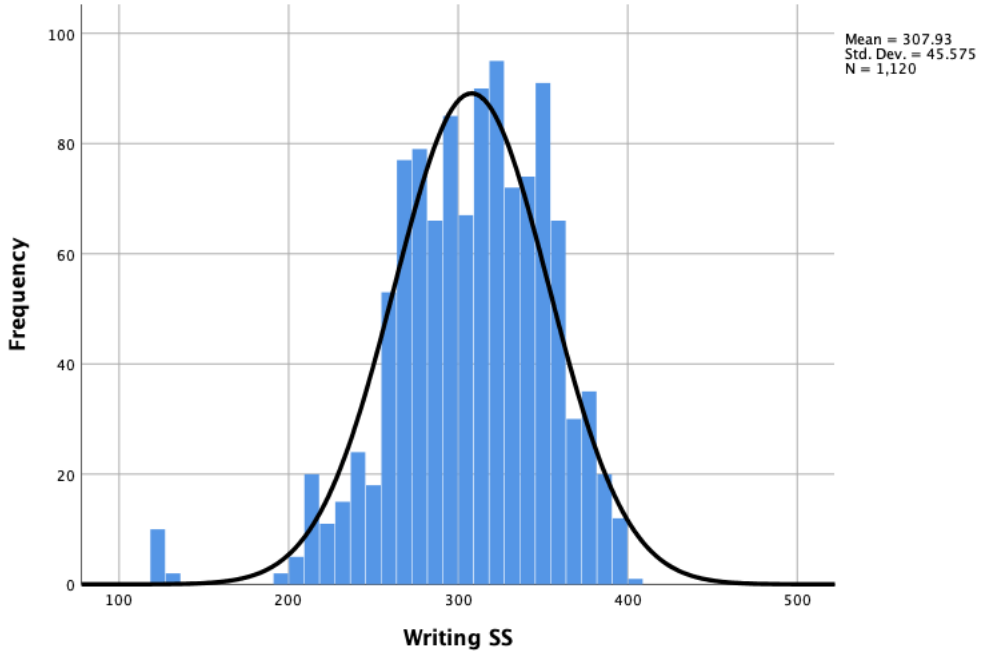
For the writing domain, the minimum student scale score was 122 and the maximum score was 404. The mean of the listening domain was 307.93, the median is 312.00, and the mode is 321. Because the mean is positioned to the left of the median, the distribution is negatively skewed with the left side of the distribution longer and fatter than the tail on the right side (Frankfort-Nachmias & Leon-Guerrero, 2018). The ACCESS reading domain has a standard deviation of 45.575 which indicates test scores are spread out over a large range (342). Variance is 2077.070 which indicates that the data are spread out from the mean. Skewness (-.791) indicates that the data is skewed left (George & Mallery, 2017). A skewness of ±1.0 is considered excellent for psychometric purposes, and the ACCESS listening data is in that range (George & Mallery, 2017). Kurtosis (1.612) indicates that the distribution has a higher peak than a normal curve and

has slightly heavier tails which is an indication of outliers (George & Mallery, 2017). A kurtosis of ±2.0 is considered acceptable for psychometric purposes, and the ACCESS listening data is in that range (George & Mallery, 2017).

The following histogram (Figure 4.10) provides a visual analysis of the relationships between variables as described above on the writing domain of the ACCESS. The histogram reflects normal distribution and skewness and kurtosis are not extreme. As a result, skewness and kurtosis are unlikely to affect correlations.

Figure 4.10

Histogram of ACCESS Writing Domain Scale Score by Frequency



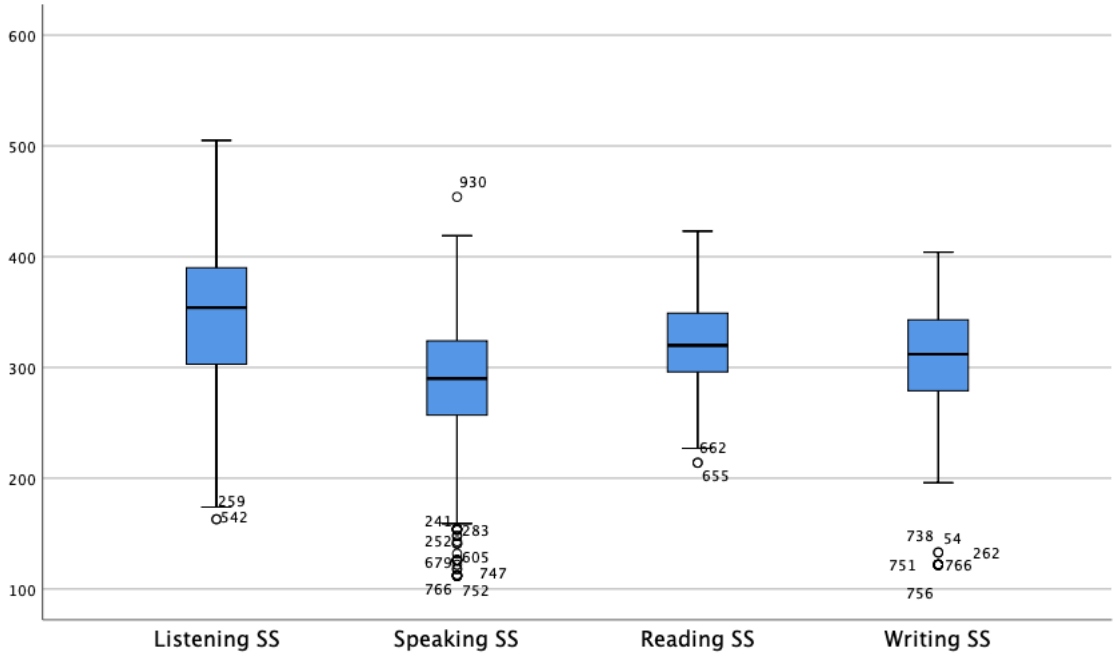
The data for each of the language domains on ACCESS was found to be consistent and normally distributed among the variables of listening, speaking, reading, and writing. This is illustrated in Table 4.8 and the previous paragraphs.

Data Screening

Prior to testing the hypothesis, the data was screened for missing data and univariate outliers. Both the NNAT test data and ACCESS test data and was provided in anonymized data sets. The NNAT data was provided in percentile rank form and the ACCESS data was provided in scale score form for each language domain. SPSS version 26 (IBM Corp., 2017) uses a boxplot to identify outliers. The boundaries of the box are Tukey's hinges. The median is identified by a line inside the box. The length of the box is the interquartile range (IQR) computed from Tukey's hinges. Values more than three IQRs from the end of a box are labeled as extreme, denoted with an asterisk (*). Values more than 1.5 IQRs but less than 3 IQRs from the end of the box are labeled as outliers with a circle (o) (Frankfort-Nachmias & Leon-Guerrero, 2018).

As previously stated, the NNAT assessment set did not have any outliers as shown in Figure 4.3. This was evident as there were not any cases denoted with an asterisk or circle. Again, this indicates that none of the cases are considered to be abnormal test scores for this population of students. Outliers were present in each of the ACCESS assessment language domain sets as shown in Figure 4.11. Each outlier is denoted with a circle (o). Each language domain is further discussed below.

Figure 4.11
Box and Whisker Plot of ACCESS Scale Score Outliers for the Language Domains



For the listening domain on ACCESS, cases were researched and found to contain valid and matched data for both assessments that fell into the extreme scoring ranges causing them to be identified as outliers. Although outliers were found that were more than 1.5 IQRs but less than 3 IQRs from the end of the box, no outliers were found that were outside of the absolute value of three standard deviations from the mean (Frankfort-Nachmias & Leon-Guerrero, 2018). This resulted in no student records being excluded from the sample population studied.

For the speaking domain on ACCESS, cases were researched and found to contain valid and matched data for both assessments that fell into the extreme scoring ranges causing them to be identified as outliers. Although outliers were found that were more than 1.5 IQRs but less than 3 IQRs from the end of the box, no outliers were found

that were outside of the absolute value of three standard deviations from the mean (Frankfort-Nachmias & Leon-Guerrero, 2018). This resulted in no student records being excluded from the sample population studied.

For the reading domain on ACCESS, cases were researched and found to contain valid and matched data for both assessments that fell into the extreme scoring ranges causing them to be identified as outliers. Although outliers were found that were more than 1.5 IQRs but less than 3 IQRs from the end of the box, no outliers were found that were outside of the absolute value of three standard deviations from the mean (Frankfort-Nachmias & Leon-Guerrero, 2018). This resulted in no student records being excluded from the sample population studied.

For the writing domain on ACCESS, cases were researched and found to contain valid and matched data for both assessments that fell into the extreme scoring ranges causing them to be identified as outliers. Although outliers were found that were more than 1.5 IQRs but less than 3 IQRs from the end of the box, no outliers were found that were outside of the absolute value of three standard deviations from the mean (Frankfort-Nachmias & Leon-Guerrero, 2018). This resulted in no student records being excluded from the sample population studied.

Assumptions Testing

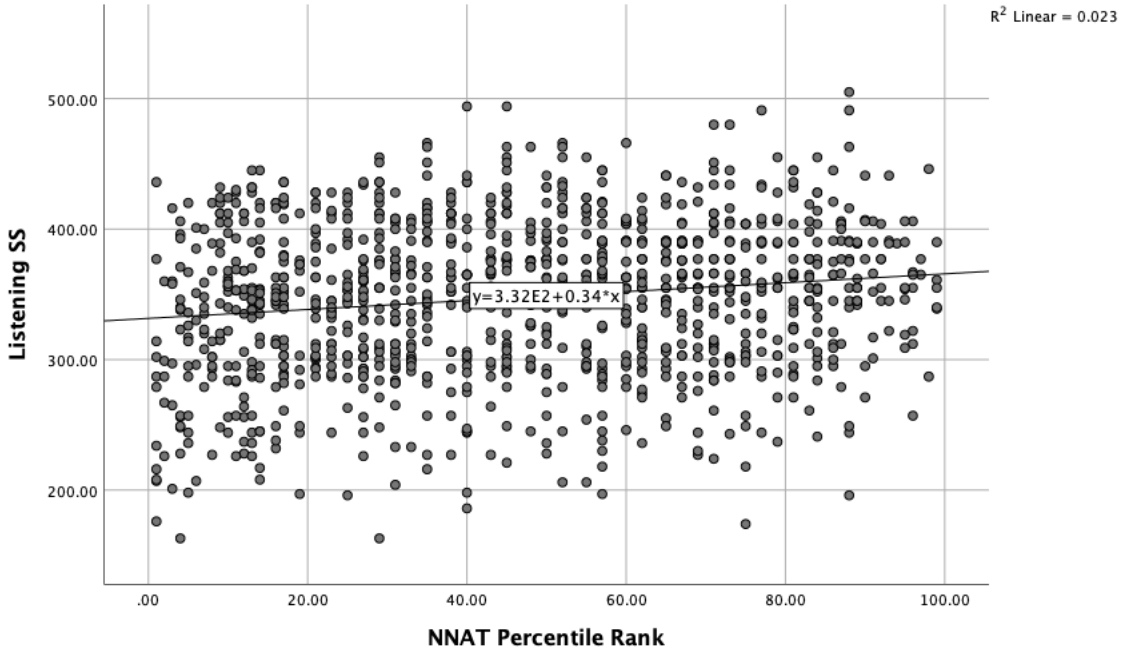
To address the research questions, appropriate statistical assumption testing was completed to ensure that a Pearson correlation could be used to analyze the data for null

hypothesis two. The variables were assessed for univariate normality, linearity, and homoscedasticity.

