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Analysis of African American and White American Cognitive Profiles

for Language and Cultural Influences

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A thesis submitted to the Graduate Faculty of

JAMES MADISON UNIVERSITY

In

Partial Fulfillment of the Requirements

for the degree of

Educational Specialist

School Psychology

August 2016

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Abstract

One of the most concerning aspects of special education is the overrepresentation of African American minority youth receiving special education services. Samuel Ortiz and colleagues considered the issue of the representation of the Latino, English Language Learner (ELL) population in special education services based on cognitive performance in relation to the mainstream population. To target this concern they determined an estimated level of expected cognitive performance of ELL's and impact of language and cultural differences to help eligibility teams more appropriately interpret and place students with the aid of the Culture-Language Interpretive Matrix (C-LIM) model they developed. The current study seeks to analyze the cognitive performance and/or the culture-language impact among African American students referred for special education services, compared to their Euro American counterparts, using the C-LIM model developed by Ortiz and colleagues. Conclusions from this study may help professionals in the field of school psychology understand the degree to which language and cultural differences may or may not impact the cognitive performance of African American students in terms of normative expectations.

Analysis of African American and White American Cognitive Profiles

for Language and Cultural Influences

There has been significant concern for the over-representation of minority

students in special education services and an underrepresentation of minority in gifted

and talented education programs. A great deal of effort has been expended during the last

decade to rectify this through prevention programming, adjustments in assessment

procedures, and monitoring of data. One consideration for understanding the over

placement of minority students in special education is the cultural and language

differences that may place minority students at a disadvantage in competing in an

educational environment that emphasizes a mainstream focus on information and

communication.

There are practices that have been identified as beneficial for students that are

more readily identified as culturally discrepant from the mainstream. These practices

have contributed to progress made in addressing the learning needs and assessment

process for considering special education services, particularly for students of the

'extreme' minority, i.e. English Language Learners. Due to the understanding that

speaking a native language other than English and migrating to a new environment

influences the student's performance compared to the mainstream population, much

caution is used in placing an English Language Learner in special education. To address

this concern, a frequently used approach is the application of the Culture-Language

Interpretive Matrix developed by Flanagan, Ortiz, and Alfonso (2013) when interpreting

cognitive scores on intelligence tests. This matrix rules out the students that have

backgrounds that are discrepant enough to indicate the tests do not measure what is intended to be measured, and therefore are unreliable for those particular students.

While it is understood that English Language Learners' educational performance tend to be impacted by cultural and linguistic factors, one may also be inclined to understand the extent to which African American minority students' educational performance is impacted by cultural and/or linguistic factors. With an understanding more representative of the cultural and linguistic impacts experienced by the African American population, school personnel will have greater potential in accurately identifying youth for special education services. Further review of the literature that supports the need for investigation of this dilemma is discussed.

Literature Review

There are numerous approaches developed in the literature that support the importance of considering culturally and linguistically diverse factors for nondiscriminatory evaluation of individuals to attain accurate interpretations of their cognitive, academic, behavioral, social, and emotional functioning. One perspective developed from Bronfenbrenner's work is the ecological and systems theory, which focuses on the idea of evaluating contexts of an individual's entire ecological system to accurately understand his/her cognitive performance. This system is comprised of the microsystem, the mesosystem, the exosystem, and the macrosystem, which starts with the environmental aspects of the individual's immediate setting (i.e., school and family home for children) and extends to the relationships between and within the range of individual and societal belief systems. Influential aspects of both culture and language are found in each of these domains, suggesting impact of an individual's cognitive performance.

The origin of the overrepresentation issue of children in special education categorized as having a specific learning disability is a complex argument. As defined, a specific learning disability is not apparent if the discrepancy between ability and achievement is primarily the result of an environmental factor, cultural or economic disadvantage. Therefore, if a student were considered to be experiencing poor living conditions, he/she would technically not qualify for special education services, by definition. However, in order to avert the dilemma of being prohibited to provide services to struggling students, school psychologists often ignore or circumvent this procedural safeguard, as less than 50% regularly complied with the clause when surveyed (Fletcher & Navarrete, 2003). Researchers posit the concept of education provided in a mainstream fashion, eliciting a disadvantage to those outside of the White, middle class, mainstream culture (Fletcher & Navarrete, 2003). Rather, more appropriate forms of pedagogy, such as activities that promote success, pride, and expression of students' experiences, are recommended as forms of prevention and intervention (Cummins, 1989).

While there are unique differences among *all* individuals, one may expect a greater magnitude of difference in cognitive performance among culturally diverse minority populations from that of the majority population, when measured using standardized assessments. Given the sample populations of which cognitive assessment measures such as the *Wechsler Intelligence Scale for Children, Fourth Edition* (*WISC-IV),* and *Differential Ability Scale, Second Edition* (*DAS-II*) are standardized with, differences in scores may be expected if cultural and linguistic factors influence ability levels. It has been postulated that cognitive measures reflect the experiences and cognitive style of the White American middle class environment, via standardization

samples. As one may infer, the more a minority population is unlike the majority

population, the lower their performance on cognitive tests are expected to be. Thus, the

use of traditional standardized cognitive assessments with culturally and linguistically

diverse individuals may exhibit bias relative to the validity of interpretation (Esquivel,

Lopez & Nahari, 2007). Considering the concerns regarding special education

overrepresentation of minority children and under-representation of minority children

placed in gifted and talented programs, one may argue the need for further investigation.

Currently, according to the National Center for Education Statistics, in the 2012-

2013 school year 15.2% of all students receiving special education services under the

Individuals with Disabilities Education Act (IDEA) were identified as African American;

whereas, 13.4% were identified as White American, 11.7% as Hispanic, and 16.3%

American Indian/Alaska Native. Furthermore, 5.8% of all students receiving services

were African American students classified under the Specific Learning Disability (SLD)

category. African American (5.8%) children were classified under the SLD category

more frequently than that of the White Americans (4.3%), and less frequently than that of

American Indian/ Alaska Native Americans (6.8%) and Hispanic Americans (5.8%).

Review of these statistics may raise conflicting concerns given the total population of the

U.S. consisted of about 63% White American, 13% African American, 15% Hispanic,

5% Asian, and 1% American Indian/Alaska Native, in 2013 (U.S. Census Bureau, 2015).

In other words, if cognitive assessments could be considered completely precise, fair, and

valid, we would expect the most occurrences of students receiving special education

services to be among the White American population, and the least occurrences among

the American Indian/ Alaska Native Americans. Additionally, one might expect the

African American population of students receiving services to be lower than that of the White American population. However, the expected special education classification distribution among the different populations is not the case.

Culturally and Linguistically Diverse Students

The literature supports students learning English as a second language require more time to reach social and academic performance levels of their monolingual peers. When learning a new language, children first develop Basic Interpersonal Communication Skills (BICS), which is basic communication of wants, needs, and social interactions, or, "playground language." Once this level of social communication is developed, the student develops Cognitive Academic Language Proficiency (CALP), which requires a more complex style of language used in reading, writing, listening, and speaking, or, "classroom language." It takes approximately 1 to 3 years to develop BICS, and then 5 to 7 years for the English language learning student to develop CALP. With this in mind, it is understood that any child who may exhibit differences in their language development from that of the majority population likely experiences difficulty when learning material is presented the same as for their linguistically proficient counterparts. In addition to language difficulties, immigrants and English language learning students face challenges in understanding and practicing cultural values and expectations of the new environment. Previous findings suggest the importance of evaluating diverse minority students with adherence to the impact of cultural and linguistic characteristics, given the differences experienced in learning.

