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Applying the cultural-linguistic interpretive matrix to neuropsychological assessment

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Applying the Cultural-Linguistic Interpretive Matrix to
Neuropsychological Assessments

Karol J. Mendoza

A research project submitted to the Graduate Faculty of

JAMES MADISON UNIVERSITY

In

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Dedication

I have been blessed throughout my education with supportive family and friends.

I dedicate this particular research to my college friends. Kara, you pushed me outside my comfort zone and supported me as I took risks. I didn't have to look back because I knew you were by my side. Brandi, I couldn't imagine getting through graduate school without our late night study dates. We motivated each other to be productive and were able to accomplish tasks with minimal stress. Even through the distance, you continue to be my moral support. Jackee, you inspire me every day to overcome my own obstacles. You are a strong, passionate, and determined individual who does not let unfortunate circumstances determine outcome. Kate, you have an appreciation for cultural differences that makes you a unique person. You break barriers by wanting to understand and experience life through the eyes of others. Sophia, you encourage me to be more decisive and perseverant. You have shown me that change is possible, if you act on it. You taught me that people are not going to understand unless I speak up and educate them. My efforts to create change are in hope to provide equal opportunities for others to be successful. I know I could not have done this alone and that I am a stronger individual because I am part of a greater team.

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Abstract

Psychologists are administering assessments to culturally and linguistically diverse individuals with limited information regarding validity and are left with many scores to subjectively interpret. This study looked at developing a guideline when administering seven frequently administered neuropsychological assessments based on the Cultural-Linguistic Interpretive Matrix. Practitioners were asked to rate the cultural loading and linguistic demand and provide rationale for the placement. Results indicated that the Judgment of Line Orientation, Rey-Osterrieth Complex Figure Test, Trail Making Test (Part A), and Wisconsin Card Sorting Test have low cultural loading and linguistic demand. The Trail Making Test (Part B) was rated as Moderate Cultural Loading and Moderate Linguistic Demand. The Boston Naming Test was rated as moderate cultural loading and high linguistic demand. Finally, the Controlled Oral Word Association and Semantic Fluency were rated as high cultural loading and high linguistic demand. Practitioners are recommended to continue to be aware of the influences of culture and language, even on assessments that are minimally influenced. Assessment of English Language Learners is difficult, since they may require five or more years of intensive daily English language instruction to develop a level of academic language proficiency that is comparable to that of native-language speaking peers.

Introduction

It is very challenging for school psychologists and neuropsychologists to evaluate children from culturally and linguistically different backgrounds than the norm. All psychological assessments are biased to some degree to the culture in which they were developed. Consequently, it is not always clear if impairment in performance is a function of a disability (e.g. traumatic brain injury, intellectual disability, etc) or due to the cultural and linguistic demands of the assessments. The Cultural-Linguistic Interpretive Matrix (C-LIM) was developed as a framework to construct batteries that are fairer to individuals from diverse background and to guide interpretation of results in a less discriminatory manner (Flanagan, McGrew, & Ortiz, 2000). Currently, the matrix primarily addresses cognitive assessments. Psychologists are also in need of a methodology to assist with differentiation within neuropsychological assessment. The focus of this research will be on issues surrounding assessment of students from culturally and linguistically diverse backgrounds.

Mendoza, Ernst, Trice, and Warner's (2007) study was preliminary research conducted with a convenience sample of graduate students in the School Psychology Program at James Madison University. The students were presented with the assessments and based on the cultural loading and linguistic demand rated each

assessment on the C-LIM. The results of the study indicated there was justified concern that needed further research. The neuropsychological assessments ranged from ratings Low Cultural Loading- Low Linguistic Demand to High Cultural Loading-High Linguistic Demand (Appendix A). This current study is a continuance of the previous research and investigated the experiences of practitioners who have evaluated students from culturally and linguistically diverse backgrounds

Impact of Legislation on Assessment of Culturally and Linguistically Different Learners

In 1974, the state of California reached an out-of-court settlement in *Diana v. California State Board of Education*. The two provisions relevant to the administration of tests to children were (a) children had to be tested in their own language as well as in English, and (b) nonverbal IQs could be substituted for full-scale IQs in assessing students with limited English proficiency (Figueroa, 1989). The first provision led to Public Law 94-142 (Education of All Handicapped Children), which states that in order to receive federal funds, states must develop and implement policies that assure a free and appropriate public education (FAPE) to all children with disabilities. The second provision legitimized the most common testing procedure used with bilingual students since the 1920s. For many years it has been assumed that eliminating the verbal aspect of a test could control the influences of culture. Nonverbal tests have been used, and

continue to be used, despite the evidence that nonverbal tests may still be culturally biased. Figueroa (1989) also states that there is now data suggesting that nonverbal tests predict less reliability than verbal measures.

In 1975, Congress passed Public Law 94-142 and reauthorized it in 2004 and is now known as the Individuals with Disabilities Education Improvement Act (IDEA). The importance of this act in relation to this proposed study is that it “mandates that instruments used in the assessment of handicapped children be administered in the children’s native language or mode of communication unless it clearly is not feasible to do so” (*The Education for All Handicapped Children Act, 1975*).

Current Practices for Assessing non-English Speakers

The current options for assessing non-English speakers include: Translate the instrument/materials, use an interpreter, use assessments that are norm referenced in the primary language and ideally also on the participants’ culture, or use a bilingual psychologist. When conducting an assessment, one must understand that there may still be cultural bias due to the wide range of differences *within* the culture. Caution must also be used when translating a test because construct validity may be violated. The original meaning of a phrase may be lost in translation and though it is easy to translate a test, it is difficult to translate psychometric properties (Figueroa, 1989). Frequently,

neuropsychological tests are simply translated to Spanish literally with little consideration of cultural relevance (Ostrosky-Solis, Ardila, & Rosselli, 1999).