Test for Linearity. Since research question two also used a Pearson correlation coefficient to test the null hypothesis, a scatterplot was constructed to ensure that the two variables were linearly related (Nolan & Heinzen, 2014). A scatterplot was constructed with the NNAT and each of the four language domains. Figures 4.12 – 4.15 shows the results of the linearity test for the variables of NNAT percentile rank and each ACCESS language domain scale score. Linearity for each scatterplot is discussed below.

Figure 4.12.

Test for Linearity Between ACCESS Listening Scale Score and NNAT Percentile Rank

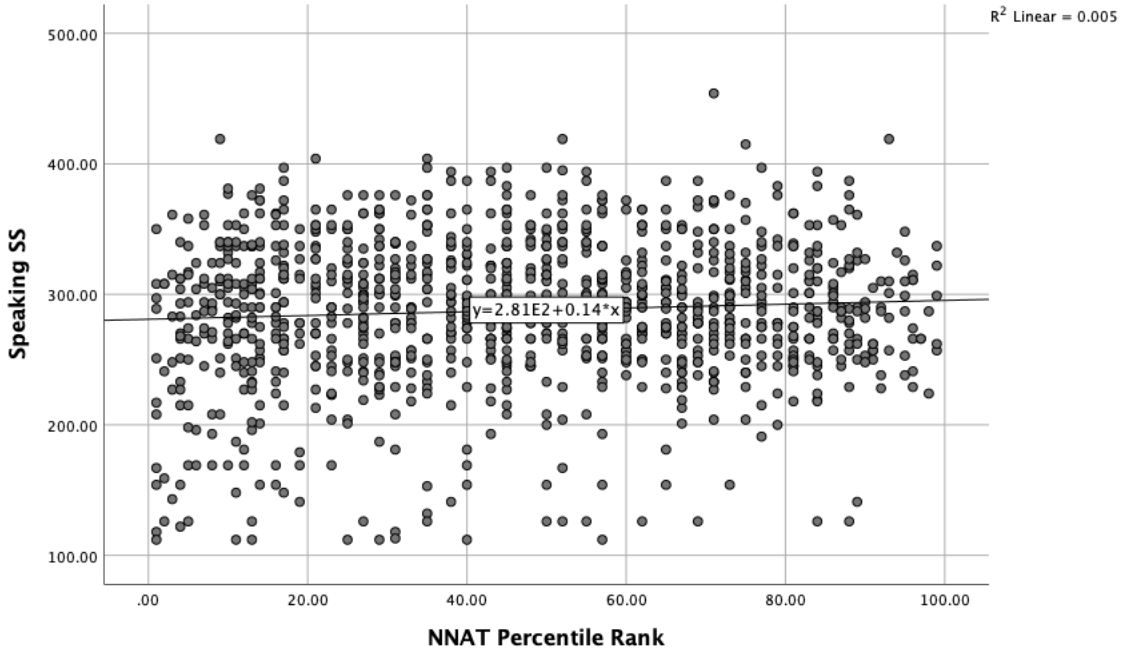


In Figure 4.13, the results for the linearity test for the variables of NNAT percentile rank and ACCESS listening domain scale score are shown. The figure shows that the assumption of linearity was met due to the linear movement of the data along the

line of best fit (Warner, 2013). This representation confirms bivariate normal distribution with a strong presence of homoscedasticity. Pearson's product-moment correlation provides the necessary stability for valid data interpretation and analyses to address hypothesis two (Gall et al., 2007).

Figure 4.13

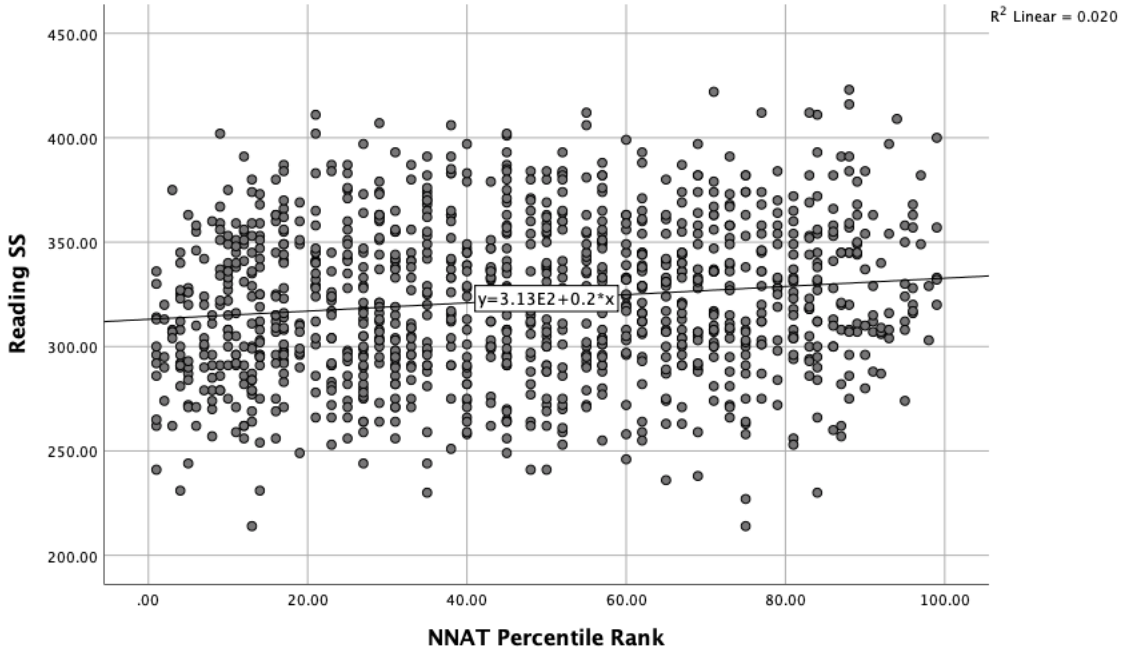
Test for Linearity Between ACCESS Speaking Scale Score and NNAT Percentile Rank



In Figure 4.14, the results for the linearity test for the variables of NNAT percentile rank and ACCESS speaking domain scale score are shown. The figure shows that the assumption of linearity was met due to the linear movement of the data along the line of best fit (Warner, 2013). This representation confirms bivariate normal distribution with a strong presence of homoscedasticity. Pearson's product-moment correlation provides the necessary stability for valid data interpretation and analyses to address hypothesis two (Gall et al., 2007).

Figure 4.14

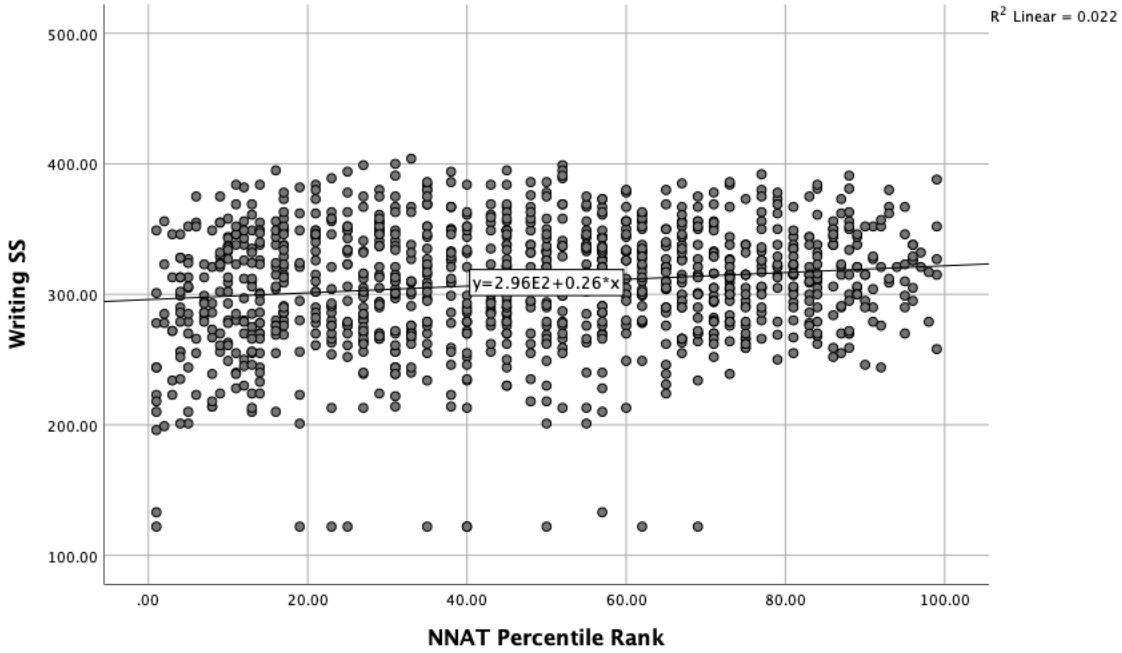
Test for Linearity Between ACCESS Reading Scale Score and NNAT Percentile Rank



In Figure 4.15, the results for the linearity test for the variables of NNAT percentile rank and ACCESS reading domain scale score are shown. The figure shows that the assumption of linearity was met due to the linear movement of the data along the line of best fit (Warner, 2013). This representation confirms bivariate normal distribution with a strong presence of homoscedasticity. Pearson's product-moment correlation provides the necessary stability for valid data interpretation and analyses to address hypothesis two (Gall et al., 2007).