Differences in preferred learning styles are apparent according to research which suggests White American and Asian American students' grades were impacted more by

motivation, while African Americans and Hispanic students' grades were impacted more by the quality of instruction provided (Flanagan & Miller, 2010). Yet, the instructional preferences and preferred learning styles endorsed within the academic setting tend to be those of the White American mainstream population, including: clear directions with concrete activities, use of manipulatives, step-by-step instructions, structured classrooms, interaction with teachers as reinforcement, small-group instruction, cooperative learning, independent activities, visual stimuli, hands-on activities, flexible instruction, and visual stimuli emphasizing interrelationships (Flanagan & Miller, 2010). Diversity is often even viewed as a barrier to learning by students themselves. For example, a survey suggested that students suggested systems which failed to accommodate differences, diversity, and disability, as the underlying contributing factor of student drop out (Esquivel etc., 2007).

Culture-Language Interpretive Matrix

Given the aforementioned influences of cultural and linguistic differences, it seems necessary to investigate a method of differentiating whether a child's experienced difficulties are reflected more by cultural and/or linguistic factors, or more by true cognitive ability, when interpreting results of standardized assessments. Flanagan, Ortiz, and Alfonso (2007) developed such an interpretive method for analyzing cognitive scores of English Language Learners, known as the Culture- Language Interpretive Matrix (C-LIM) (Flanagan, Ortiz, & Alfonso, 2013). Initially, researchers created Culture-Language Test Classifications (C-LTC) for 20 different standardized cognitive measures in the attempt to identify those that reflected the lowest levels of cultural loading, the extent to which a subtest requires knowledge of culturally-bound content, and linguistic demand, the amount of receptive or expressive language ability required to respond or complete a

task. Researchers Flanagan, et al., (2013) decided to use these two dimensions based on Figueroa's suggestions and the literature, which consistently defines cultural loading and linguistic demand as factors that could render invalid test results, given the significant influence on test performance. The C-LTC system categorizes subtests from the cognitive measures according to the degree- low, medium, or high- to which they share similar levels of cultural loading and linguistic demand. Categories are established according to mean scores reported in the literature. For example, scores which fall at or near the normative mean (i.e., SS=100 or ScS=10) reflect little affect by cultural and linguistic influences and would therefore be categorized as having low cultural loading and low linguistic demand. Contrary, scores that significantly deviate from the mean (i.e., at least one standard deviation or SS=85 or ScS= 7) suggest susceptibility to cultural and linguistic influences, and would therefore be categorized as having high cultural loading and high linguistic demand.

The categorization also defines linearity among the dimensional orders, such that there are five levels with equivalencies of degrees of expected deviation, or attenuation in performance, along the left-right diagonals of the classifications. For example, the three cells along the main diagonal (i.e., High Culture/Low Language, Moderate Culture/Moderate Language, and Low Culture/High Language) are described to be equivalent in the degree of deviation and expected attenuation in performance. Level 1 represents those of the highest expected scores and lowest degree of attenuation due to lower degrees of cultural loading and linguistic demands, while Level 5 represents the lowest expected scores and highest degree of attenuation due to higher degrees of cultural loading and linguistic demands.

The C-LTC is the foundation in the development of the C-LIM. The intended purpose of the C-LIM is to allow practitioners to more directly assess the extent to which cultural and/or linguistic variables influenced the cognitive abilities measured. C-LIM developers (Flanagan, et al., 2013; and Flanagan, et al., 2007) used the classifications of the C-LTC to define patterns representative of the expected performance for individuals from diverse cultural and linguistic backgrounds. They found that relative to the impact of cultural and linguistic factors, there is a pattern of declining performance among culturally and linguistically diverse or "bilingual" individuals. They also found difference levels defined by the magnitude of mean scores based on level of acculturation.

Aggregated scores within the first cell of Level 1 (Low Cultural / Low Language, as defined by the C-LTC classifications) are highest, followed by decreasing aggregated performance scores across Levels 2, 3, and 4, to the lowest aggregated performance scores in Level 5 (High Culture/High Language) in the described declining pattern of performance among culturally and linguistically diverse individuals. In the case of such a declining pattern, which follows the approximated pattern by magnitude and rate of decline, the results are said to be an invalid representation of the individual's true cognitive abilities. This is because, the approximated pattern suggests that the individual's performance is likely more representative of cultural and linguistic factors such as, level of acculturation and English language proficiency, than his/her abilities intended to be measured.

Although this method may seem promising, there is a lack of published empirical data in peer-reviewed journals to support its potentials. The purpose of the study conducted by researchers Kranzler, Flores, and Coady (2010) was to investigate the

predicted effects of cultural loading and linguistic demand on cognitive test performance in non-referred bilingual and culturally diverse students. The sample population consisted of 46 students ages 5-18 in a Florida school district. Researchers administered the core tests from the Woodcock Johnson –III, a demographic questionnaire, and completed a file review to analyze scores on the Comprehensive English Language Learning Assessment (CELLA). Statistically significant decreasing trends were observed for the combined effects. Within-subjects analyses results supported no significant main effect of linguistic demand or cultural loading. Results support previous literature which describes that culturally diverse students tend to obtain higher scores on nonverbal tests than verbal (Kranzler, et al., 2010). Rushton and Jensen (2010) also found differences in IQ scores between African Americans and Euro Americans on g, or general factor of cognitive ability, loaded tests.

With that said, one may infer potential for cultural and linguistic influences, requiring further study of the use of the C-LIM with culturally and linguistically diverse children beyond that of the ELL population. Furthermore, the purpose of the C-LIM is to assist in determining if the results of standardized testing are interpretable or not. According to researchers Styck, Watkins, and Vanderwood (2013), the C-LIM is not considered an accurate profile for determining validity of interpretations for individual students due to within group differences observed in their study. However, such an inference from the study results is questionable given that sample size of the two groups observed were fairly different (86 ELL compared to 2,033 profiles from WISC-IV normative sample) and those who exhibited scores at or below a standard score of 73 were omitted. While there seems to be contrasting results and interpretations in the

literature in regard to the validity of the use of the C-LIM when interpreting cognitive

scores and potential cultural and linguistic influences, Flanagan, etc., (2013) have

thoroughly developed the model with the C-LTC and contributing research as the

supporting foundation.

African American Culture and Language

The literature consistently describes the history of the differences often observed

between African American individuals and White American individuals that contribute to

the controversial usage of cognitive tests. For instance, in a southern rural school district

researchers found the average IQ for African Americans to be 71, while the average IQ

for the White Americans was 101 (Rushton & Jensen, 2010). Rushton and Jensen (2010)

also state that while IQs of African Americans have increased over the years, military

testing conducted during World War II suggested an IQ gap of 22 rather than the

formerly postulated 15 point, one standard deviation, gap (Cleary, Humphreys, Kendrick,

& Wesman, 1975). Researcher Richard Lynn found the world average IQ to be 90; where

Europeans exhibited an IQ score average of 100. Also, North Africans and sub-Saharan

Africans exhibited IQ score averages of 84 and 67, respectively (Rushton & Jensen,

2010). To summarize Rushton and Jensen's (2010) findings, it is understood that African

American IQ tends to be an average of 70-85, while that of the White Americans tend to

be 100 and cultural achievements among African Americans is described as lower

compared to the higher cultural achievement described among White Americans.

Essentially, multiple research findings suggest cultural influences as contributing factors

to differences in cognitive performance between African American and White American

individuals.