Most of the current research and practices surround the Spanish-speaking population. Currently, there are few neuropsychological tests for Spanish-speaking children despite the fact that Spanish is the third most widely spoken language in the world and the second most commonly spoken language in the United States. The United States represents the fifth-largest Spanish speaking country in the world (Mexico, Spain, Colombia, Argentina, and the U.S.) with over 20,000,000 Spanish speakers (Ostrosky-Solis, Ardila, & Rosselli, 1999). The growth of the Spanish-speaking population in the United States has been approximately 60% to 80% in the past two decades. It is expected by the year 2050, one in every four Americans will be Hispanic and at least 50% of that population will be foreign born and Spanish speaking (U.S. Bureau of the Census, 1999).

Neuropsychologists are bound to interact with children that are culturally and linguistically diverse. Therefore, it is vital to find the appropriate tools to accurately assess this population, especially the ever-increasing Hispanic population. Attempts have been made in translating existing assessments into Spanish in hopes that it is equivalent to the original. Sattler, Avila, Houston, and Toney (1980) administered the Spanish and English versions of the Peabody Picture Vocabulary Test on bilingual Mexican-American

children because there were no known tests that had been standardized on a representative sample of Hispanic-American children living in the United States. The comparison between the norms and Hispanic-American children may lead to misleading test results and interpretation. For example, culture provides a context for processing information (Ardila, 2003). Ardila states that each culture emphasizes certain elements of life, depending on their specific environment conditions, history, and contact with other cultures that are very likely to affect test performance and results.

The Sattler et al. (1980) study looked at the effect of age and language used in the assessment (Spanish or English) and the effect on test performance. The results of this study led to the following recommendations when testing Hispanic children: First, the child's preferred language should be determined because one cannot assume equal competence in both languages. Second, the preferred language should be used in administering the assessment. The investigators also discuss that the classification decisions based exclusively on the neuropsychological test could lead to many Hispanic preschoolers incorrectly being labeled mentally retarded.

Sources of Cultural Bias

Culture clearly plays a role in neuropsychological assessment performance and no assessment can be completely culture-free. Van de Vijver (1997) is one of many

researchers who have noted problems with bias and cultural equivalence in assessments. He identifies three types of bias in assessment: construct bias, method bias, and item bias. Construct bias can be illustrated when behaviors associated with one of the measurements is not identical across cultural groups. Construct bias exists when the test is no longer accurately measuring the construct or trait that it is designed to measure, such as bilingualism. The second type of bias, method bias, represents measurement problems at the test level, such as the mastery of the testing language or familiarity with the test stimuli. Previous exposure to the psychological tests or similar tasks may have an effect on the individual's performance. The last bias, item bias, refers to differential item functioning across groups. Item bias occurs when individuals with the same ability do not have an equal probability of getting the same answer on a test.

The degree of cultural influence on neuropsychological tasks may not be obvious but studies have shown that inaccurate results may be obtained when evaluating children from culturally and linguistically diverse backgrounds. Rosselli and Ardila (2003) discussed the inappropriateness in assessing participants from non-western societies using drawing tests. It has been shown that some tasks require cognitive strategies adopted by certain cultures and not others. They found that some skills are learned and are "school-dependent." Those with higher education attainment perform better on most

neuropsychological tests. It is also important to remember that education is a reflection of the culture. The education received in the United States may not be equivalent to the education received elsewhere.

In neuropsychology, cognitive disturbance associated with brain pathology have only been studied in contemporary Western, and most often urban-middle class, and literate brain-damaged individuals. Ardila and Moreno (2001) stated that the current understanding about the brain pathology is undoubtedly culturally biased. In this study, Aruaco Amerindians of Colombia were evaluated using a brief and simple neuropsychological test battery (i.e. copying a cube, Rey-Osterrieth Complex Figure Copy, RCFT Immediate Memory, Block Design from the WISC-R, Recognition of Overlapped Figures, Recognition of Figures—multiple choice, Ideomotor Praxis Test, Draw-a-Map Test, Spatial Memory, Verbal Fluency, Modified Wisconsin Card Sorting Test). The tests were selected based on three criteria: (1) short and easy to administer, (2) adaptability to the Indian living condition, and (3) sampling a large range of cognitive abilities. Ardila and Moreno found that in most of the tests the younger participants performed higher than then older group; however, in some tests the performance was similar between the two age groups. Younger children seem to have more exposure to Western cultural elements through direct contact and school. The older participants were

more traditional and had less exposure to the Western cultural influence. In other words, younger children seem to have a higher level of acculturation, which leads to better performance on neuropsychological tests that are culturally loaded.

The Aruacos had no previous exposure to map drawing and probably did not understand the purpose of the task. When given test instructions in a formal language (i.e. academic language) it may be difficult for those with no formal education to understand. When compared to samples from Bogotá, Colombia and Canada, two cultures operationally defined as western, the Aruacos' score on the Rey-Osterrieth Complex Figure was significantly lower. The researchers noted that the Aruaco culture does not reinforce the recall of such irrelevant drawings. Therefore, nonverbal tests appear to be subject to similar cultural biases as verbal tests. It is unfair to assess a child and make decisions about their ability based on tasks that he or she has not been exposed to before and then make a comparison to the norms of children who have had such exposure.

Impact of Education

Current studies show that learning to read and write during childhood influences the functional organization of the adult human brain. Learning to read stimulates the development of many cognitive abilities and reinforces certain fundamental abilities,

such as verbal memory, phonological awareness, and certain types of visuospatial discrimination. Therefore, it is not surprising that the participants with no formal education scored lower on the tests that tap into these abilities (Ardila, 2003). They were virtually unable to draw a cube or copy the Rey-Osterrieth Complex Figure.

Interestingly, they actually had never used a pencil before, nor had they ever previously had performed the task of drawing or copying anything. Most of the tests were confusing and the participants were unable to comprehend the task. The lack of understanding could also be attributed to the verbal instruction. Even though there was no language involved in the nonverbal measures, they were not appropriate tests for cross-cultural use.