Figure 4.15

Test for Linearity Between ACCESS Writing Scale Score and NNAT Percentile Rank



In Figure 4.16, the results for the linearity test for the variables of NNAT percentile rank and ACCESS writing domain scale score are shown. The figure shows that the assumption of linearity was met due to the linear movement of the data along the line of best fit (Warner, 2013). This representation confirms bivariate normal distribution with a strong presence of homoscedasticity. Pearson's product-moment correlation provides the necessary stability for valid data interpretation and analyses to address hypothesis two (Gall et al., 2007).

The variability of all ACCESS language domains (Figures 4.13 – 4.16) is low with the existence of a line of best fit. The figures show that the assumption of linearity was met, which is one of the three assumptions for correlation to be tested. Following a cumulative review of the scatterplots with the skewness and kurtosis for the four domains

of ACCESS of in regard to the assumption of linearity show the analyses to meet assumptions and linearity distributions were not violated.

Test for Normality. Figures 4.7 – 4.10, along with the descriptive statistics, demonstrated normal distribution of the four language domain variables of listening, speaking, reading, and writing. In addition to the histograms displayed in Figures 4.7 – 4.10, a Shapiro Wilk test of normality was also used to test the normality of the data. The results of the Shapiro Wilk tests are displayed in Table 4.9.

Table 4.9

Shapiro Wilk Tests of Normality for ACCESS Language Domain Scale Scores

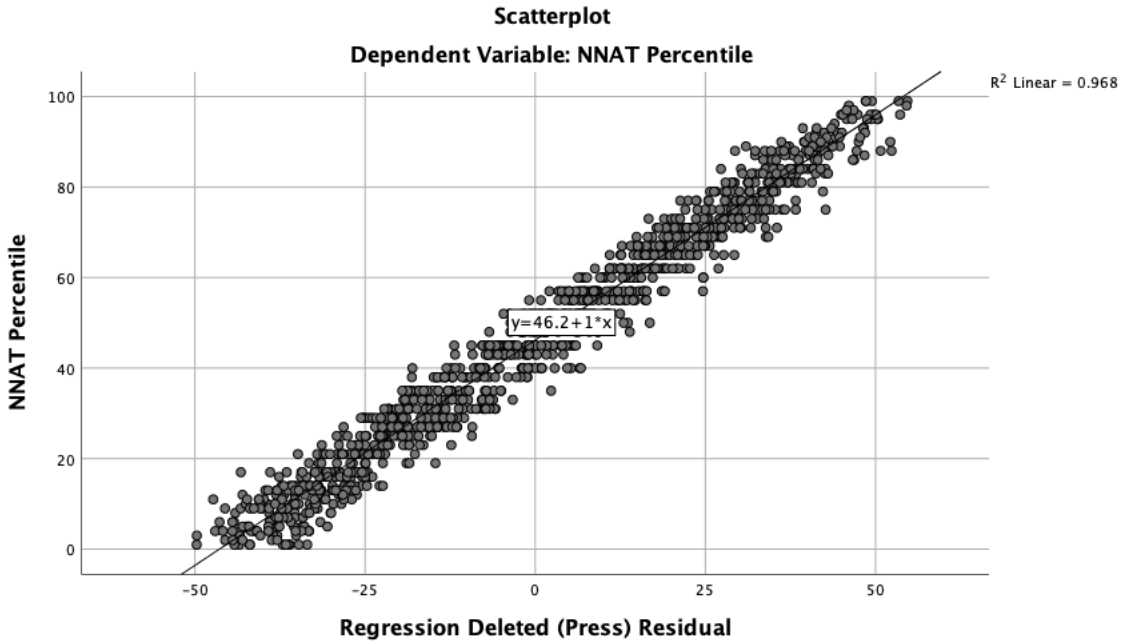
Variable	Shapiro Wilk	df	Sig.
Listening scale score	.988	1120	.000
Speaking scale score	.971	1120	.000
Reading scale score	.995	1120	.002
Writing scale score	.963	1120	.000

The Shapiro Wilk test of normality showed that the Sig. value was less than the alpha level ($p \geq 0.05$) for normality in the analysis of the ACCESS language domain scale scores. A *p*-value of less than the stated alpha level indicates that the population deviates from a normal distribution (Warner, 2013). Although the assumption of normality was not met using the Shapiro-Wilk test, the assumption of normality was met using skewness and kurtosis as shown in the histograms in Figures 4.7 – 4.10. Following

a cumulative review of the histograms with the outcomes of the Shapiro Wilk tests regarding the assumption of normality show that the analyses to meet assumptions and normality distributions were not violated.

Test for Homoscedasticity. In statistics, a sequence of random variables is homoscedastic if all its random variables have the same finite variance. This is also known as homogeneity of variance. The complementary notion is called heteroscedasticity. Data should show homoscedasticity to run a Pearson product-moment correlation. Homoscedasticity is shown in Figure 4.16 because the variances along the line of best fit remain similar as the data moves along the line.

Figure 4.16
Test for Homoscedasticity



Homoscedasticity was also tested using Levene's Test of Homogeneity of Variances. Population variances are not equal if Sig. ≤ 0.05. Levene's test showed that

the variances for NNAT scores and ACCESS domain scores were not equal (Figure 4.10). After analyzing skewness and kurtosis and finding nothing unusual, the assumption of homoscedasticity was met (George & Mallery, 2017).

Table 4.10
Levene's Test for ACCESS Language Domain Scale Scores

Variable	Levene Statistic	df1	df2	Sig.
Listening scale score	1.493	59	1059	.011
Speaking scale score	1.493	59	1059	.014
Reading scale score	1.386	59	1059	.020
Writing scale score	1.674	59	1059	.001

Results for Null Hypothesis Two

Null hypothesis two stated, "There is no statistically significant relationship between the four language domains of the ACCESS for ELLs (listening, speaking, reading, and writing) and general intellectual ability as measured by the NNAT in English language learner students." As assumption tests were satisfied, the analyses of relationships between the NNAT percentile rank and the ACCESS for ELLs scale score for each domain were studied using the Pearson product-moment correlation in the statistical software SPSS version 26 (IBM Corp., 2017). The results of the analyses are listed in Table 4.11.

Results indicated there was a weak positive relationship between the NNAT and the ACCESS for ELLs domain scores. For the listening domain, the relationship was determined to be a statistically weak positive relationship, Pearson's $r = .153$, $p \leq 0.001$.

For the speaking domain, the relationship was determined to be a statistically weak positive relationship, Pearson's r = .069, $p \leq 0.001$. For the reading domain, the relationship was determined to be a statistically weak positive relationship, Pearson's r = .141, $p \leq 0.001$. For the writing domain, the relationship was determined to be a statistically weak positive relationship, Pearson's r = .149, $p \leq 0.001$. The results are shown in Table 4.11.

Table 4.11

Correlational Analysis of NNAT and ACCESS Domain Scale Scores (SS)

Variables		Listening SS	Speaking SS	Reading SS	Writing SS
NNAT percentile	Pearson Correlation	.153**	.069*	.141**	.149**
	Sig. (2-tailed)	.000	.020	.000	.000
	N	1120	1120	1120	1120

Based on these analyses, the null hypothesis for research question two was rejected. The data analysis showed a weak positive relationship between the variables. This study has shown that there is a statistically positive correlation between the performance of ELLs on the NNAT and the ACCESS domain scores for ELLs.

Research Question Three

RQ3: What is the relationship between language proficiency growth as measured by the ACCESS for ELLs English language proficiency assessment and general intellectual ability as measured by the NNAT in English language learner students?

Descriptive Statistics

For research question three, 165 students had data analyzed, 74 female and 91 male with a 10.4% difference between male and female. All 165 students had Hispanic listed as their race/ethnicity. The number of students by grade listed for students in the 2018-2019 school year was 88 (53.3%) of students in 6th grade, and 77 (46.7%) of students in 7th grade. The amount of students by grade is comparable in the middle school grades with 6.6% difference between the two grades. Each student had two test scores for both the NNAT and ACCESS. These demographic statistics are reported in Table 4.12.

Table 4.12

Frequencies of Descriptive Statistics

	Gender		2018-2019 Grade		Race
Descriptive	Female	Male	6	7	Hispanic
Frequency	74	91	88	77	165
Percent	44.8	55.2	53.3	46.7	100.0

The two variables examined for this research question are language growth on ACCESS as the independent variable and NNAT percentile and as the dependent variable. As stated in chapter three, a residual gain score was determined to be the best method for representing language growth on ACCESS. The residual gain score was

calculated by running a linear regression using the second time point as the dependent variable and the first time point as the independent variable.

In order to examine the consistency and normality of the data for each variable, the mean, median, mode, standard deviation, variance, skewness, kurtosis, and range for both NNAT time point two and ACCESS residual gain data were analyzed. The statistic for the NNAT time point two Percentile Rank is illustrated in Table 4.13.

Table 4.13
Descriptive Statistics for NNAT Time Point Two and ACCESS Residual Gain

Statistic		NNAT Time 2 Score	ACCESS Residual Gain
N Statistic		165	165
Range Statistic		89.000	106.375
Minimum Statistic		1.00	-62.154
Maximum Statistic		90.00	44.220
Mean Statistic		37.697	.000
Std. Deviation Statistic		22.625	21.354
Variance Statistic		511.895	456.003
Skewness	Statistic	.331	-.571
	Std. Error		
Kurtosis	Statistic	-.885	.261
	Std. Error		

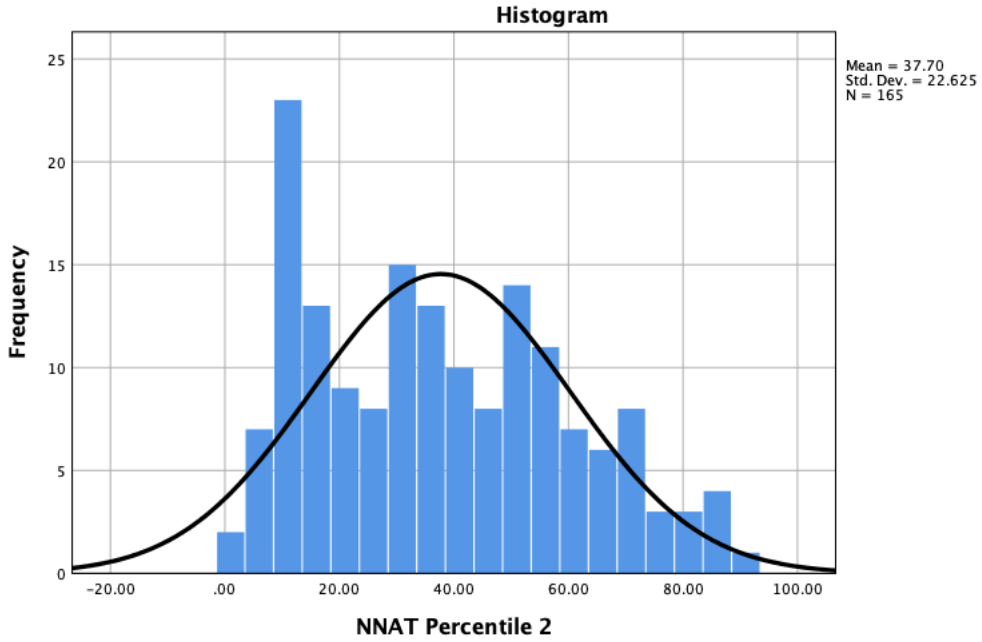
The minimum student score on the NNAT was 1 and the maximum score was 90. The mean of the NNAT is 37.697, the median is 45.00, and the mode is 52.000. Because the mean is positioned to the right of the median, the distribution is positively skewed (Frankfort-Nachmias & Leon-Guerrero, 2018). This indicates that there is a greater number of values below the mean (George & Mallery, 2017). A skewness of ±1.0 is considered excellent for psychometric purposes, and the skewness of the NNAT data