An investigation of potential cultural bias which analyzed a common regression line of majority and minority groups revealed 7 instances where the achievement of African Americans was significantly lower than what would be predicted using ability scores obtained from the *Wechsler Intelligence Scale for Children, Third Edition* (*WISC-III*) (Glutting, Oh, Ward, & Ward, 2000). The Full Scale IQ (FSIQ), Verbal IQ (VIQ), and Performance IQ (PIQ) ability scores showed significant ethnicity effects on the reading and mathematics achievement performance, and on the language achievement [on the *Wechsler Individual Achievement Test* (*WIAT*)] for the PIQ predictor (Glutting et al., 2000). These results indicate that the performance of African American students on cognitive assessments may actually overestimate their performance on achievement tests, which measure their level of functioning in regards to material learned in the classroom (Glutting et al., 2000). This suggests differences in learning styles and cultural and linguistic factors between African American students and White American students within the mainstream classroom. Hence, an overrepresentation of African American children in special education, classified under the specific learning disability (SLD) category, compared to their White American counterparts.

Further study supports caution when interpreting cognitive measurements obtained using the *Wechsler Intelligence Scale for Children* (*WISC*) as a result of significantly lower performance scores on the *WISC* among Latino children compared to performance on the *Leiter International Performance Scale* (Lewis & Lorentz, 1994). Researchers Lewis and Lorentz (1994) suggest language and cultural background to be of negative impact on their performance on the *WISC*. Differences between performance scores on the *WISC* and *Leiter International Performance Scale* among African

American children were not found to be significantly different. However, researchers did find that among the 15 African-American and 11 Latino children, their means showed differences, although correlations were not significantly different (.71 to a high of .90) (Lewis and Lorentz, 1994). In other words, it appears that African American children perform at similar levels as the Latino children on measures such as the *WISC*, although, an effect was not evident between performance on the *WISC* and *Leiter* assessments for African American children (Lewis and Lorentz, 1994).

Culture. Schiele (1991) provided a review of the literature which describes the affective epistemological attributes of African Americans and how they differ from the epistemological attributes of a cognitive, fragmented form of thinking among White Americans. The African American epistemology, or system of knowing, is described as having strengths in rhythm, affect, and spirituality that shape their world view. In the African American culture, affect is considered a major mode of knowledge, with a focus on a holistic style rather than fragmented style of thinking (Schiele, 1991). It is believed that the traditional affective focus of African society is manifested by contemporary African Americans (Schiele, 1991). Rushton and Jensen (2010) explained differences between African American and White American parenting practices that may contribute to the disparity in thinking styles. For example, researchers suggest that by three years of age the child of a White American professional has heard about 500,000 encouragements related to abstraction and cognitive ability and about 80,000 discouragements; whereas, a three year old child of an African American parent has heard about 75,000 encouragements and 200,000 discouragements related to abstraction and cognitive ability (Rushton & Jensen, 2010).

Further research posited that differences in brain functioning may contribute to differences in thinking styles and strengths. The majority of functioning cognitive skills involved in logical, linguistic problem solving, analytical, and conceptual thinking are located within the left hemisphere of the brain. The functioning of holistic, intuitive, and rhythmic skills are located within the right hemisphere of the brain (Schiele, 1991). When cognitive functioning is measured, two (verbal and logical-mathematical) of three abilities function within the left hemisphere of the brain, while spatial abilities primarily function within the right hemisphere. Therefore, differences in location of the foremost of brain functioning may elicit lower performance scores in those who may function primarily from the right hemisphere of the brain (allegedly African Americans) than those who may function primarily from the left (allegedly White Americans) (Schiele, 1991). This emphasis of spatial and emotional functioning of life and mental health tend to be considered significantly different from the focus of our expectations in the educational setting and cognitive assessment. With a narrow emphasis on the measure of cognitive abilities, there is a lack of attention given to the strengths and abilities shared among African American individuals; which means the validity of interpretations attained from cognitive assessment may perhaps lack accuracy when used with some African American individuals.

Language. It is believed that one's understanding and interpretation of language is linked to one's culture. Furthermore, communication style can be distinguished between individualistic and collectivistic cultures (Qualls & Harris, 1999). Specifically, African Americans are described to have linguistic features associated with collectivistic societies. For example, those in collectivistic societies typically communicate in a way

that expresses an implicitly shared meaning between speakers with reliance on within group identity. Whereas, those that use a more explicit, elaborative style of language, such as the White Americans, tend to be associated with individualistic societies (Qualls & Harris, 1999).

The details that make up the foundation of language are certainly complex. There are between and within group differences in terms of dialect, accent, definitions, meanings, attitudes/tone, abbreviations, and more. African American Vernacular English is a key example of a within group difference in language style of the English language. African American Vernacular English can be described as a variety of American English, most commonly spoken by urban working-class and bi-dialectal middle-class African Americans. The language is largely influenced by the grammar and phonology of the rural dialects among the Southern United States, and is sometimes referred to as Ebonics. An ethnographic study revealed individuals described the way White Americans talk as proper English and the way African American people talk as slang (Ogbu, 1999). The proper English was described to differ from African American Vernacular in people's vocabulary, accent, and attitude. Furthermore, findings suggested White Americans and African Americans tended to interpret the same statements differently. "For example, a Black person may say something that sounds harsh, but Blacks will not feel threatened, whereas, if a White person utters the same statement, a White audience is likely to assume that there is a real threat of harm" (Ogbu, 1999, pp.160-161).

A study which investigated potential bias in language assessment discovered significantly lower performance scores among the minority participants. Participants were 11-14 year-old males representative of the U.S. minority population (67% African

American, 1% Asian, and 1% Native American) and (31%) White American, majority

population. Specifically, minority participants' performance was significantly lower on

knowledge-dependent tasks of language skill, but did not exhibit differences for

processing-dependent tasks (Campbell, Dollaghan, Needleman, & Janosky, 1997). The

observed differences in knowledge-dependent scores may contribute to the explanation of

generally lower IQ scores and poorer performance on cognitive assessments among

African American individuals.

Researchers Qualls and Harris (1999) investigated the differences between White

American (N=24) and African American (N=24) fifth graders ability to comprehend

idioms, a commonly used feature of daily language, of high-familiarity, moderate-

familiarity, and low-familiarity. Findings from their study revealed significantly

increased understanding of low-familiarity idioms among the White American students

compared to the African American students (Qualls & Harris, 1999). Researchers also

found results suggested increased understanding of idioms of moderate-familiarity among

African American students compared to White American students whose performance

suggested increased understanding of idioms of high-familiarity. In terms of differences

within the sample African American population, students' performance indicated

strongest understanding of moderate-familiarity idioms and poorest understanding of

low-familiarity idioms. Compared to the White American students' performances, the

African American students' levels of understandings varied more (Qualls & Harris,

1999). Overall, Qualls and Harris (1999) determined cultural background and regional

place of residence to be influencing factors of idiom comprehension.

Given conceptualization of the literature, one may recognize the extent to which differences in understanding of even minute features of language can have an impact on students' academic and cognitive performance. More specifically, it may be more difficult for African American students to follow along with social interactions and academic instruction with similar consistency of their mainstream White American counterparts. Overrepresentation is just another form of miseducation being provided, which often results in high drop-out rates, low academic achievement, truancy, entrance into the juvenile justice system, mediocre educational opportunities, and zero tolerance, punitive disciplinary procedures (Harris & Goldstein, 2007).