Assessing the Language Skills of Students with Limited English Proficiency

English Language Learners may require five or more years of intensive, daily English language instruction to develop a level of academic language proficiency that is comparable to that of native-language speaking peers (Woodcock, Munoz-Sandoval, Ruef, & Alvarado, 1993). Learning to read, as a cultural extension of oral language, provides new strategies to organize and conceptualize the incoming information. It further reinforces certain abilities (verbal memory, lexical knowledge, etc.) frequently included in standard cognitive testing (Ardila, 2003). Language performance and academic success are closely related and differentiating a language disorder from a bilingual, cross-

cultural difference in a student with limited English proficiency is important to all specialists (Langdon, 1989). It has been found that if a language disorder exists in the primary language, then it will also be reflected in the second language. Zavala and Mims (1983) found that the population with a learning disability, in general, demonstrated an underdeveloped proficiency in both their primary and secondary language ability. Their findings supported Cummins' (1979) notion that bilingual students need to attain a threshold level of linguistic proficiency in their native language in order to allow the potential beneficial aspects of being bilingual to influence their cognitive growth.

Bilingualism is yet another factor that may impact test performance on measures of verbal fluency. Rosselli, Ardila, Salvatierra, Marques, Matos, and Weekes (2002) found cross-linguistic similarities in oral verbal fluency scores in Spanish-English bilinguals and English and Spanish monolinguals. Word generation between monolingual English and Spanish participants was similar, but it significantly decreased in performance of bilinguals in the English language. The research discussed that the bilingual participants may have experienced interference between the two languages when performing the semantic category fluency task in their second language. Bilingual individuals cannot simply provide the first word that comes to mind, but must suppress one language and verify that each word belongs to the target language.

To conclude that a child with limited English proficiency (LEP) has a language disorder, the assessor needs to rule out factors that may lead to the appearance of a language disorder (Langdon, 1989). Factors to consider include: (1) Length of residence, (2) Attendance-disruption of schooling, (3) Type of classrooms and programs the student attended, (4) use of languages, and (5) health and developmental factors.

Length of residence is considered because a student may develop language problems in English because of limited exposure to English or interrupted exposure due to migration between countries. Many families migrate to the United States to work temporarily and then return to their native country. Migrant workers must also be taken in consideration, since they are constantly moving for their employment, interrupting the education of the child. Also, most students with LEP are considered “sequential bilinguals” because they do not acquire English until after they enroll in school, usually at four or five years of age (Ortiz & Kushner, 1997).

Attendance-disruption of schooling is a factor to consider in regards to the development of academic language proficiency. Attendance and cognitive academic language proficiency (CALP) are positively associated, the higher the attendance, the higher the probability of acquiring CALP skills. The next factor to consider is the type of classrooms and programs the student attended. The instructional language and

modifications must be determined to eliminate it as causing the student's academic failure or lack of progress in acquiring the second language.

The fourth factor, use of languages, is considered when a student does not respond to a task to rule out experience or exposure to certain linguistic activities. Peer comparison, which assesses the child's language experience and linguistic background, must also be considered as a possible factor. The parent should be interviewed to determine the language experiences of the student. The assessor must also determine if the student has the same difficulties at home or whether the student's difficulties can be attributed to using language in a more academically oriented context.

The final factor to consider is health and developmental factors. Language disorders may resemble cases of mental retardation, malnutrition, visual, hearing, motor, and emotional handicaps. Therefore, it is vital to rule out these factors by looking at the student's health and developmental history.

Research Literature on Recommended Practices

The Bateria Woodcock Psicoeducativa en Español (the Psycho-educational Woodcock Battery in Spanish) was developed in 1982 and the Bateria Woodcock-Muñoz-Pruebas de Habilidades Cognitivas Revisada (The Revised Woodcock-Muñoz Cognitive Ability Test Revised) in 1996. The norms for these tests were obtained using a

sample of 802 children from Costa Rica, Mexico, Peru, Puerto Rico, and Spain. These two tests are among the few Spanish cognitive-test batteries that test cognitive ability, academic achievement, and scholastic aptitude and can also be useful for neuropsychological assessment.

The Evaluación Neuropsicológica (Neuropsychological Evaluation, NEUROPSI), a short, standardized, neuropsychological test battery for use with Spanish-speaking adults, is another test battery that has been developed for Spanish speaking children. The items included are relevant for Spanish-speaking individuals and can be applied to persons who are illiterate or from low educational groups. The battery included language and picture tests that vary in frequency of occurrence in the Spanish language (Aveleyra et al., 1996). Ostrosky, Ardila, and Rosselli (1999) suggest the NEUROPSI as the test that may help fill the need for brief, reliable and objective evaluation of a broad range of cognitive functions in Spanish-speaking people. It is the only available Spanish instrument that provides norms across a broad range of ages and education levels including people that are illiterate, primary school, high school, and professional level.

Ardila (1995) decided that instead of developing a “culture-free” or “culture-fair” measure, it would be more appropriate to consider a continuum ranging from “heavily

culture-loaded” to “highly culture-reduced.” There are various cultural factors that could affect test results, thus, Ardila suggested some criteria to reduce the amount of culture loading in psychological tests. For instance, performance tests (instead of paper-and-pencil tasks), oral instructions (instead of printed instructions), pictorial (instead of written), and oral responses (instead of written responses). Ardila also suggested, power tests (instead of speed tests), nonverbal content (instead of verbal content), and abstract reasoning (instead of specific factual knowledge). Finally, Ardila suggested non-scholastic skills (instead of scholastic skills), and solving novel problems (instead of recall of previously learned information). Ardila acknowledges that there are still cultural influences within these suggestions; however, they should be taken into consideration in neuropsychological testing when performing cross-cultural comparisons.

Guidelines to Assess Culturally and Linguistically Diverse Individuals

The foundation to accurately assessing an individual requires the psychologist to acknowledge the influences of culture and language on behavior and awareness when assessing diverse individuals. The view that cultural differences are primarily due to language differences is a misconception. The ability to communicate with an individual does not guarantee accurate and nondiscriminatory assessment. This is an essential

understanding in the validity of the methods and procedures used during assessment and the interpretation of the results (Flanagan & Ortiz, 2001).

Flanagan and Ortiz (2001) described four essential points for practitioners to be aware of when assessing culturally and linguistically diverse individuals.

- (1) All tests are culturally loaded and reflect the values, beliefs, and knowledge that are deemed important within the culture in which the tests were developed—for example, U.S. mainstream culture.
- (2) All tests require some form of language (or communication) on the part of both the examiner and the examinee. Such factors may affect administration comprehension and task performance, which include nonverbal tests.
- (3) Tests vary significantly on two dimensions—the degree to which they are culturally loaded and the degree to which they require language.
- (4) Interpretation of results from standardized tests using existing norm groups for performance comparisons may be invalid for diverse individuals.