(.331) is in that range (George & Mallery, 2017). NNAT has a standard deviation of 22.625 which indicates test scores are spread out over a large range (89). Variance is 511.895 which indicates that the data are very spread out from the mean. Skewness (.331) is approximately symmetric since the skewness is between -0.5 and 0.5 (Frankfort-Nachmias & Leon-Guerrero, 2018). Kurtosis (-.885) indicates that the distribution is flatter than a normal curve and light-tailed, which indicates that the data does not have outliers. A kurtosis of ±1.0 is considered excellent for psychometric purposes, and the kurtosis of -.885 is in that range (George & Mallery, 2017).

The following histogram (Figure 4.17) provides a visual analysis of the relationships between variables on the NNAT second time point. The histogram reflects normal distribution and skewness is not extreme and as a result is unlikely to affect correlations. For the second time point on the NNAT, the data was found to be consistent as is evidenced by the standard deviation remaining consistent among variables.

Figure 4.17

Histogram of NNAT Time Point Two Percentile Rank Score by Frequency



The ACCESS residual gain score was also examined for the consistency and normality of the data using the mean, median, mode, standard deviation, variance, skewness, kurtosis, and range. The statistics are listed in Table 4.13.

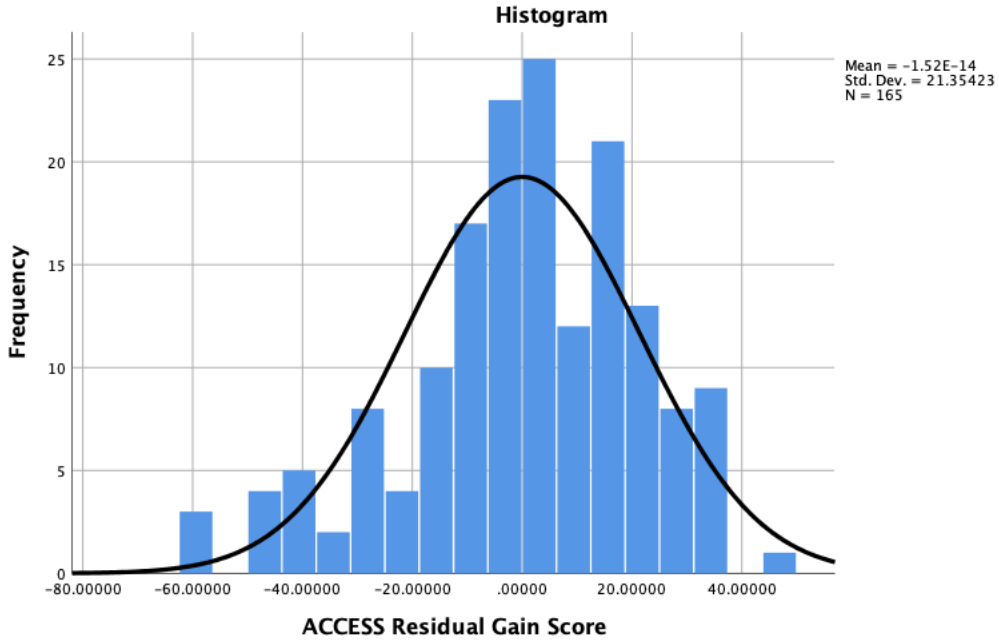
The minimum ACCESS residual gain score was -62.154 and the maximum score was 44.220. The mean of the NNAT is .000, the median is 1.664, and the mode is 13.046. Because the mean is positioned to the left of the median, the distribution is negatively skewed (Frankfort-Nachmias & Leon-Guerrero, 2018). This indicates that there is a greater number of values above the mean (George & Mallery, 2017). A skewness of ±1.0 is considered excellent for psychometric purposes, and the skewness of the ACCESS residual gain data (-.571) is in that range (George & Mallery, 2017). ACCESS residual gain has a standard deviation of 21.354 which indicates test scores are spread out over a

large range (106.375). Variance is 456.003 which indicates that the data are very spread out from the mean. Skewness (-.571) is approximately symmetric since the skewness is between -0.5 and 0.5 (Frankfort-Nachmias & Leon-Guerrero, 2018). Kurtosis (.261) indicates that the distribution is more peaked than a normal curve and heavy-tailed, which indicates that the data has outliers. A kurtosis of ±1.0 is considered excellent for psychometric purposes, and the kurtosis of .261 is in that range (George & Mallery, 2017).

The following histogram (Figure 4.18) provides a visual analysis of the relationships on the ACCESS residual gain data. The histogram reflects normal distribution and skewness is not extreme. As a result, skewness and kurtosis are unlikely to affect correlations. For the ACCESS residual gain score, the data was found to be consistent and is evidenced by the standard deviation remaining consistent among the variables.

Figure 4.18

Histogram of ACCESS Residual Gain Score by Frequency



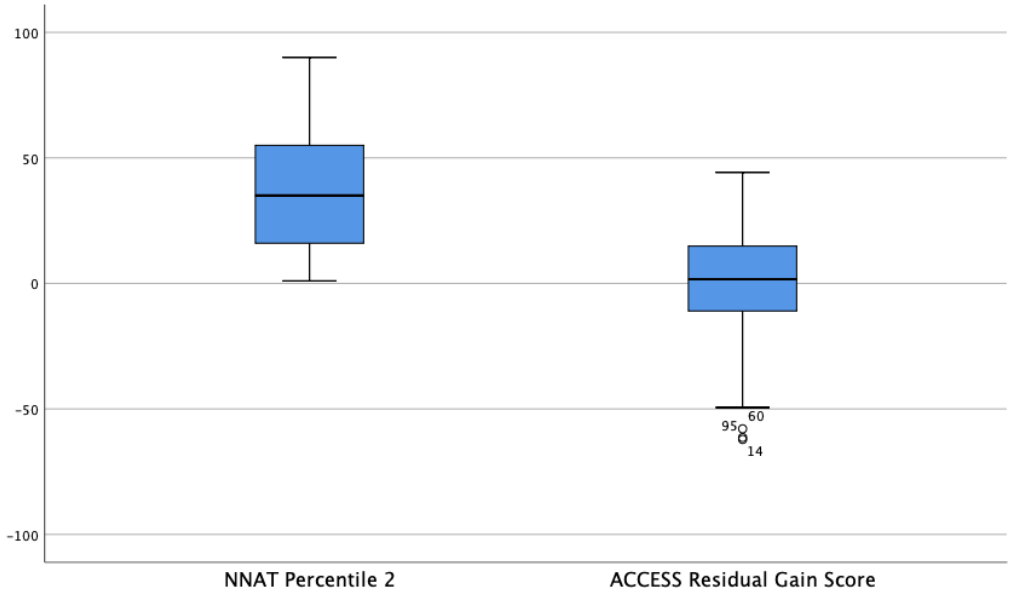
Data Screening

Prior to testing the hypothesis, the data was screened for missing data and univariate outliers. Both the NNAT test data and ACCESS test data and was provided in anonymized data sets. The NNAT data was provided in percentile rank form and the ACCESS data was provided in scale score form. SPSS version 26 (IBM Corp., 2017) uses a boxplot to identify outliers. The boundaries of the box are Tukey's hinges. The median is identified by a line inside the box. The length of the box is the interquartile range (IQR) computed from Tukey's hinges. Values more than three IQRs from the end of a box are labeled as extreme, denoted with an asterisk (*). Values more than 1.5 IQRs but less than 3 IQRs from the end of the box are labeled as outliers with a circle (o) (Frankfort-Nachmias & Leon-Guerrero, 2018).

Outliers were present in both the NNAT growth data set and the ACCESS growth data set as shown in Figure 4.19. The outliers are denoted in the boxplots with a circle (o). Cases were researched and found to contain valid and matched data for both assessments that fell into the extreme scoring ranges causing them to be identified as outliers. Although outliers were found that were more than 1.5 IQRs but less than 3 IQRs from the end of the box, no outliers were found that were outside of the absolute value of three standard deviations from the mean (Frankfort-Nachmias & Leon-Guerrero, 2018). This resulted in no student records being excluded from the sample population studied.