Research Questions

The purpose of this study is to investigate the culture and language influence among the African American minority population of students referred for special education services. It is worthy of investigation to apply the Culture-Language Interpretive Matrix (C-LIM) to the cognitive profiles of African American minority students and to the cognitive profiles of White American nonminority students who have been referred for special education services, and determine if there are significant patterns for minority students that suggest a cultural and/or language influence.

Research questions worthy of investigation include:

(1) Do the cognitive profiles of African American individuals who have been referred for eligibility determination of special education services indicate patterns that suggest influence of culture and language relative to the approximated declining pattern of performance as defined by the C-LIM?

(2) Do the cognitive profiles of White American individuals who have been referred for eligibility determination of special education services indicate patterns that suggest influence of culture and language relative to the approximated declining pattern of performance as defined by the C-LIM?

(3) Given indication of patterns among cognitive profiles of both the African American and White American individuals who have been referred for eligibility determination of special education services that suggests influence of culture and language relative to the approximated declining pattern of performance as defined by the C-LIM, are the patterns indicated by the African American cognitive profiles similar or significantly different from the patterns indicated by the White American cognitive profiles?

(4) Given a significant difference between the patterns indicated by the African American cognitive profiles and patterns indicated by the White American cognitive profiles, is there more cultural and linguistic influence suggested among the African American cognitive profiles than that of the White American cognitive profiles?

Method

Participants

School psychologists in the designated school system collected and reported the cognitive profiles of African American and White American students referred for cognitive evaluation, using test results that were administered within the current school year. Participants included 49 White American and 63 African American, English speaking students in grades K-8 referred for special education services from a rural

public school system of southern Virginia. Referred students included those referred for

initial evaluations and re-evaluations for eligibility to receive special education services.

Students' race, age, and sex were indicated in data collection. No identifying information

was obtained, as all of the data was blinded.

According to 2014-2015 school-year enrollment, this rural school system in

southern Virginia consisted of about 5,525 students, 2,422 (43.8%) of which are reported

to be African American and 2,778 (50.3%) reported to be White American. According to

records, in the 2014-2015 school year 60.8% of students in the target community were

considered eligible for free and reduced school lunch. Reports from the 2013-2014

school-year enrollment indicated a total of 987 (17.7%) students with disabilities that

received services within this school system. Enrollment records (2013-2014) from the

school system specified a total of 399 (14.20%) White American students and 545

(21.87%) African American students with disabilities that received services. The majority

of White American students (125) received services under the Specific Learning

Disability category, while the majority of African American students (207) also received

services under the Specific Learning Disability category. Below (Figure 1) is a

representation of the number of White American and African American students,

respectively, who received services under the specified disability categories (Virginia

Department of Education, 2015).
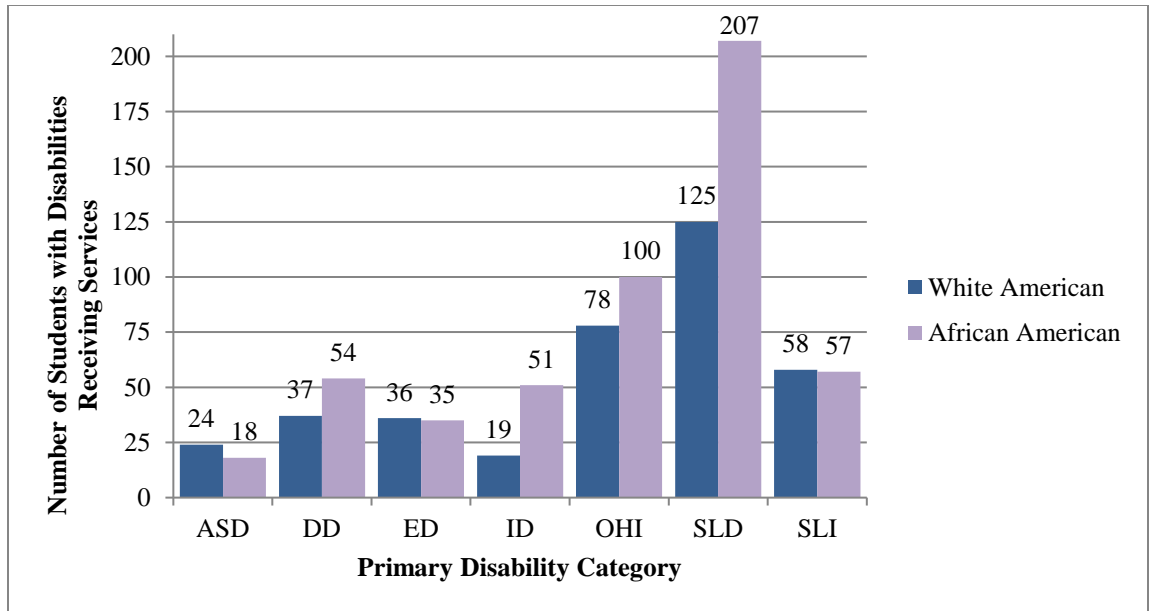
Figure 1. Southern VA School District 2013-2014 Special Education Child Count by Primary Disability Category.

The sample population is fairly representative of the national profile of African American and White American students in public schools receiving special education services among the disability categories. For example, the African Americans were most frequently identified under the SLD category in both the sample population and the U.S. population. The graph below (Figure 2) illustrates the percent of White American and African American students enrolled of the total population of students enrolled in special education in the U.S.
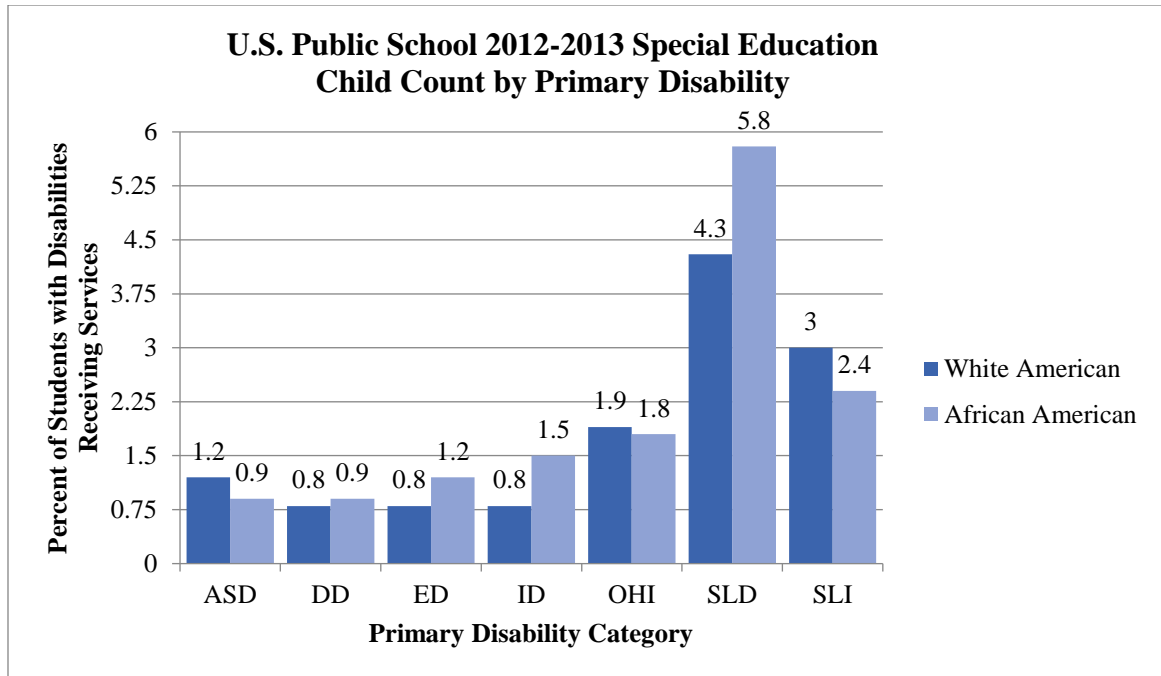
Figure 2. U.S. Public School 2012-2013 Special Education Child Count by Primary

Disability.