Cultural-Linguistic Interpretive Matrix (C-LIM)

Flanagan, McGrew, and Ortiz (2000) have developed a 3x3 matrix that provides the essential information of a single battery regarding classification according to its degree of linguistic demand, degree of cultural loading, and the Cattell-Horn-Carroll Cross Battery broad and narrow ability classifications. The matrix is simple and easy and presents the information in a visual representation. The majority of the classification of cognitive assessments, however, was subjective and derived primarily through the integration of substantive issues presented in the literature as well as expert judgment. The classification matrix is insufficient, by itself, to establish a comprehensive basis for assessment of diverse individuals; however, it is identified as a guideline in both the diagnosis and the interpretive arenas.

The purpose of this study was to use empirical research findings, the Cultural-Linguistic Interpretive Matrix (Flanagan et al, 2000), as well as expert judgment to assess the impact of culture and language on commonly used neuropsychological assessments for individuals from culturally and linguistically diverse backgrounds. This study looked at seven commonly used neuropsychological assessments selected from a survey (Rabin, Barr, and Burton, 2005) conducted with neuropsychologists to determine which assessment practices were most frequently used. The cultural and linguistic loadings

were first hypothesized based on the research and then the final placement of each assessment on the C-LIM was determined based on the findings of this study.

Trail Making Part A & B (TMT-A&B)

The Trail Making Test is used to assess visual search, psychomotor speed, and mental flexibility. It is ranked as the most frequently used attention assessment instrument, third most frequently used neuropsychological assessment instrument, 16th memory assessment instrument, fourth executive functioning assessment, and 36th return to work assessment instrument (Rabin et al, 2005). It is also the most frequently administered neuropsychological test in English-speaking countries (Lu & Bigler, 2002).

The TMT consists of two parts: Trail Making Test Part A and Trail Making Test Part B. Part A instructs the participant to make a line connecting the circles with numbers in ascending order as quickly as possible. The circles, numbered 1 – 25, are spaced on the page in a pattern that appears to be random but allows the circles to be connected without intersecting lines. In Part B there are also 25 circles arranged in a pattern that appears random, but 13 circles are numbered 1 to 13, and the remaining 12 are lettered A through L. The individual must still connect each circle with a line, but in Part B the order alternates from number to letter. The individual will start with 1 and

connect to A, A to 2, 2 to B, B to 3, and so on. For both Part A and Part B, the score is the total time in seconds required to complete the task.

It was hypothesized that Part A was low in linguistic demand because there is no verbal response and the instruction is simple and straightforward. The cultural loading was hypothesized to be moderate because of the time factor and the competitiveness of the task. Part B was hypothesized to be moderate linguistic demand and moderate cultural loading because of the relatively high complexity of the instruction.

Rey-Osterrieth Complex Figure Test (RCFT)

The RCFT assess visual memory, visuospatial organization, and visuoconstruction. It is ranked the eighth most commonly administered neuropsychological assessment instrument, third memory assessment instrument, second executive functioning assessment instrument, and 36th return to work assessment instrument (Rabin et al, 2005).

There are four separate tasks to this test: Copy Trial, Immediate Recall Trial, Delayed Recall Trial, and Recognition Trial. The Copy Trial instructs the individuals to look at a complex figure stimulus card and copy it onto a blank sheet of paper. Then three minutes of unrelated verbal activity follow. The Immediate Recall Trial then instructs the individual to draw the figure from memory on a blank sheet of paper. The

individual is then given the Delayed Recall Trial 30 minutes after the Copy Trial. The individual is instructed to draw the figure from memory on a blank sheet of paper. The last task is the Recognition Trial, which consists of 24 geometric figures, 12 of which are individual scoring elements of the stimulus figure and 12 of which are distracters. The individual is instructed to indicate which of the 24 recognition items he or she recognizes as being part of the stimulus figure.

It was hypothesized that the RCFT was low linguistic demand and moderate cultural loading. The linguistic demand was believed to be low because there is no verbal response and the instruction is simple and straightforward. RCFT is considered a nonverbal test; however, this does not make it “culture-free.” Ardila and Moreno (2001) found differences between age and education in their study of Aruaco Amerindians of Colombia, South America. Copying figures and drawing are tasks that are not generally reinforced in the Aruaco culture (Rosselli & Ardila, 2003). Aruaco participants showed difficulties in remembering the details of complex figures, whereas Canadian and western-Colombian participants had a higher performance. The RCFT is believed to be an unfair test for individuals belonging to similar cultures where there is little reinforcement for the recall of nonsense drawings.

Benton Judgment of Line Orientation (JLO)

This test is used to assess visuospatial perception without requiring a motor response. It is ranked 11th in return to work assessment instruments (Rabin et al, 2005). The individual is instructed to look at the position of lines and indicate the matched pair from a selection of different lines.

It was hypothesized that the JLO was low linguistic demand and low cultural loading. Linguistic demand was believed to be low because the directions are short, simple, and straightforward. The individual's response can be either verbal or can be indicated by pointing to the matched pair. The cultural influence was believed to be low because similar tests have previously been rated as such (Flanagan & Ortiz, 2001).

Boston Naming Test (BNT)

The Boston Naming Test primarily assesses expressive language and is mainly used to detect aphasia. It was ranked 13th neuropsychological assessment instrument, fourth memory assessment instrument, and 19th return to work assessment instrument (Rabin et al, 2005). It provides a detailed examination of naming abilities ranging from simple, high-frequency vocabulary ("tree") to rare words ("abacus"). Pictures depicting objects are presented one at a time on cards and the examinee has to name the object. If

the examinee is unable to do so, a stimulus cue (e.g. it is an instrument) and a phonemic cue (e.g. it starts with the sound “dr”) are provided.