Figure 4.19

Box and Whisker Plot of NNAT Time Point Two Percentile Rank Scores and ACCESS Residual Gain Score Outliers



Assumptions Testing

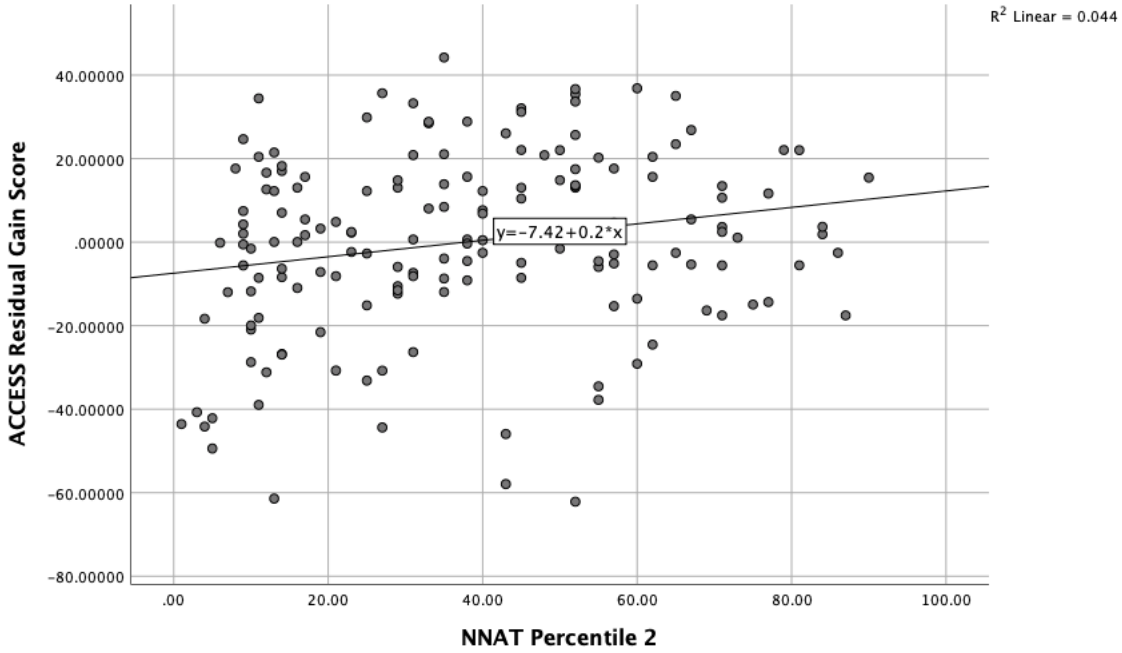
To address the research questions, appropriate statistical assumption testing was completed to ensure that a Pearson correlation could be used to analyze the data for null

hypothesis one. Assumptions are the required characteristics from a sampled population in order to make accurate inferences (Nolan & Heinzen, 2014). The variables were assessed for univariate linearity, normality, and homoscedasticity.

Test for Linearity. Because the Pearson correlation coefficient quantifies a linear relationship between two variables, a scatterplot is first constructed to ensure that the association between the two variables is linear (Nolan & Heinzen, 2014). Figure 4.20 shows the results of the linearity test for the variables of NNAT percentile rank and ACCESS overall scale score. The figure shows that the assumption of linearity was met due to the linear movement of the data along the line of best fit (Warner, 2013). This representation confirms bivariate normal distribution with a strong presence of homoscedasticity. Pearson's product-moment correlation provides the necessary stability for valid data interpretation and analyses to address hypothesis one (Gall et al., 2007).

Figure 4.20

Test for Linearity with the Variables of NNAT Growth and ACCESS Growth



Test for Normality. As stated previously, histogram 4.17 indicated normal distribution for the NNAT time point two data and histogram 4.18 indicated normal distribution for the ACCESS residual gain data for research question three. In addition to the histograms displayed in Figures 4.17 and 4.18, a Shapiro Wilk test of normality was also used to test the normality of the data. The results of the Shapiro Wilk tests are displayed in Table 4.14. The Shapiro Wilk test of normality showed that the *p*-value was less than the alpha level ($p \leq 0.005$) for normality in the analysis of the NNAT percentile rank and ACCESS overall scale score. A *p*-value of less than the stated alpha level indicates that the population violates the null hypothesis that the data is normally distributed (Warner, 2013).

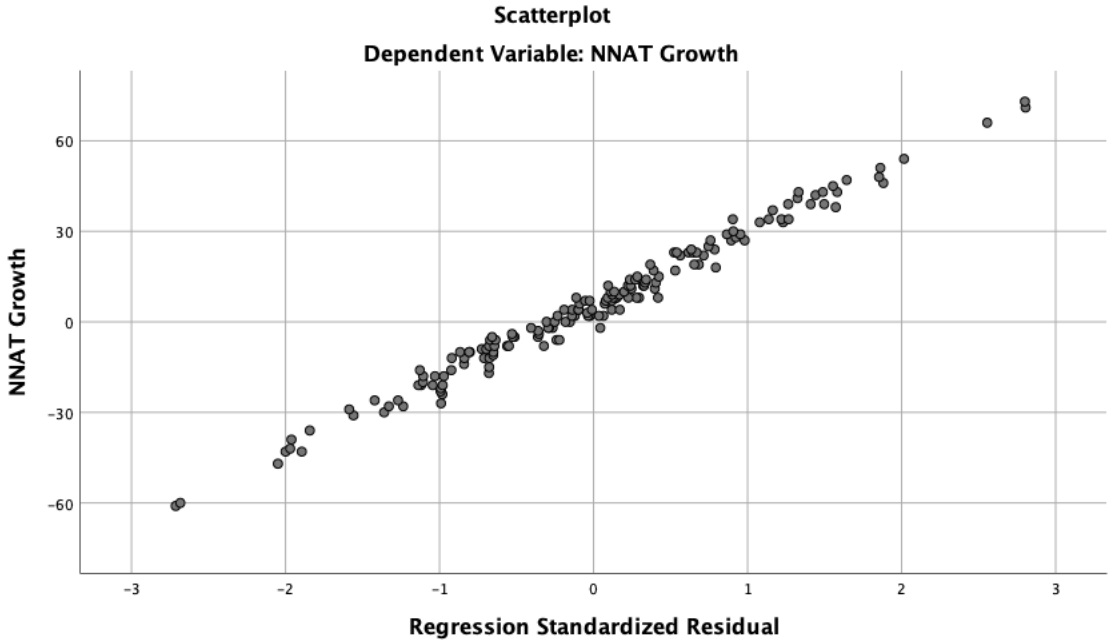
Table 4.14
Shapiro Wilk Tests of Normality for NNAT Percentile Rank and ACCESS Residual Gain Score

Variable	Shapiro Wilk	df	Sig.
NNAT percentile rank	.993	165	.626
ACCESS overall residual gain score	.981	165	.038

Following a cumulative review of the histograms with the outcomes of the Shapiro Wilk tests in regard to the assumption of normality show the analyses to meet assumptions and normality distributions were not violated.

Test for Homoscedasticity. In statistics, a sequence of random variables is homoscedastic if all its random variables have the same finite variance. This is also known as homogeneity of variance. The complementary notion is called heteroscedasticity. Data should show homoscedasticity to run a Pearson product-moment correlation. Homoscedasticity is shown in Figure 4.21 because the variances along the line of best fit remain similar as the data moves along the line.

Figure 4.21
Test for Homoscedasticity



Homoscedasticity was also tested using Levene's Test of Homogeneity of Variances. Population variances are not equal if Sig. ≤ 0.05. Levene's test showed that the variances for NNAT scores and ACCESS domain scores were not equal, F = 1.866, p = .008 (Figure 4.15). After analyzing skewness and kurtosis and finding nothing unusual, the assumption of homoscedasticity was met (George & Mallery, 2017).

Table 4.15
Levene's Test of NNAT Time Point Two and ACCESS Overall Residual Gain Score

Variable	Levene Statistic	df1	df2	Sig.
ACCESS overall residual gain score	1.866	34	117	.008

Results for Null Hypothesis Three

Null hypothesis three stated, "There is no statistically significant relationship between language proficiency growth and general intellectual ability in English language learner students." As assumption tests were satisfied, the analyses of relationships between the NNAT time point two percentile rank and the ACCESS for ELLs residual gain score were studied using the Pearson product-moment correlation in the statistical software SPSS version 26 (IBM Corp., 2017). The results of the analyses are listed in Table 4.16. Results indicated there was a weak positive relationship between the NNAT and the ACCESS for ELLs. This relationship was determined to be a statistically weak positive relationship, Pearson's $r = .209$, $p \leq 0.001$ (Table 4.16).

Table 4.16

Correlational Analysis of NNAT Time Point Two and ACCESS Residual Gain Score

Variables	Pearson Correlation	Sig. (2-tailed)	N
NNAT percentile rank and ACCESS scale score residual gain score	.209**	.007	165

Based on these analyses, the null hypothesis for research question three was rejected. The data analysis showed a weak positive relationship between the variables. This study has shown that there is a statistically positive correlation between the performance growth of ELLs on the NNAT and the ACCESS domain scores for ELLs.

Research Question Four

RQ4: How do demonstrated relationships among English language proficiency as measured by the ACCESS for ELLs English language proficiency assessment and general intellectual ability as measured by the NNAT inform gifted identification in English language learner students?

Results for Null Hypothesis Four

For research questions one, two, and three descriptive statistics were analyzed to determine the consistency and normality of the data set for each question. The data was screened for missing data and outliers and assumptions testing was completed in order to ensure that a Pearson correlation could be used to analyze the data for null hypotheses one, two, and three. Assumptions were satisfied and a Pearson correlation coefficient was used to reject null hypotheses one, two, and three. The Pearson correlation coefficient for each research question is listed in table 4.17.

Table 4.17

Correlational Analysis of Research Questions One, Two, and Three

Research Question	Variables	Pearson Correlation	Sig. (2-tailed)	N
1	NNAT percentile rank and ACCESS scale score	.193**	.000	1741
2	NNAT percentile rank and ACCESS Listening scale score	.153**	.000	1120
2	NNAT percentile rank and ACCESS	.069**	.000	1120

	Speaking scale score			
2	NNAT percentile rank and ACCESS Reading scale score	.141**	.000	1120
2	NNAT percentile rank and ACCESS Writing scale score	.149**	.000	1120
3	NNAT percentile rank and ACCESS scale score residual gain score	.209**	.007	165

There was a positive correlation between NNAT percentile rank and ACCESS scale score, r = 0.193, n = 1741, p = .000. There was a positive correlation between NNAT percentile rank and ACCESS listening scale score, r = 0.153, n = 1120, p = .000. There was a positive correlation between NNAT percentile rank and ACCESS speaking scale score, r = 0.069, n = 1120, p = .000. There was a positive correlation between NNAT percentile rank and ACCESS reading scale score, r = 0.141, n = 1120, p = .000. There was a positive correlation between NNAT percentile rank and ACCESS writing scale score, r = 0.149, n = 1120, p = .000. There was a positive correlation between NNAT percentile rank and ACCESS scale score, r = 0.209, n = 165, p = .007.

As stated in Chapter Three, since a correlation coefficient of 0.50 is considered a large correlation (Cohen, 1988, as cited in Nolan & Heinzen, 2014) the correlation

coefficient of $r \geq 0.5$ and a significance of $p \leq 0.001$ was used to determine if there is a significant statistical relationship between variables in research questions one, two, and three. Null hypothesis four stated, "Demonstrated relationships among English language proficiency as measured by ACCESS for ELLs English language proficiency assessment and general intellectual ability as measured by the NNAT do not inform gifted identification in English language learner students." Based on the correlation coefficients for each research question, the null hypothesis was accepted. Although the significance of each correlation, with the exception of research question three, was ≤ 0.001, all correlation coefficients were less than the stated value of 0.5 and therefore are not considered a large correlation.