Materials

Materials necessary for this study were for data collection and analysis. Scores

obtained on cognitive assessments were entered and stored in a Microsoft Excel template

designed to correspond to the scoring used on the *Wechsler Intelligence Scale for*

Children, 4th Edition (WISC-IV) and *Differential Ability Scales, 2nd Edition* (DAS-II)

cognitive assessments. The WISC-IV and DAS-II were used for this study because

school psychologists in the designated school system typically use these two

measurements for cognitive evaluations, and are commonly used throughout the field.

The Culture-Language Interpretive Matrix (XBA C-LIM v2.0) program provided

in the *Essentials of Cross-Battery Assessment, Third Edition* (Flanagan, Ortiz, & Alfonso,

2013) was used for data analysis. Statistical analyses were conducted using the SPSS

statistical analysis software program. The C-LIM was used given support from the

literature for using it to assist with interpreting the cognitive profiles of English Language

Learning individuals and the potential influence of culture and/or language.

Measurements

The cognitive profiles of the African American and White American students

referred for special education services were provided using the *Wechsler Intelligence*

Scale for Children, Fourth Edition (WISC-IV) and *Differential Ability Scales, Second*

Edition (DAS-II) administered assessments. The WISC-IV is an individually

administered intelligence test, designed to be administered to children ages 6 years (6:0)

through 16 years 11 months (6:11). The WISC-IV was normed using a sample consistent

with the U.S. census demographics and is considered to have exceptional reliability, as

evidenced by statistics such as internal consistency reliability coefficients of 0.96 to 0.97

for the Full Scale measurement. The WISC-IV is also described to be an accurate

measure of intelligence. The test provides subtest and composite scores which represent

intellectual functioning in specific cognitive domains [Verbal Comprehension (VCI),

Perceptual Reasoning (PRI), Working Memory (WMI), and Processing Speed (PSI)], as

well as a composite score [Full Scale IQ (FSIQ)], which represents general intellectual

ability. Within each of the four domains are a variety of subtests that form the index

score. The Verbal Comprehension Index (VCI) measures verbal concept formation,

verbal reasoning, and knowledge acquired from one's environment. The VCI includes the

Vocabulary, Similarities, Comprehension, Information, and Word Reasoning subtests.

The Perceptual Reasoning Index (PRI) measures perceptual and fluid reasoning, spatial

processing, and visual-motor integration. The PRI consists of the Block Design, Matrix

Reasoning, Picture Concepts, and Picture Completion subtests. The Digit Span – Digits

Forward, Digit Span – Digits Backward, Letter-Number Sequencing, and Arithmetic

subtests contribute to the Working Memory Index (WMI) Index, which measures the

individual's ability to process and manipulate orally presented verbal sequences. The

Coding, Symbol Search, and Cancellation subtests contribute to the Processing Speed

Index (PSI), which provides a measure of the individual's ability to visually perceive,

organize, and scan information in a speeded manner, with paper and pencil tasks.

Administered assessments depend on the characteristics of the individual being assessed,

such as reasons for referral, typical levels of functioning, and environmental factors.

The DAS–II is a comprehensive, individually administered, clinical instrument

for assessing the cognitive abilities that are important to learning. The test is designed to

be administered to children ages 2 years 6 months (2:6) through 17 years 11 months

(17:11) across a broad range of developmental levels. The DAS-II was normed using a

sample consistent with the U.S. census demographics and is considered to have

exceptional reliability, as evidenced by statistics such as a mean internal consistency

reliability coefficients of 0.95 to 0.96 for the General Conceptual Ability (GCA) and

Special Nonverbal Composite (SNC) for the School-Age Battery. The instrument consists

of 20 subtests that measure of variety of cognitive abilities including verbal and visual

working memory, immediate and delayed recall, visual recognition and matching,

processing and naming speed, phonological processing, and understanding of basic

number concepts. The subtests are grouped into the Early Years and School-Age

cognitive batteries with subtests that are common to both batteries and those that are

unique to each battery. These batteries provide a composite score, the General

Conceptual Ability score (GCA), which focuses on reasoning and conceptual abilities. The subtests also contribute to the following composite/cluster areas, as follows: Verbal Reasoning ability (Verbal Comprehension and Naming Vocabulary), Nonverbal Reasoning ability (Picture Similarities and Matrices), Spatial Reasoning ability (Pattern Construction and Copying), School Readiness (Early Number Concepts, Matching Letter-Like Forms, and Phonological Processing), Working Memory (Recall of Sequential Order and Recall of Digits Backward), and Processing Speed (Speed of Information Processing and Rapid Naming). Administered assessments depend on the characteristics of the individual being assessed, such as reasons for referral, typical levels of functioning, and environmental factors.

The subtest scaled scores from the WISC-IV and subtest T-scores from the DAS-II were individually coded into the Culture-Language Interpretive Matrix. The program then calculates an average standard score for each cell, based on subtest scores provided, and produces a corresponding graph. Average standard scores are represented in the matrix graph. When multiple cells contain scores, evaluators are able to visually analyze for a declining or a sporadic pattern. The matrix cells and corresponding core and supplemental subtests using the WISC-IV and DAS-II are designed as follows:

Cell Levels	**Cells**	**WISC-IV Subtests**	**DAS-II Subtests**
Level 1	1	Cancellation Matrix Reasoning	Copying Matching Letter-Like Forms Matrices Pattern Construction Recall of Designs Sequential & Quantitative

			Reasoning
Level 2	2	Block Design Coding Digit Span Symbol Search	Recall of Digits-Backward Speed of Information Processing
	3		Picture Similarities Recall of Objects-Delayed Recall of Objects-Immediate Recognition of Pictures
Level 3	4	Letter-Number Sequencing	Recall of Digits-Forward
	5	Arithmetic Picture Concepts	Early Number Concepts Rapid Naming Recall of Sequential Order
	6	Picture Completion	
Level 4	7		Naming Vocabulary Verbal Comprehension
	8		Phonological Processing
Level 5	9	Comprehension Information Similarities Vocabulary Word Reasoning	Verbal Similarities Word Definitions

Table 1. WISC-IV and DAS-II subtests corresponding to the C-LIM cells.

The data was first analyzed for interpretation within the matrix for culture and language impact. The degree of culture and language impact is indicated in the graph produced using the matrix. Researchers observed the pattern indicated from Cell 1 to Cell 5 for each profile. The C-LIM provides a "difference" level which provides a suggested range of performance to be expected of an English Language Learner. The level of

difference and range of expected performance was disregarded for the purpose of the current study. After researchers visually analyzed profiles, the data from the African American population was then statistically analyzed for discrepancies in matrix profiles compared to the White American population matrix profiles.

Procedure

Data was collected from an educational database of the designated school system for 49 White American and 63 African American students ages 5-15 who were referred for eligibility determination for special education services and administered the WISC-IV or the DAS-II. Upon data collection, race and assessment administered for each student were coded by a secondary researcher to eliminate bias. The primary researcher then entered the scaled scores or T-scores of each subtest administered from the WISC-IV and DAS-II, for each individual profile, into the corresponding cells of the C-LIM. After data entry, two researchers separately analyzed the graphs produced using the C-LIM program, for each profile, in order to provide interrater-reliability.