It was hypothesized that the Boston Naming Test was high linguistic demand and high cultural loading. The BNT requires expressive language to respond and many of the items are from mainstream U.S. culture (e.g. picture of a trellis). Thus the items may not be appropriate for individuals from other cultures. Individuals from other cultures may not have been exposed to the items and therefore may be unable to name them due to cultural and/or linguistic differences as opposed to a language disturbance such as aphasia. Barker-Collo (2001) found that non-clinical New Zealand university students performed significantly worse when compared to American norms. Barker-Collo concluded that the cultural bias in performance might have been underestimated. Most errors were found for word-items that are not frequently used in the Australian English language, such as *beaver* and *pretzel*. Barker-Collo also found that on the item *canoe* all the Maori individuals gave the response “waka,” a Maori word used to refer to a large war canoe. When the data was reevaluated, accepting “waka” as a correct answer, performance on the item was not significantly different from the norm.

In addition, Hermans, Bongaerts, DeBot, and Schreuder (1998) found that bilingual speakers cannot suppress activation from their first language when naming

pictures in a second language. The BNT may therefore be influenced by bilingualism as well as culture. Individuals with a higher education level were also found to have a broader vocabulary due to an increase in exposure to verbal educational materials. Thus, educational level, dialect, country of origin, geographical location, socioeconomic status, gender, age, proficiency in each language spoken context and age of acquisition of each of the languages must also be considered when assessing language skills on tasks such as the BNT (Kohnert, Hernandez, & Bates, 1998).

Controlled Oral Word Association (COWA)

Controlled Oral Word Association assesses verbal fluency. The individual is given 60-second trials for the three (F,A,S) word retrieval task. It is ranked 19th neuropsychological assessment instrument, sixth memory assessment instrument, 16th attention assessment instrument, fifth executive functioning assessment instrument, and 30th return to work assessment instrument (Rabin et al, 2005).

COWA was hypothesized to be high linguistic demand and moderate cultural loading. The instrument instructions may be easy to read, but the response is high in vocabulary. The selected letter and semantic category affect the level of difficulty (Matute, Rosselli, Ardila, & Morales, 2004). Matute et al. (2004) also found support for the cross-cultural validity of verbal fluency tests. If the appropriate semantic are selected

and significant variables are controlled (e.g. age and education) similar performance can be expected from diverse individuals. Standardized testing, however, often requires a specific category to be selected, which may adversely impact performance. Moreover, culture may still influence the generation of words because the educational systems differ heavily between countries (Benito-Cuadrado, Esteba-Castillo, Böhm, Cejudo-Bolivar, Peña-Casanova, 2002). The frequency of words beginning with a specific phoneme may also impact performance. The instrument also requires the tasks to be timed and the possibility of interference in bilingual participants may affect the time dedicated to producing a given word (Gollan, Montoya, & Werner, 2002).

Semantic Fluency (SF)

Semantic Fluency assesses word generation in response to a category cue. The individual is instructed to name as many animals as they can in one minute. It is ranked 30th memory assessment instrument, and 28th executive functioning assessment instrument (Rabin et al, 2005).

Semantic Fluency was believed to be high linguistic demand and high cultural loading because of the similarities to COWA's stimuli, administration, and scoring instructions.

Wisconsin Card Sorting Test (WCST)

The WCST assesses nonverbal concept formation and mental flexibility. It is ranked the most frequently used executive functioning assessment instrument, seventh neuropsychological assessment instrument, 14th memory assessment instrument, sixth attention assessment instrument, and 30th return to work assessment instrument (Rabin et al, 2005).

Four cards are placed in front of the child, and two sets of 64 response cards become the child's deck. The child must match each consecutive response card to the examiner's cards according to the principle the child devises. The child is told whether he or she is right or wrong without explanation. The child is unaware that one of the three sorting principles changes at a certain time and he or she must adjust to the change.

The WCST was hypothesized to be high linguistic demand and moderate cultural loading. The instructions to the WCST are somewhat long and complicated and an individual taking the computer version must be familiar with using one. Coffey, Marmol, Schock, and Adams (2005) found a significant difference in performance between a Mexican-American sample and the English norms. The researchers concluded that the WCST is not a culture-free neuropsychological instrument. This study demonstrated that

the use of English norms on Mexican-Americans could produce false indications of executive functioning deficits in normal individuals.

Methods

Participants

Participants were professionals with neuropsychological training in administration of neuropsychological instruments to individuals from culturally and linguistics diverse backgrounds. The review panel consisted of 13 participants (6 females, 7 males) that held various neuropsychological endorsements. They attended different doctoral training programs and participated in different internships. Six participants did year-long neuropsychology post-doctoral fellowships. All participants self-identified as American (with some reservations) and all speak English at home. Four participants grew up in homes that spoke a language other than English. Eight of the participants currently work in urban settings, two in rural settings, and two in suburban settings where half or more of the clients are children and adolescents.

Procedures

Participants were recruited by professional contact and professional networking. Professional contact included professionals that were personally known to the investigators. Professional contacts were asked to recruit other professionals to be contacted by the investigators through email and/or phone calls. The participants were mailed a packet with instructions, an example of how to rate the test, a blank form to

indicate if the test is low, moderate, or high in cultural loading and linguistic demands, space to give rationale to the rating, and demographic information (Appendix B).

Participants were then asked to fill out the packet based on their own professional knowledge and experience. After completing the information, participants were asked to mail back the packet in the self-addressed and stamped envelope provided. The researcher then received the packet and removed the participant's name from the master list; the packet was then coded to maintain confidentiality of the participant.

Instruments

A 3x3 matrix was used indicating low cultural-low linguistic, low cultural-moderate linguistic, low cultural-high linguistic, moderate cultural-low linguistic, moderate cultural-moderate linguistic, moderate cultural-high linguistic, high cultural-low linguistic, high cultural-moderate linguistic, and high cultural-high linguistic.

Analysis

In order to test hypothesis number one, that the Trail Making Test Part A was moderate cultural loading and low linguistic demand, the cultural median and linguistic median were analyzed in regards to placement on the matrix and Qualitative Analysis was used to interpret the rationale given. Information gained from the Qualitative

Analysis that differed from the research was reported individually; otherwise, agreement among raters was summarized and reported.