Summary

This study examined the performance of English language learner students on the NNAT test and the ACCESS for ELLs. The study set out to determine if there was a relationship between general intellectual ability and English language proficiency for the purpose of gifted identification. Additionally, the study set out to determine if the domains of language as measured by ACCESS, listening, speaking, reading, and writing, had a strong relationship to general intellectual ability.

Data was found to be consistent as evidenced by the standard deviations following a consistent form among the variables. Normality, skewness, and kurtosis of the data was observed via histograms and the Shapiro Wilk tests. Linearity was assessed by a scatter dot plot. The data was confirmed to have met all assumption testing. Null hypothesis one

was rejected. This indicates that there is a statistically positive correlation between general intellectual ability and English language ability. Null hypothesis two was rejected. This demonstrates a statistically positive correlation between general intellectual ability and the domains of language as measured by ACCESS, listening, speaking, reading, and writing. Null hypothesis three was rejected. As such, there is statistically positive correlation between the performance growth of ELLs on the NNAT and the ACCESS domain scores for ELLs. Null hypothesis four was accepted. Demonstrated relationships between English language proficiency tests and general intellectual ability assessments do not inform gifted identification.

Chapter Five

Discussion and Implications

Overview

This study investigated the persistent problem of practice that ELLs are not identified for gifted programs at the same rate as their native English-speaking peers (Civil Rights Data Collection, 2016), despite the fact that equitable education is guaranteed for all students (Alexander, 2015). The purpose of this research study was to investigate the relationship among English language proficiency levels and general intellectual ability of English language learners for gifted identification. Because this study sought to investigate the relationship among variables, a quantitative research design was chosen. Further because the research investigated strength of relationship without the manipulation of variables, a correlational design was determined as the best fit for the research.

The research was conducted by examining the relationship between the variables of English language proficiency and general intellectual ability as delineated in the problem statement. NNAT Nonverbal Ability Test, the performance on the ACCESS for ELLs language proficiency test, the performance on the ACCESS for ELLs language domains, and the growth on the ACCESS for ELLs were the variables examined based on their reliability and validity as assessment instruments. They were examined to determine

if significance existed within the respective relationships as illustrated in the four research questions:

RQ1: What is the relationship between English language proficiency as measured by the ACCESS for ELLs English language proficiency assessment overall score and general intellectual ability as measured by the NNAT in English language learner students?

RQ2: What is the relationship between the four language domains of the ACCESS for ELLs (listening, speaking, reading, and writing) and general intellectual ability as measured by the NNAT in English language learner students?

RQ3: What is the relationship between language proficiency growth as measured by the ACCESS for ELLs English language proficiency assessment and general intellectual ability as measured by the NNAT in English language learner students?

RQ4: How do demonstrated relationships among English language proficiency as measured by the ACCESS for ELLs English language proficiency assessment and general intellectual ability as measured by the NNAT inform gifted identification in English language learner students?

The four research questions were chosen to align with the problem statement, purpose of this study, methodology, design, instrumentation, data collection, and analysis. A Pearson product moment correlation, recognized as the best method of measuring association, was used to examine the strength and direction of the relationship between variables. An ex

post facto design was used to collect existing data for investigation of the research questions.

This study intended to contribute to the body of knowledge around Vygotsky's (1978) Social Development theory and Piaget's (1952) Theory of Cognitive Development. It also sought to contribute to knowledge of the theories posited by Cummins (1979, as cited in Lewis et al., 2012) and Krashen (1982, as cited in Lewis et al., 2012). Another intention of this research was to fill in the gap in current research investigating the relationship between English language proficiency and general intellectual ability to supplement the parallel studies that exist to examine the relationship between either general intellectual ability and another measure, or English language proficiency and another measure.

Educational equity was used as the theoretical framework for this study. In Colorado, an increasing number of decisions around gifted identification and entrance into gifted programs are being made based upon standardized test performance. When exemptions or considerations are present related to these decisions, they are often based upon the speed of growth an English language learner has shown in language acquisition. The findings of this study may have powerful theoretical, practical, and future implications for policy around appropriateness and effectiveness of considerations made for identification. This chapter present conclusions, implications, and recommendations based on the research.

Discussion

The results of the study supported the hypothesis that there was a relationship between English language proficiency and general intellectual ability. This section presents the summary of findings for each research question based on the data analysis. This section also presents conclusions made as a result of the findings related to the significance of the study.

The results of the study supported the first hypothesis indicating that there was a relationship between the NNAT test of general intellectual ability and the ACCESS for ELLs language proficiency test. The relationship tested at a significance of $p \leq 0.001$, which indicates that the findings had a low probability of chance. The correlation itself indicated a negligible positive relationship, Pearson's $r = 0.193$ (Cohen, 1988, as cited in Nolan & Heinzen, 2014). Students who demonstrated higher levels of English language proficiency in reading on the ACCESS for ELLs language proficiency assessment also demonstrated higher levels of achievement in general intellectual ability on the NNAT, however, the relationship was weak.

Regarding the second hypothesis, the study showed that there was a positive relationship between the NNAT test of general intellectual ability and the ACCESS for ELLs language proficiency test language domains. The relationship for the domains of listening, reading, and writing tested at a significance of $p \leq 0.001$, which indicates that the findings had a low probability of chance. The relationship for the domain of speaking tested at a significance of $p \leq 0.020$, which is higher than the chosen alpha level but

lower than the typical p value of 0.05 indicating that the findings had a low probability of chance. The information provided by Lewis et al. (2012) states that students are generally proficient in the receptive domains of language, listening and reading, earlier than the productive domains of language, speaking and writing. Based on this research, the hypothesis was that the listening domain of the ACCESS would show the weakest correlation, followed by the reading domain, the speaking domain, and finally the highest correlation would be with the writing domain, but this was not the case.

The correlations of all domains in the second hypothesis indicated a negligible positive relationship. The weakest relationship was between the NNAT and the speaking domain, Pearson's $r = 0.069$ (Cohen, 1988, as cited in Nolan & Heinzen, 2014). The relationship between the reading domain was also weak, Pearson's $r = 0.141$ (Cohen, 1988, as cited in Nolan & Heinzen, 2014). For the writing domain, Pearson's $r = .141$, and for the listening domain, Pearson's $r = .153$. Students who demonstrated higher levels of English language proficiency in the speaking, reading, writing, and listening domains on the ACCESS for ELLs language proficiency assessment also demonstrated higher levels of achievement in general intellectual ability on the NNAT.

For the third hypothesis, the relationship between the NNAT percentile rank and the ACCESS residual gain score tested at a significance of $p \leq 0.007$, which is higher than the chosen alpha level but lower than the typical p value of 0.05, which indicates that the findings had a low probability of chance. The correlation itself indicated a weak positive relationship, Pearson's $r = 0.209$ (Cohen, 1988, as cited in Nolan & Heinzen,

2014). Students who demonstrated higher levels of growth on the ACCESS for ELLs English language proficiency assessment also demonstrated higher levels of achievement in general intellectual ability on the NNAT, however, the relationship was weak.

Research question four investigated how demonstrated relationships among English language proficiency and general intellectual ability inform gifted identification for ELLs. For this research question, the correlation coefficients for research questions one, two, and three were analyzed using Cohen's (1988, as cited in Nolan & Heinzen, 2014) assertion that 0.50 is a large correlation. When the correlation coefficients were compared to the standard of 0.50, correlation coefficients for all three research questions were below this benchmark. Thus, the null hypothesis was accepted that demonstrated relationships between English language proficiency and general intellectual ability to not inform gifted identification.

The study produced four primary findings related to ELLs and their performance on the NNAT Nonverbal Ability Test. The first finding was that there is a relationship between the English language proficiency on the ACCESS for ELLs language proficiency and student performance on the NNAT Nonverbal Ability Test. As discussed in the literature review in Chapter Two, there are two developmental theories that discuss the relationship between language development and cognition.

Piaget's (1952) four stage model of how the mind processes new information encountered is called the Theory of Cognitive Development. All children pass through every stage in the same order, but at different rates (Piaget, 1952). Piaget's proposition

that students can pass through stages of cognitive development more quickly aligns with the gifted characteristic that students are able to retain unusually large amounts of information allowing them to master content more quickly (Callahan, 2018). Gifted ELLs specifically are able to acquire a second language more rapidly (Felder et al., 2015).

Vygotsky (1987) believed that social interaction holds an essential role in cognitive development. Since language and cognition both develop through social interactions, language plays a critical role in cognitive development (Vygotsky, 1962). This supports the characteristic of gifted ELLs that have a mature sense of culture and language (Felder et al., 2015). The fact that there is a relationship supports the work of these two theorists and the definition of characteristics of ELLs. The relationship means that as a student's proficiency in the English language increased, so did their achievement score on the NNAT Nonverbal Ability test. As such, the lower proficiency in English a student had, the lower they scored on the NNAT Nonverbal Ability test. However, since the relationship was weak, there is a lower likelihood of a significant relationship between the two variables. This finding confirms that language should be valued as a characteristic of giftedness.

The research presented supports that there is not only a relationship between language ability and cognition, but also the speed at which language is acquired is also an indicator of cognitive ability (Callahan, 2018). Research question three confirmed the assertion that as language ability increases, cognitive ability increases (Felder et al., 2015; Krashen, 1987; Lewis et al., 2012; Piaget, 1952; Vygotsky, 1978). Again, the

relationship was weak so there is a lower likelihood that the relationship between the two variables is significant. This finding confirms that language growth should be valued as a characteristic of giftedness.

Another finding of this study was that there was relationship between the four domains of language as measured by the ACCESS for ELLs and general intellectual ability as measured by the NNAT. This research question sought to support the claim that more cognitively abstract thinking is demonstrated through the language domain of writing (Carillo, 2017; Cummins, 1979, as cited in Lewis et al., 2012; Tinberg, 2015). However, the strongest correlation was between the listening domain score and general intellectual ability, $r = .153$, $p = .000$. The listening domain of language is considered to be in the category of Basic Interpersonal Communication Skills (BICS) which are cognitively undemanding and unspecialized (Cummins, 1979, as cited in Lewis et al., 2012).