Profiles were coded as either indicating cultural/linguistic influence (I) or no influence (NI). Profiles are defined as indicating cultural/linguistic influence when the graph indicates a declining pattern of performance across cells, suggesting higher performance on measures of lower cultural and linguistic influence, and lower performance on measures of higher cultural and linguistic influence (Refer to example Figures 2 and 3). Profiles are defined as indicating no cultural/linguistic influence when the graph indicates a valid interpretation of scores, suggesting little to no cultural and/or linguistic influence on the individual's performance (Refer to example Figures 5 and 6). Profiles that elicited discrepant interpretations were further analyzed with a tertiary

researcher to determine a final interpretation. Statistical analyses were conducted using
SPSS after profiles were visually analyzed to determine influences were indeed exhibited
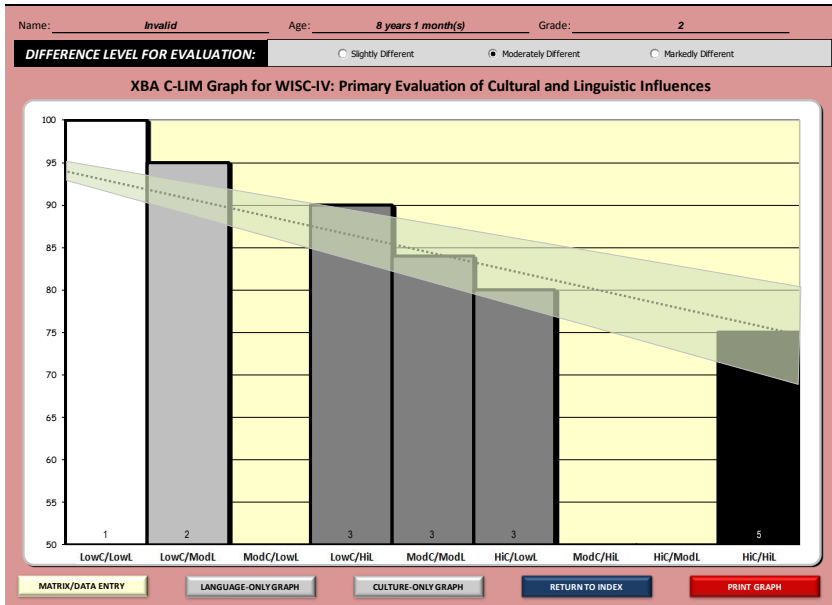among the White American and African American profiles.

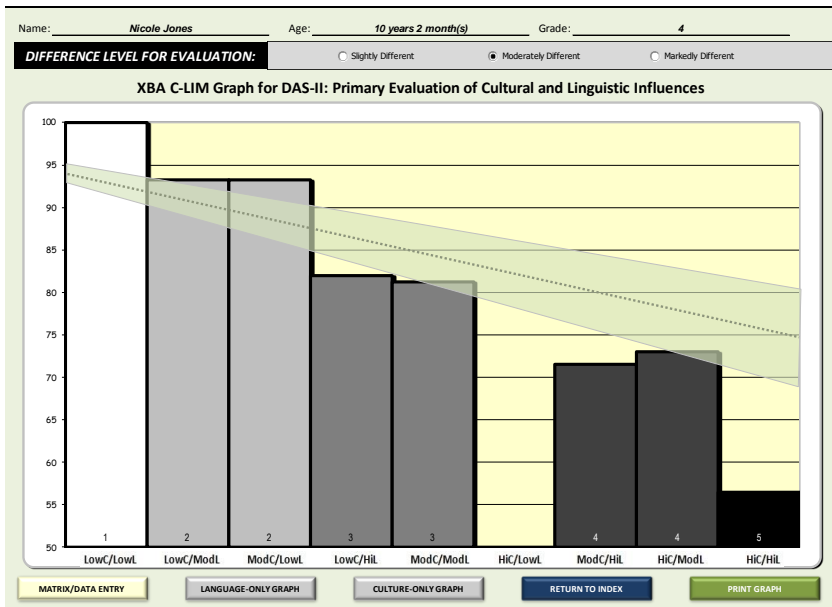*Figure 3*. WISC-IV Profiles Defined as Indicating Cultural/Linguistic Influence.

Figure 4. DAS-II Profiles Defined as Indicating Cultural/Linguistic Influence.
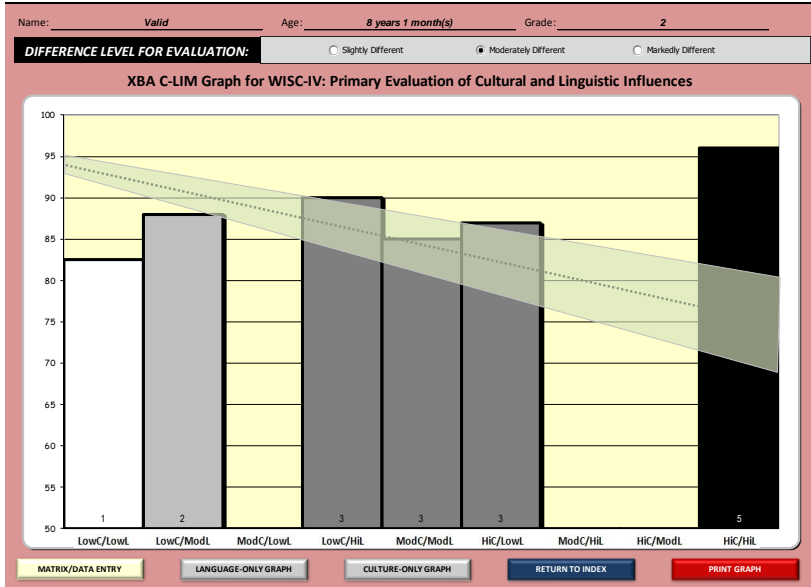
Figure 5. WISC-IV Profiles Indicating No Cultural/ Linguistic Influence.

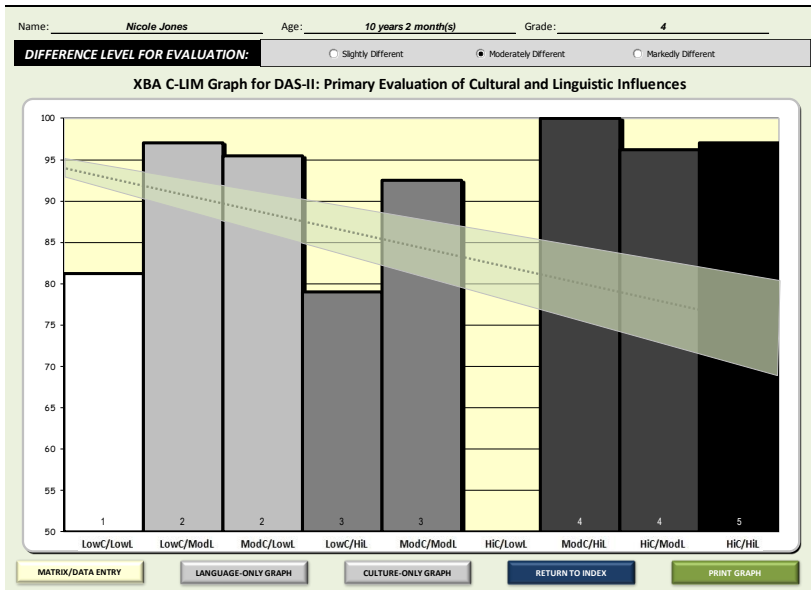*Figure 6*. DAS-II Profiles Indicating No Cultural/ Linguistic Influence.