In order to test hypothesis number two, that the Trail Making Test Part B was moderate cultural loading and moderate linguistic demand, the cultural median and linguistic median were analyzed in regards to placement on the matrix and Qualitative Analysis was used to interpret the rationale given. Information gained from the Qualitative Analysis that differed from the research was reported individually; otherwise, agreement among raters was summarized and reported.

In order to test hypothesis number three, that the Rey-Osterrieth Complex Figure Test was moderate cultural loading and low linguistic demand, the cultural median and linguistic median were analyzed in regards to placement on the matrix and Qualitative Analysis was used to interpret the rationale given. Information gained from the Qualitative Analysis that differed from the research was reported individually; otherwise, agreement among raters was summarized and reported.

In order to test hypothesis number four, that the Benton Judgment Line of Orientation was low cultural loading and low linguistic demand, the cultural median and linguistic median were analyzed in regards to placement on the matrix and Qualitative Analysis was used to interpret the rationale given. Information gained from the

Qualitative Analysis that differed from the research was reported individually; otherwise, agreement among raters was summarized and reported.

In order to test hypothesis number five, that the Boston Naming Test was high cultural loading and high linguistic demand, the cultural median and linguistic median were analyzed in regards to placement on the matrix and Qualitative Analysis was used to interpret the rationale given. Information gained from the Qualitative Analysis that differed from the research was reported individually; otherwise, agreement among raters was summarized and reported.

In order to test hypothesis number six, that the Controlled Oral Word Association was moderate cultural loading and high linguistic demand, the cultural median and linguistic median were analyzed in regards to placement on the matrix and Qualitative Analysis was used to interpret the rationale given. Information gained from the Qualitative Analysis that differed from the research was reported individually; otherwise, agreement among raters was summarized and reported.

In order to test hypothesis number seven, that the Semantic Fluency was high cultural loading and high linguistic demand, the cultural median and linguistic median were analyzed in regards to placement on the matrix and Qualitative Analysis was used to interpret the rationale given. Information gained from the Qualitative Analysis that

differed from the research was reported individually; otherwise, agreement among raters was summarized and reported.

In order to test hypothesis number eight, that the Wisconsin Card Sorting Test was moderate cultural loading and high linguistic demand, the cultural median and linguistic median were analyzed in regards to placement on the matrix and Qualitative Analysis was used to interpret the rationale given. Information gained from the Qualitative Analysis that differed from the research was reported individually; otherwise, agreement among raters was summarized and reported.

		Degree of Linguistic Demand		
		<i>Low</i>	<i>Moderate</i>	<i>High</i>
Degree of Cultural Loading	<i>Low</i>	JLO		
	<i>Moderate</i>	RCFT TMT-A	TMT-B	COWA WCST
	<i>High</i>			BNT SF

Table 1: Visual Representation of Hypotheses

Results

2-directional Median Analysis

The following assessments were rated as expected based on the degree of cultural loading: Judgment of Line Orientation (Low Cultural), Trail Making Test- B (Moderate Cultural), and Semantic Fluency (High Cultural). The following assessments were rated less culturally loaded than hypothesized Trail Making Test- A (Low Cultural), Rey-Osterrieth Complex Figure Test (Low Cultural), Boston Naming Test (Moderate Cultural), and Wisconsin Card Sorting Test (Low Cultural). The Controlled Oral Word Association Test was rated higher in the degree of cultural loading than hypothesized (High Cultural).

The following assessments were rated as expected based on the degree of linguistic demand: Trail Making Test-A (Low Linguistic), Rey-Osterrieth Complex Figure Test (Low Linguistic), Judgment Line of Orientation (Low Linguistic), Trail Making Test-B (Moderate Linguistic), Controlled Oral Word Association (High Linguistic), Boston Naming Test (High Linguistic), Semantic Fluency (High Linguistic). The Wisconsin Card Sorting Test was rated less linguistically demanding than hypothesized (Low Linguistic).

		Degree of Linguistic Demand		
		<i>Low</i>	<i>Moderate</i>	<i>High</i>
Degree of Cultural Loading	<i>Low</i>	JLO RCFT TMT-A WCST		
	<i>Moderate</i>		TMT-B	BNT
	<i>High</i>			COWA SF

Table 2: Visual Representation of Participant Results

Qualitative Analysis

The following information is derived from the overall trends in participant response for the assessments indicated in the specified cell. The raw qualitative data can be found in Appendix D.

Low Cultural- Low Linguistic Assessments

The participants indicated that task familiarity through similar games and activities may give mainstream children an advantage over children from different

cultures. There is also minimal verbal responses and comprehension required to perform the tasks.

Moderate Cultural- Moderate Linguistic Assessment

Verbal comprehension of the lengthy and somewhat complicated instructions elevated the linguistic demand of the Trail Making Test-B. The assessment is also dependent on the English language alphabet, thus, increasing the cultural loading in comparison to the TMT-A.

Moderate Cultural-High Linguistic Assessment

The level of acculturation and exposure to vocabulary were indicated to influence performance on the Boston Naming Test. The test requires a verbal response to cultural objects and thus indicates a higher cultural and linguistic demand.

High Cultural-High Linguistic Assessment

The requirement of timing was indicated as culturally loaded and the lack of cultural importance to respond quickly may hinder the child's performance. Also, task familiarity through games that emphasize the use of beginning letters may give mainstream children an advantage to quickly recall information.

Discussion

The levels of cultural loading were more difficult to determine because it is more of an abstract concept and there was less consistency between the hypotheses and participant responses. The participants have been immersed in American culture and it may have been more challenging to remain culturally aware while rating the assessments. Contrary to Rosselli and Ardila's (2003) study, the participants' ratings resulted in the Rey-Osterrieth Complex Figure Test to be low cultural loading. Participants agreed that there are American games that would familiarize the child with the task; however, some participants also discussed exposure to Islamic art and the Chinese system of characters as another route to the same end result of familiarization. The Wisconsin Card Sorting Test resulted in minimal cultural loading with the understanding that the stimuli may be culture bound. Participants also rated the Trail Making Test-A as low cultural loading because the task was considered simple. It was difficult to determine an overall trend for assessments rated low in cultural loading because the majority of participants gave no rationale for their rating. It is also unclear how much research knowledge the participants had and how that compared to their own practical experiences.