The study determined that although there was a relationship between the four domains of language tested by the ACCESS for ELLs and the NNAT Nonverbal Ability Test, it was not a strong relationship. Many language theorists consider writing as a higher-level cognitive skill as it is needed to "apply, adapt, and transform knowledge across contexts" (Carillo, 2017). According to Tinberg (2015, p. 76), "cognition refers to the acquisition and application of knowledge through complex mental processes … but the effective accomplishment of writing tasks over time requires even more." Lewis, Rivera, and Roby (2012) state that students are typically proficient in the receptive

domains of language, listening and reading, earlier than the productive domains of language, speaking and writing again with the understanding that writing takes more cognitive ability to cultivate. During the five stages of language acquisition, writing is one of the last skills to develop (Lewis et al., 2012). Cummins (1979, as cited in Lewis et al., 2012), defined Cognitive Academic Language Proficiency (CALP), which is acquired through more cognitively demanding abstract thinking and is measured through the writing domain on the ACCESS for ELLs. These language theories led to the hypothesis that the domain of writing on the ACCESS for ELLs would have the strongest relationship between cognitive ability as measured by the NNAT, however, this was not the case.

The final finding resulting from this study: because there is not a significant relationship between the dependent variable of general intellectual ability and the independent variables of English language proficiency, the domains of language, or language growth, the ACCESS cannot be used for gifted identification. The correlation was not strong enough to indicate that the relationship should be further investigated for this specific language assessment to be a qualifying data point.

These findings result in several conclusions. First, ELLs need the appropriate support for language growth from their parents, teachers, and environment (Krashen, 1982, as cited in Lewis et al., 2012). One conclusion is that students are not receiving appropriate supports to show significant language achievement and growth on the ACCESS for ELLs. This could be related to the quality of language instruction, the

ability of teachers to provide that instruction, or the ability of parents to provide support in learning English. Quality of instruction could be a factor in the scores of reading and writing.

Another conclusion could be that the administration of the tests was not adequately supportive of ELLs. Although training exists to ensure that tests are administered in a similar manner, in is not known if all schools used the recommendation by CDE (2016) to give students a practice test before cognitive test administration to support unfamiliarity with test items. It is also not clear if students were encouraged to use test taking best practices like getting enough sleep the night before, eating a nutritious breakfast, arriving early, listening to directions, using all of the allotted time, and making sure to answer all of the questions. Teacher and student attitude could also have been a factor.

Implications

This section describes what will transpire as a result of the completion of this research. The implications are delineated in terms of what the research implies theoretically, practically, and for the future. Theoretical implications interpret the study in terms of the research questions and hypotheses that guided the study. This study used developmental theories of language and cognition (Cummins, 1979, as cited in Lewis et al., 2012; Krashen, 1982, as cited in Lewis et al., 2012; Piaget, 1952; Vygotsky, 1987) to further support the research design, methodology, and development of the research questions, so the implications for these theories will be discussed. Practical implications

delineate applications derived from the study in order to solve current problems. The overarching theory of Educational Equity (Manichander, 2016) was used to guide practical investigation of this study and will be discussed in relation to results and conclusions. Future implications describe implications for future research. A critical evaluation of the strengths and weaknesses of the study are included.

Theoretical Implications

Piaget's (1952) Theory of Cognitive Development outlines the four stages that children progress through as their mind processes new information encountered. Each stage of human cognition is influenced by language, and language depends on thought for development (Slobin, 1979). Language development can follow cognitive development, or cognitive abilities can be reflected through a child's speech (Slobin, 1979). Vygotsky (1987) asserted that the process of the transition of language from social speech to inner speech is a driver of cognitive development. According to these theories, there is a potential that as language ability increases, cognitive ability increases. As evidenced in the data, as ACCESS for ELLs English language proficiency scores increased as did their performance on the NNAT Nonverbal Ability test, but at a weak positive rate. The finding confirmed the validity of these theories.

Cummins' research (1979, as cited in Lewis et al., 2012) states that CALP requires more cognitively advanced thinking during such activities as reading and writing. BICS are cognitively undemanding and unspecialized and demonstrated during tasks where there is social interaction such as speaking and listening. The research

showed that the strongest correlation was between the domain of listening and general intellectual ability. The difference of .004, however, was negligible. The correlation between the speaking domain and general intellectual ability was .069 which confirms the Cummins' (1979, as cited in Lewis et al., 2012) assertion that social interaction is less cognitively demanding. The reading domain and writing domain had a correlation of .141 and .149 respectively. Their comparable correlations verify the more cognitively demanding nature of CALP as measured by the reading and writing domains of language.

The correlation between the residual gain score and general intellectual ability had the strongest relationship. The implications are that exposure to language has the greatest relationship with general intellectual ability. This confirms Krashen's (1987) input hypothesis that because ELPA (General Assembly of the State of Colorado, 2014) guarantees programs and educators that support English language development, second language acquisition is taking place. This verifies that second language instruction is essential in facilitating cognitive development.

Validating research behind the conceptions and definitions of giftedness in relationship to gifted ELLs (Felder et al., 2015) is also a goal of this research. This study confirmed that there is a relationship between the gifted characteristic of acquiring a second language rapidly (Felder et al., 2015) and general intellectual ability. This research also confirms the language-based characteristics of advanced language proficiency levels and learning multiple languages at an accelerated pace (Felder et al., 2015).

Practical Implications

This study set out to measure the fairness and inclusion of the gifted identification process on Colorado. This was done by investigating the challenges and barriers faced by ELLs and researching what additional supports could help overcome those barriers. The barrier identified in this study was standardized tests being used as entrance criteria into gifted programs. Standardized assessments are a struggle for ELLs because they have limited familiarity with the types of questioning and vocabulary used in standardized tests. The goal was to use ACCESS, a test designed for ELLs, to work within the confines of the gifted identification system that values the results of standardized tests. Because the correlation between ACCESS and NNAT did not meet the benchmark of $r \geq 0.5$, the conclusion is that ACCESS is not the standardized test needed to make the gifted identification process in Colorado equitable for ELLs.

One goal of the researcher is that findings impact community decisions and branch out to benefit entire districts and influence state policy. In Colorado, high stakes decisions are being made as a part of a larger accountability system identifying gifted students using standardized test scores. Cognitive and achievement tests are the most common tool used to not only recognize and identify gifted students, but to also develop their potential (Iowa Department of Education [IDOE] & The Connie Belin and Jacqueline N. Blank International Center for Gifted Education and Talent Development [Belin-Blank Center], 2008). The result is the underrepresentation of gifted and talented students (IDOE & Belin-Blank Center, 2008). In identification decisions, it is suggested

that other methods should supplement those standardized test scores (IDOE & Belin-Blank Center, 2008).

These results of the ACCESS not having a strong correlation with NNAT has practical implications. Although the researcher wanted a straightforward way to modify the assessments in the gifted identification system to make it fair and inclusive, the research was not able to confirm that ACCESS for ELLs should be that amendment. This has direct implications for policy. First, methods that are considered supplemental for the body of evidence in gifted identification need to be reevaluated and normed in a way that they are no longer supplemental. Checklists, inventories, teacher observation and rating scales, portfolios, performances, student educational profiles, and nomination forms need to be tested and normed for reliability to use for gifted identification. Limiting identification to narrow categories is excluding students from gifted identification, and thus, gifted programming. Although these instruments are considered subjective, they are recommended by the NAGC (n.d.-b) to be included in gifted identification. Performance on IQ or achievement tests are not enough to guarantee equitable identification for all populations (NAGC, n.d.-b).

If current policies and practices are not identifying the population of ELLs equitably, then there needs to be further exploration of the definition of giftedness. The definition of giftedness is directly tied to identification practices as the definition is the driver for identification instruments. Critics of achievement-based definitions argue that measures of current performance are biased and will not identify giftedness in students

from groups, while critics of the definitions based on potential contend that existing assessments do not predict gifted performance (Callahan, 2009). Although the consensus is that giftedness is a result of an interaction between these two factors, the innate and the environment (Callahan, 2009), and that multiple factors are involved in the development of giftedness over time (Marland, 1971), there is more focus on current achievement and not enough focus on potential that could be cultivated through an appropriate environment. The NAGC acknowledges that existing conceptions and definitions of giftedness focus too narrowly on cognitive ability and that the definition needs to include that talent development is a lifelong process (Callahan et al., 2018). It is time for educators to reevaluate this definition to support ELLs.

Further, gifted educators need to evaluate the purpose of gifted programming. "No matter what theoretical foundation or conceptual framework one uses to define giftedness, the end goal of K-12 gifted education is to provide students in need with some service or intervention that they would not otherwise receive" (Peters, 2017). If a child shows a need to be challenged, educators need not wait until a gifted identification is in place to begin providing appropriate programming (Peters, 2017). A label should not be an assurance of services or a gateway to access opportunity (Peters, 2017). If a gifted identification is preventing a child from accessing gifted programming, then we are not providing and equitable educational experience. Reevaluating the purpose of gifted programming would also support a new definition of giftedness that focuses in talent

development through a supportive environment that recognizes the multiple factors involved in the development of gifted characteristics.

In addition, the ACCESS for ELLs needs to be used as a data point for gifted identification. Although this research study did not prove that there was a strong correlation between English language ability and general intellectual ability, research studies have proven that there is a strong positive relationship between English language ability and scores on standardized achievement assessments. The literature review from this research study compiled existing studies that correlated English language proficiency with achievement (Grisso, 2018; McFann-Mora, 2016; Parker, et al., 2009; Pearson, 2015; Rios, 2018). Naglieri and Ronning (2000) provided evidence that there is a strong relationship between general intellectual ability and reading achievement. Parker et al. (2009) found that English language proficiency scores as measured by ACCESS for ELLs were significant predictors of content assessment outcomes as measured by NECAP. Pearson (2015) found that if ELLs reached level 5 on ACCESS then they did as well on MAP. McFann-Mora (2016) found that when ACCESS for ELLs overall scores increased, the reading and math scores increased. Finally, Grisso (2018) showed that there is a strong positive relationship between English language proficiency and academic achievement. If multiple conclusive studies show that the results on the ACCESS for ELLs correlates with approved achievement tests, then the ACCESS should be considered part of this category.

The results of this study showed that there was a relationship between growth on ACCESS and general intellectual ability. Thus, language instruction must be having a positive impact on cognitive development. If prominent cognitive and language theorists have shown that language drives cognitive development, then districts and teachers should focus on creating an environment that supports language development. This includes following the recommendations of Krashen (1987) and ensuring that the material taught is comprehensible, interesting, relevant, and not grammatically sequenced. The input hypothesis (Krashen, 1987) states that the language instruction received by a learner should be one step beyond the current language learning level. Affective filter hypothesis identifies the classroom conditions that impact a student's ability to acquire a second language, like self-esteem and motivation (Lewis et al., 2012). The Prism model (Thomas, 2007, as cited in Lewis et al., 2012) describes the sociocultural component which is part of a holistic approach to teaching ELLs which influence their optimal success. It allows for natural language, academic, and cognitive development (Lewis et al., 2012).