Results are discussed within the confines of the current study for the purpose of exploring potential patterns and implications of special education eligibility decision making. Special education eligibility and placement for children were determined by the multidisciplinary teams, following assessments by the participating school psychologists.

Decisions were made independent of analyses within this study. The teams followed

Virginia state special education regulations, which align with federal guidelines.

Analysis

After subtest scores collected from the *Wechsler Intelligence Scale for Children,*

4th Edition (WISC-IV) and *Differential Ability Scales, 2nd Edition* (DAS-II) were entered

into the Culture- Language Interpretive Matrix (C-LIM) for each individual profile,

profiles were visually analyzed. Using the C-LIM, researchers visually analyzed profiles

for evidence of a declining pattern or no evidence of a declining pattern. Researchers

coded cultural and linguistic influential patterns for both the White American and African

American populations as "T" for trend or "NT" for no trend. For the purpose of this study

we define "trend" as significant influence of cultural and/or linguistic characteristics on

cognitive performance as defined by the observed pattern consistent with the

approximated declining pattern of the C-LIM. "No trend" is defined as no significant

influence of cultural and/or linguistic characteristics on cognitive performance as defined

by the observed pattern not consistent with the approximated declining pattern of the C-

LIM. Three profiles presented discrepant interpretations and were decided to be

considered not indicative of cultural and/or linguistic influences due to lack of evidence

(i.e., only two cells were represented in the profile). Then, the frequency and percentages

of profiles that indicated cultural and/or linguistic influence among each population were

obtained.

Given indication of influence among both populations, researchers conducted

descriptive statistical analyses using SPSS to compare the African American profiles to

the White American profiles. Dichotomous codes were entered for race (1= White

American, 2= African American) and for patterns observed (1= Trend, 2= No Trend) into

SPSS. A chi-square analysis was conducted to compare the discrepancy and level of

significance of the "race" and "pattern" variables.

Results

The purpose of this study was to explore the patterns of culture and language

influence on cognitive assessment among African American and White American

children, based on patterns defined among the English Language Learner population.

Research questions and findings were as follows:

(1) Do the cognitive profiles of African American individuals who have been

referred for eligibility determination of special education services indicate patterns that

suggest influence of culture and language relative to the approximated declining pattern

of performance as defined by the C-LIM?

The matrix graph for each profile was visually analyzed for patterns indicating

cultural and linguistic influence, as evidenced by higher performance levels on subtests

with little cultural loading and little linguistic demand compared to lower performance on

subtests with high cultural loading and high linguistic demand. Of the 112 profiles, 10

(9%) of the African American profiles exhibited a declining pattern indicating cultural

and linguistic influence. Visual analysis revealed 10 among the 63 (16%) African

American profiles exhibited a declining pattern indicating cultural and linguistic

influence. Refer to Figure 7.

(2) Do the cognitive profiles of White American individuals who have been

referred for eligibility determination of special education services indicate patterns that

suggest influence of culture and language relative to the approximated declining pattern of performance as defined by the C-LIM?

The matrix graph for each profile was visually analyzed for patterns indicating cultural and linguistic influence, as evidenced by higher performance levels on subtests with little cultural loading and little linguistic demand compared to lower performance on subtests with high cultural loading and high linguistic demand. Researchers visually analyzed the matrix graphs for each profile. Of the 112 profiles, 4 (4%) of the White American profiles exhibited a declining pattern indicating cultural and linguistic influence. Visual analysis revealed 4 among the 49 (8%) White American profiles exhibited a declining pattern indicating cultural and linguistic influence.

(3) Given indication of patterns among cognitive profiles of both the African American and White American individuals who have been referred for eligibility determination of special education services that suggests influence of culture and language relative to the approximated declining pattern of performance as defined by the C-LIM, are the patterns indicated by the African American cognitive profiles similar or significantly different from the patterns indicated by the White American cognitive profiles?

Visual analysis revealed 10 among the 63 (16%) African American profiles and 4 among the 49 (8%) White American profiles exhibited a declining pattern indicating cultural and linguistic influence. A Pearson chi-square was performed to examine the relation between race and cultural and/or linguistic influence. The relation between these variables was not significant, X^2 (1, N=112) = 1.50, $p = .22$.

(4) Given a significant difference between the patterns indicated by the African American cognitive profiles and patterns indicated by the White American cognitive profiles, is there more cultural and linguistic influence suggested among the African American cognitive profiles than that of the White American cognitive profiles?

A Pearson chi-square was performed to examine the relation between race and cultural and/or linguistic influence. The relation between the frequency of cultural and linguistic influence on cognitive scores of African American profiles and the frequency of cultural and linguistic influence on cognitive score of White American profiles was not significant, X^2 (1, N=112) = 1.50, p = .22. However, visual analysis revealed higher frequency of cultural/linguistic influence among the African American profiles and less among White American profiles. Results specified 10 among the 63 (16%) African American profiles and 4 among the 49 (8%) White American profiles exhibited a declining pattern indicating cultural and linguistic influence. The chart below illustrates the occurrence of cultural and linguistic influence observed among profiles within each race.
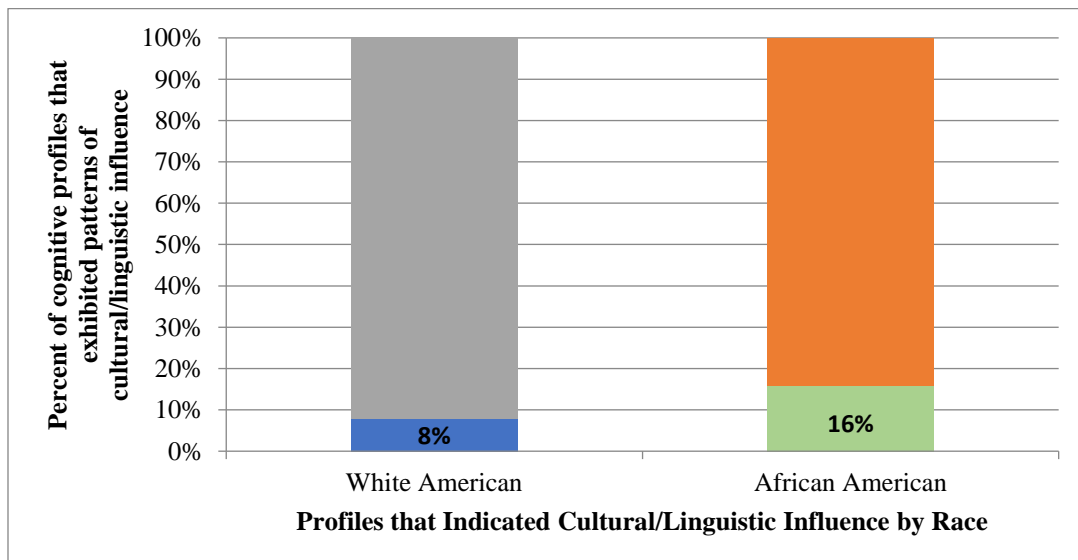
Figure 7. White American and African American Cognitive Profiles that Indicated Cultural and Linguistic Influence.