Consistent with Van de Vijver's (1997) research on bias in assessment (i.e. construct, method, and item), the Boston Naming Test was rated at a moderate level for

cultural loading. The Trail Making Test-B was also rated moderate cultural loading because knowledge of the English language alphabet is a cultural necessity in order to perform the task.

The Controlled Oral Word Association, however, resulted in a high level of cultural loading. The timing of the test in addition to familiarity and exposure to vocabulary within the category were more heavily influenced than hypothesized.

There was more consistency between the linguistic demand hypotheses and participant responses. Language requirements are more easily observable than the level of cultural loading in an assessment. Participants agreed that the Trail Making Test-A, Rey- Osterrieth Complex Figure Test, and Judgment of Line Orientation require no verbal output and demand minimal linguistic acquisition. The Controlled Oral Word Association Test and Semantic Fluency both require verbal output and English vocabulary knowledge and thus were rated high for linguistic demand. The complex instructions to the Trail Making Test-B and the verbal comprehension needed to perform the task elevated the linguistic demand. Contrary to the hypothesis, the Wisconsin Card Sorting Test was rated low linguistic loading despite the complex and lengthy directions.

Limitations

This study had several limitations. It was primarily limited by its small sample size. Including participants from neuropsychological organizations that focus on cultural and linguistic diversities could have expanded the sample size. Ideally, the number of participants would have been more evenly distributed across gender, cultural and linguistic backgrounds, and years of experience in the field. The participants represented a narrow range of race, ethnicity, gender, and age. A larger sample with more diversity would have benefited this study.

The literature review available at the time of research was also limited because it was primarily derived from studies focusing on the Latino population. Currently, there is limited research available in regards to the effects of language and culture of other ethnicities. The Cultural-Linguistic Interpretive Matrix was developed as a guide for interpretation and is subject to change based on new research.

Semantic Fluency was based on the responses of four out of 13 participants. Despite the research, this sample did not commonly administer the assessment. Finally, it is questionable whether the participants' ratings were based on the WCST computer version or card version and if the administration would have affected the participants' ratings. The card version requires the administrator to verbally give the instructions,

whereas the computer version will read the directions to the student. The participants may have been more familiar with the computer version and may not have considered the length of instructions because it is not part of their verbal administration.

Future Research

A greater depth of information may have been obtained by conducting focus groups comprised of participants representative of the sample. Discussion could include one topic per focus group meeting, during which each topic area could be the focus of discussion such as cultural influence and linguistic demands on assessment. A focus group would allow conduction of a group interview of participants to evaluate their understanding of cultural and linguistic influences, research knowledge and experience, and identify alternative methods of neuropsychological assessment.

Another possible improvement to the study could have been interviewing the participants. Personal interviews could elicit greater information regarding participants' knowledge and experience. This method could have added important qualitative data and greater insight into the participants' thoughts and opinions.

Finally, one other possible improvement to the study could be to administer each test to children of culturally and linguistically diverse backgrounds and compare observations and results to students of the U.S. Mainstream. Ideally, the number of

participants would be evenly distributed across gender, age, race/ethnicity, level of acculturation, English language proficiency, and number of years receiving education within the U.S.

Implications

Based on the results, school psychologists and neuropsychologists should continue to use the Judgment Line of Orientation, Rey-Osterrieth Complex Figure Test, Trail Making Test (Part A), and Wisconsin Card Sorting Test with students from culturally and linguistically diverse backgrounds. It is recommended, however, to continue to be aware of the cultural loading and linguistic demand because the low rating does not indicate “culture/linguistic free.” Practitioners should demonstrate more caution when administering verbal as well as “nonverbal” assessments to individuals from culturally and linguistically diverse backgrounds, including the Trail Making Test-B, Boston Naming Test, Controlled Oral Word Association, and Semantic Fluency. The purpose of the evaluation (acculturation, language proficiency, or true disability) should be considered when administering an assessment with higher cultural loading and linguistic demand.

Psychologists should also continue to develop assessments that have minimal cultural loading and linguistic demands to appropriately assess students from culturally

and linguistically diverse backgrounds. In the event a school psychologist, or neuropsychologist, must use an existing test to evaluate a student it is important to consider the information presented in this research. Key information to consider when evaluating a student for placement and instruction include, but are not limited to the following: (1) English Language Learners may require five or more years of intensive, daily English language instruction to develop a level of academic language proficiency that is comparable to that of native-language speaking peers. (2) There are federal laws that mandate instruments used in the assessment of handicapped children be administered in their native language or mode of communication, unless it is clearly not feasible to do so. (3) Literal translation of tests may lose the meaning of words and psychometric properties are difficult, if not impossible, to translate. (4) Most of the current research and practices surround the Spanish-speaking population.

Appendix A: Mendoza, Ernst, Trice, Warner (2007) C-LIM results

		Degree of Linguistic Demand		
		<i>Low</i>	<i>Moderate</i>	<i>High</i>
Degree of Cultural Loading	<i>Low</i>	Judgment of Line Orientation Finger Tapping Test Children's Category Test	Grooved Pegboard Test	
	<i>Moderate</i>	Trail Making Test-A Rey-Osterrieth Complex Figure Test	Trail Making Test-B	Controlled Oral Word Association Semantic Fluency Wisconsin Card Sorting Test
	<i>High</i>			Boston Naming Test

Appendix B: Participant Packet

Consent Form

Identification of Investigators & Purpose of Study

You are being asked to participate in a research study conducted by Karol Mendoza that is a component of her graduate thesis for Educational Specialist degree in School Psychology. The purpose of this study is to assist the investigators in determining the cultural and linguistic demands of commonly given neuropsychological tests in order to help the investigators develop a methodology for culturally competent neuropsychological assessment practices. This project is being supervised by Ashton Trice, Ed.D. of the Department of Graduate Psychology.

Time Required

Participation in this study will require approximately 2 hours.

Potential Risks & Benefits

The investigator does not perceive more than minimal risks from your involvement in this study.

Potential benefits from participation in this study include providing information that may result in the development of culturally competent neuropsychological assessment services to better serve children from diverse backgrounds with neurodevelopmental conditions.