This classroom instruction should not only follow recommendations by language theorists, but also be designed to cultivate characteristics of gifted ELLs. Instruction in the core classroom needs to be designed to support high ability in mathematics, advanced creativity, and leadership. In language arts, they should be supported in the fact that they acquire a second language rapidly, have a mature sense of culture and language, advanced awareness of American expressions, ability to joke in both languages, teaching

their native language to others, and advanced levels of oral translation. Specific support in English language acquisition should be provided around their ability to navigate in both cultures, balance of heritage, global sense of community, and pride in culture.

Gifted education programming standards should be incorporated in planning for classroom instruction with special consideration for standard two to support ELLs. The three student outcomes from this standard provide information to facilitate and promote gifted education for ELLs. The first student outcome, establishing equal access, creates environments that encourage students to express characteristics and behaviors associated with giftedness (Johnson, 2012b). The second student outcome, using and interpreting a variety of assessment evidence allows students to reveal their exceptionalities in multiple ways (Johnson, 2012b). The last student outcome, representing students from diverse backgrounds ensures that gifted underrepresented students are representative of the total student population (Johnson, 2012b). Districts following the recommendations of these three outcomes would increase the equitability of identification for underrepresented populations.

Since a relationship between English language development and growth and general intellectual abilities for ELLs exists, then ACCESS for ELLs could be used to inform instruction for gifted ELLs. As stated previously, gifted theorists provide information on best practices for the education of gifted ELLs. NAGC programming standards promote not only an equitable environment in line with prominent theorists, but also using a variety of assessment evidence to ensure equal representation of populations.

Once classrooms are designed to follow the recommendations of gifted standards and developmental theorists, then data will be needed to drive instruction. ACCESS could provide information on what that learning level is and what instruction needs to take place to achieve the next level (Lewis et al., 2012).

Finally, because the NNAT data from this study follows a standardized normal distribution, it verifies claims from the NNAT that it is based on normative data. As such, it should be used as a universal screener in Colorado. Universal Screening is an assessment of all students in a grade level with the purpose of identifying students with exceptional ability or potential, especially those students from underrepresented populations (CDE, 2016). "Universal Screening ensures fair and equal access for ALL students to demonstrate ability and potential" (CDE, 2016). Universal Screening would be a system that could be put in place to ensure fairness and inclusion in the identification process by recommending students for further gifted identification assessment or a place in the talent pool to receive appropriate programming to develop potential.

Future Implications

This section lists recommendations for practitioners and for future research. The areas identified and discussed need further examination and address gaps and needs found in the study. Further research could replicate the study using future data from ACCESS for ELLs testing. This study only investigated the Hispanic population of students to see if there was a correlation between English language proficiency and general intellectual ability. A different population of ELLs could produce stronger or

weaker correlations which could refine the conclusions made based on this study. Different races have different cultures and as a result giftedness presents in different ways. These cultural aspects could be investigated for strength of correlations.

For further research, this study could be revisited to follow the recommendation that the NNAT be used as a universal screener. The study would further investigate students who scored in the 80th percentile and above. The research should look at these students to see if these students were able to score exceptionally on academic assessments or observational instruments which could be an indicator of gifted characteristics. The research should also investigate if these students were identified as gifted. Administering one-on-one assessments like the Wechsler Intelligence Scale for Children - Fifth Edition (WISC-V) to these students to further examine areas of cognitive ability such as verbal comprehension, visual-spatial ability, fluid reasoning, working memory, and processing speed would be imperative to this research as one of the cognitive abilities may be an indicator of a specific area of giftedness.

Another recommendation is that this research could be replicated is by examining the correlations in respect to the quality of English language instruction. Using Krashen's (1987) Input hypothesis, the correlation between ACCESS and NNAT could be investigated to see if making content more comprehensible by being deliberate about the level of instruction, more interesting and relevant to students using surveys and inventories, and reducing grammatically dependent instruction to see if correlations are improved.

Because of this study, unanswered questions in the area of language proficiency and general intellectual ability for ELLs may become more focused and the gifted characteristics of ELLs could be further explored. One finding was that there was the strongest correlation between the listening domain of language and the general intellectual ability of ELLs. More research would discover if listening skills are a characteristic of Hispanic ELLs or if it is a gifted characteristic.

This research study provides confirmation of a weak positive relationship between English language proficiency as measured by the ACCESS for ELLs and general intellectual ability as measured by the NNAT Nonverbal Ability Test. This research should be replicated using future ACCESS data, as the assessment has undergone revisions in content, administration, and scoring. Additionally, data analysis for the relationship with both assessments and other factors, such as type of English language development instruction, composite English language proficiency level, and the impact of grade retention should be performed to do a further analysis of the various factors that impact the academic and linguistic achievement of ELLs.

Strengths and Weaknesses of the Study

This study had the advantage of being able to collect a large amount of data for correlation. Although causation was not able to be determined, it allows future researchers the opportunity to determine causation experimentally and conduct more focused research. The correlations provide insight for future researchers because they were collected from a natural environment. The data is consistent, precise, and reliable

because it was collected using reliable and valid instruments and the assessments were completed in a comparable environment.

A disadvantage of the design of this study is that correlational research only uncovers a relationship, not conclusive reasons for the relationship, or lack of a relationship. Although there was a relationship between English language proficiency and general intellectual ability, it cannot be assumed which variable is influencing the other. More research needs to be done to determine causation or if there is a third variable influencing both.

A weakness of the data is that it was not robust enough to explain the complex issue of gifted identification. Additional data would be useful in exploring what additional variables influence English language proficiency and cognitive ability. Some variables that would have been useful for this research but were not available were if the students were previously identified as gifted and were receiving gifted programming, evaluation ratings of teachers providing English language instruction, or years of experience of teachers.

Another weakness in the study is the age of the data in the analysis as compared to current protocols. ACCESS assessments have undergone multiple changes and updates in the past few years. The data that was analyzed for this study was from the 2011-2019 school years. In 2016, the ACCESS for ELLs was retired and the ACCESS for ELLs 2.0 was launched in an online testing format. Prior to the 2017 ACCESS for ELLs 2.0

testing, the scoring alignment was revised to increase the rigor of the assessment and the 2017 scores were released on new standards scoring framework.

The use of standardized tests as variables is another weakness because of the factors that can influence test performance. There is evidence that standardized test results underestimate large numbers of students as learners, especially those who belong to minority groups (Pastor, 2019). The results of standardized tests can be affected by moderator variables that cannot be controlled such as illness, hunger, sleep deprivation, unfamiliar forms of a test, or a limited command of English (Pastor, 2019). Certain aspects of a student's life including physical, mental, or situational aspects can have a negative effect on a student's score. Poverty, ethnicity, class size, and teacher experience are three examples of student aspects present in Paradise Public Schools.

Conclusion

This research study was based on hypotheses regarding the relationships between the performance of ELLs on the ACCESS English language proficiency test, growth and language domains and the NNAT Nonverbal Ability Test. The sample student population was a school district in Colorado. A Pearson correlation model confirmed the relationship between the ACCESS for ELLs English language proficiency test, growth, and language domains and the NNAT Nonverbal Ability Test, although there was not a strong enough correlation to recommend using ACCESS as a data point in gifted identification.

The population of ELLs will continue to grow in this country, and as such, so will the population of gifted ELLs. It is the responsibility of educators and policy makers to

ensure that these students have the same opportunities as their English-speaking peers. This research provides a way to begin the conversation around changing policy to improve identification practices for these students. Although this research does not provide enough evidence to amend current identification practices, it does confirm the urgent need to modify gifted identification guidelines. The first step in improving inequitable identification practices is adapting the definition of gifted students reflect the current population of students in the United States. As a result, identification practices that are confined based on the definition of giftedness would need to be altered to reflect the more up-to-date definition. Immediate action needs to be taken to grant access for ELLs to gifted programming whether or not they are representative of the current definition.

The Marland Report (1971) states:

> Gifted and Talented children are, in fact, deprived and can suffer psychological damage and permanent impairment of their abilities to function well which is equal to or greater than the similar deprivation suffered by any other population with special needs served by the Office of Education.

Almost fifty years have passed since this impactful statement was written. The inaction of gifted educators is creating harm and injustice within the education system, and the tools exist to right this inequality so all gifted students can reach their potential. It is the hope of the researcher that this serves as a call to action to use the recommendations based on the findings of this research to impact chance on the gifted identification process for ELLs.

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Appendix

Community Partner Agreement

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Katie Coggin is completing her research and dissertation project for the Doctorate of Education in Gifted Education at the University of Denver under the supervision of Dr. Norma Lu Hafenstein. The doctorate is part of the Carnegie Project on the Education Doctorate (CPED). A key component of the requirements is to obtain a community partner. Researchers must disseminate their work to interested community members as defined by the nature of the research. Community partners can attend during the defense of the dissertation, which will occur in spring 2020 for approximately two hours in length, although attendance is not required. Based on feedback from the community partner the research project may need revision to meet the practical needs of the community partner.

The partners will meet twice: once in fall 2019 and once in spring 2020, to discuss the research project and dissertation. The purpose of this study is to investigate the relationship among cognitive ability and gifted identification in English language learners. This will be a qualitative, descriptive, associational research study to analyze the relationship between cognitive scores (NNAT), English Language Acquisition scores (ACCESS), and gifted characteristics (GES-3) of English language learners.

The rationale for the choice in research is:

- There is a disparity in the number of high-ability English language learners (ELLs) who reach advanced levels of academic performance compared to their native English-speaking peers (Ross, 1993)
- Schools typically define giftedness based on standardized testing (VanTassel-Baska, 2010)
- Schools and districts should adopt a multiple-criteria method for identification along with the traditional cognitive and achievement assessments (Mirta-Itle and Dirsmith, 2017)

The research questions for this study are:

1. What is the relationship between cognitive scores and language acquisition scores in English language learners?
2. What is the relationship between cognitive scores and behavioral characteristics scores in English language learners?
3. What is the relationship between language acquisition scores and behavioral characteristics scores in English language learners?
4. What is the relationship among cognitive scores, language acquisition scores, and behavioral characteristics scores in English language learners?
5. What is the relationship between cognitive scores and language acquisition growth in English language learners?
6. What is the relationship between cognitive scores and language acquisition growth in English language learners?

4/29/19
Date

Katie Coggin Date