Discussion

The purpose of the current study was to explore the potential influence of culture and language characteristics among the African American minority population of students referred for special education services. In the field of cognitive assessment, it is known that assessment measures were designed and normed with the majority population consisting of middle class White American individuals. Researchers Flanagan, Ortiz, and Alfonso (2007) considered the phenomenon with the English Language Learning student population. Researchers developed a method to visually analyze the potential degree of culture-language influence on an ELL's cognitive performance, based on research that suggested overall lower levels of performance among English Language Learners (ELL) and further research that suggested particular amounts of cultural and linguistic loading on individual subtests of cognitive assessments. This method is known as the Culture-Language Interpretive Matrix, and can serve as an additional tool to interpret performance and ability. Thus, it seemed worthy of investigation to apply the Culture-Language Interpretive Matrix to the cognitive profiles of African American minority students and to the cognitive profiles of White American nonminority students who have been referred for special education services, to determine if there are significant patterns for minority students that suggest a culture and/or language influence.

In regards to the first two research questions posed, findings from the current study suggest patterns of culture and language influences relative to the declining pattern, as defined by the C-LIM, among both the African American and White American sample

populations. Based on the literature and history that defines cultural and linguistic differences between the two populations, one may suspect an increased occurrence of influence among the African American population, compared to their White American counterparts. Overall, 16% African American profiles and 8% of the White American profiles exhibited scores that may have been impacted by cultural and linguistic factors. As suspected, there were more patterns observed among the African American profiles. However, the difference between the prevalence of cultural and linguistic influence among African American cognitive profiles compared to that of White American cognitive profiles was not found to be statistically significant.

Although results were nonsignificant, observed differences are indication of a need for further investigation. In terms of practice, consideration of caution may be necessary when interpreting the cognitive performance of African American children and others that might share different cultural and linguistic characteristics compared to that of the mainstream, middle class, White population. Given observed patterns of cultural and linguistic influence among both populations, practitioners should consider the demographics of the population with which they are providing services. In other words, even those more closely representative of the mainstream, middle class, White American culture might experience difficulty acculturating to the typical practices in the school system, depending on the characteristics of the general community.

Most importantly, practitioners should consider the potential for cultural and linguistic impact on cognitive assessment in order to encourage a fair, free and appropriate public education (FAPE) in the least restrictive environment (LRE), for each individual. For instance, if the cognitive performance of an African American student

happened to be negatively impacted by differences in culture and language, then

recommendations would likely be to place him/her in special education to receive

services for a learning disability or cognitive impairment. The potential dilemma in this

case is while the student may need accommodations and targeted guidance to acculturate

to the mainstream educational system, he/she may not benefit from removal from the

general education environment. Removing them from the general education environment

could theoretically impact his/her ability to achieve at his/her own potential because it

would remove them from the typical challenges students experience among their

typically functioning peers, and tentatively lower expectations of him/her. Thus, the focus

is recommended to be targeted towards the idea of providing a resilient, fair, and

accepting environment for each and every student.

One may consider the impact of external factors, independent of cultural loading

and linguistic demand. Apparently, there are various factors that contribute to an

individual's performance, including SES and values withheld in the home. For example,

low socioeconomic status could be a factor contributing to low scores and may present in

similar patterns and/or correlate with culture and language. Children raised in poor living

conditions likely may not have access to educational resources such as books at home. In

this case, the child would likely exhibit language deficits. Thus, interpretations of the

current study's results should consider the impact external factors may have on cognitive

performance. Within the community of the current study's sample population, 60.8% of

the students qualified to receive free and reduced lunch. Although such conditions may

be contributing factors, the key point of interpretation is that the student may be

performing at measured levels due to factors other than the mere demonstration of their true ability to achieve.

In conclusion, the purpose of the current study was to explore the usefulness of a tool such as the Culture-Language Interpretive Matrix (C-LIM) for assisting evaluators in the interpretation and eligibility determination process. Findings from the current study suggest such a tool may be helpful for aiding in team decisions regarding services a child may or may not need, based on his/her cultural and language differences from that of the mainstream population. Influences of culture and language were apparent in the cognitive profiles of both the White American and African American children, although more frequently among the African American profiles. Thus, it may be worth investigating the typical patterns of cognitive performance in respect to the cultural loading and linguistic demand for the African American population. A tool such as the matrix developed specifically for the culture of African American individuals could have potential to assist evaluators in determining special education eligibility more appropriately consistent with what the student needs to achieve in school and the community. Consequently, long term outcomes could involve a positive change and decrease the prevalence of African American children placed in special education, more specifically within the Specific Learning Disability (SLD) category. Ultimately, the goal of school personnel and special education teams should be to promote a fair, free and appropriate public education in the least restrictive environment for each and every student, regardless of origin and background.

Limitations and Future Implications

Further investigation of the cultural and linguistic influence upon African American students is encouraged. As previously noted, although the differences in cognitive scores between the African American and White American profiles were not statistically significant, findings revealed apparent patterns of cultural and linguistic influence among both populations, and more so among the African Americans, as suspected. Additionally, a small effect was observed, therefore a larger sample size for future research is suggested. The current study was limited to one community in a rural, southern area with demographics that may have contributed to findings. For instance, the sample population consisted of about 43.8% African American and 50.3% White American individuals and 60.8% children were approved for free and reduced school lunch. Overall, it is necessary to consider the socioeconomic status, environmental factors, and living conditions of the targeted students. The literature clearly suggests the negative impact factors such as socioeconomic status, safety of neighborhoods, parent-child relationships, and conditions in the home have on the academic performance and overall physical, mental, social, and emotional growth of children. Thus, it is conceivable that factors such as SES could have an impact equivalent or close to that observed among race.

Research that involves the investigation of this matter should use a cognitive assessment, or battery of assessments to measure the ability level of target populations that completely correspond to each cell and level within the C-LIM. It would be beneficial to obtain information equally distributed among the matrix in order to provide a more complete profile for interpretation. In the current study, the subtests of the WISC-IV and the DAS-II did not equally contribute to the matrix. For example, subtests on the

WISC-IV do not load into Level 4 of the matrix, while subtests of the DAS-II load into

both cells of Level 4 (i.e., cells 7 and 8). However, this may be limiting due to time

constraints and typical assessment practices utilized among school psychologists.

In addition to considering the way in which the information loads onto the matrix,

one may reconsider the structure of the matrix. The C-LIM was designed to be used with

English Language Learners. Therefore, the level of culture and language may be

perceived differently when analyzing profiles of African American individuals. For

example, African American students that are impacted more by the culture and language

differences in the mainstream school system may exhibit more differences in the area of

culture and less in the area of language, compared to their English Language Learning

counterparts. This is important to consider when analyzing the matrix because differences

in these areas of measurement could produce patterns that suggest influence, but not

necessarily presented in the same declining pattern, or to the same degree, as defined by

the C-LIM. For this reason, the "difference level" (e.g., slightly different, moderately

different, or markedly different) was not included in the analysis of the profiles for the

current study. However, for the development of such a tool specific to the African

American population, one would need to establish an average level of performance and

difference level.

In general, one may also want to consider the accuracy of with which the matrix

was structured. Developers designed the matrix based on average scores obtained from

the bilingual population and categorized subtests based on their typical levels of

performance. For example, lower averages among subtests were categorized as having

moderate-high cultural loading and moderate-high linguistic demand. Higher average

scores among subtests were categorized as having low cultural loading and low linguistic

demand. One may again, argue underlying factors that may have impacted scores could

be factors other than culture and language. In order to develop a tool specific to the

African American population, developers would also need to determine specific areas of

difficulty, as they are likely different from that of the English Language Learner

population. When considering the African American population it is imperative to

reconsider the cultural impact and patterns of performance among the general population,

rather than compare their performance to that of bilingual individuals.

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