Research Procedures

You will be asked to rate commonly administered neuropsychological tests based on their cultural influence and linguistic demand. You'll then be asked to fill out a demographic survey.

Confidentiality

A master copy of the participants' name and contact information will be kept in a secure location only accessible to the researcher. Once responses are returned, the participants' information will be removed and be coded for data analysis. The results of this study may be submitted for publication in a professional journal and/or presented in poster format at a psychology conference. No identifiable information will be presented in the

final form of this study. The researcher retains the right to use and publish non-identifiable data. At the end of the study, all records will be destroyed. Final aggregate results will be made available to participants upon request.

Participation & Withdrawal

Your participation is entirely voluntary. You are free to choose not to participate. Should you choose to participate, you can withdraw at any time without consequences of any kind.

Questions

If you have questions or concerns during the time of your participation in this study, or after its completion or you would like to receive a copy of the final aggregate results of this study, please contact:

Karol Mendoza
Graduate Psychology
James Madison University
mendozkj@jmu.edu

Dr. Ashton Trice
Graduate Psychology
James Madison University
Telephone: (540) 568-8189
tricead@jmu.edu

Questions about Your Rights as a Research Subject

Dr. David Cockley
Chair, Institutional Review Board
James Madison University
(540) 568-2834
cocklede@jmu.edu

Giving of Consent

I have been given the opportunity to ask questions about this study. I have read this consent and I understand what is being requested of me as a participant in this study. I certify that I am at least 18 years of age. By completing this packet I am consenting to participate in this research. I am not being asked to sign this form in order to keep my responses anonymous.

Introduction to the Study

The purpose of this study is to see the effect of cultural influence and linguistic demand on neuropsychological tests, based on the matrix developed by Flanagan et al (2000). The task is to place each neuropsychological test in one of the cells of the 3x3 matrix based on the cultural and linguistic loading of each test.

For the purpose of this study consider *linguistic demand* in regards to the length and complexity of instruction as well as the length and complexity of a typical verbal response. For rating *cultural loading* consider how much of main stream U.S. culture is reflected by the test.

You are being asked to rate the neuropsychological tests in which you have had previous training **AND** experience administering to individuals from culturally and linguistically diverse backgrounds. Only rate those tests you feel meet that requirement. You are being asked to rate the following tests:

Abbreviation	Instrument
RCFT	Rey-Osterrieth Complex Figure Test
BNT	Boston Naming Test
JLO	Benton Judgment of Line Orientation Test
COWA	Controlled Oral Word Association Test
SF	Semantic Fluency Test
TMT-A	Trail Making Test Part A
TMT-B	Trail Making Test Part B
WCST	Wisconsin Card Sorting Test

The following page is the matrix of cultural loading and linguistic demand classification of the Wechsler Subtest, as determined by Flanagan et al (2000). Please review the example to gain a better understanding of the process.

Sample Matrix:

		Degree of Linguistic Demand		
		<i>Low</i>	<i>Moderate</i>	<i>High</i>
Degree of Cultural Loading	<i>Low</i>	MATRIX REASONING	BLOCK DESIGN SYMBOL SEARCH DIGIT SPAN CODING	LETTER-NUMBER SEQUENCING
	<i>Moderate</i>			
	<i>High</i>			INFORMATION SIMILARITIES VOCABULARY COMPREHENSION

Sample Response:

Test: WISC

Rationale:

Behavioral observations noticed in culturally and linguistically diverse students that differs from “U.S. mainstream” students:

I have noticed that during digit span my clients have used their fingers while counting. I have also noticed that during vocabulary my clients that speak Portuguese will ask me what the word equivalent for certain vocabulary words. It seems that they would know how to respond had they known what the word was in their native language.

Previous experience that may influence familiarity with task:

Clients that watch programs like Sesame Street or other educational programs in English may have an advantage on the tasks identified with high cultural loading and linguistic demand.

Developmental differences among students:

I have noticed that the younger clients have had an easier time transitioning to school and acquiring some of those cultural pieces.

Linguistic Acquisition needed to perform task:

Information, Similarities, Vocabulary, and Comprehension are found to be high linguistic demand because the response is depends heavily on one's verbal abilities.

Letter-Numbering Sequencing was found to be high linguistic demand and low cultural loading because the correct response depends solely on the individual's verbal output, but the context of the task is not dependent on the culture.

Cultural Considerations:

The context of the information for the tasks identified as high cultural loading derives from mainstream culture and makes it difficult for individuals from other countries to respond.

Effects of Acculturation:

A client who recently immigrated to the U.S. would be expected to have a much lower performance on those tasks that relied higher on linguistic demand and cultural loading because of their exposure to similar stimuli.

**The tests you are being asked to rate do not have subtests; please rate the test as a whole and give your rationale for placement for the overall test.*

ID # _____

		Degree of Linguistic Demand		
		<i>Low</i>	<i>Moderate</i>	<i>High</i>
Degree of Cultural Loading	<i>Low</i>			
	<i>Moderate</i>			
	<i>High</i>			

Please provide your rationale for placement of each test you rated. Feel free to use additional paper.

Test: _____

Rationale:

Behavioral observations noticed in culturally and linguistically diverse students that differs from "U.S. mainstream" students:

Previous experience that may influence familiarity with task:

Developmental differences among students:

Linguistic Acquisition needed to perform task:

Cultural Considerations:

Effects of Acculturation:

Test: _____

Rationale:

Behavioral observations noticed in culturally and linguistically diverse students that differs from “U.S. mainstream” students:

Previous experience that may influence familiarity with task:

Developmental differences among students:

Linguistic Acquisition needed to perform task:

Cultural Considerations:

Effects of Acculturation:

Test: _____

Rationale:

Behavioral observations noticed in culturally and linguistically diverse students that differs from “U.S. mainstream” students:

Previous experience that may influence familiarity with task:

Developmental differences among students:

Linguistic Acquisition needed to perform task:

Cultural Considerations:

Effects of Acculturation:

Test: _____

Rationale:

Behavioral observations noticed in culturally and linguistically diverse students that differs from “U.S. mainstream” students:

Previous experience that may influence familiarity with task:

Developmental differences among students:

Linguistic Acquisition needed to perform task:

Cultural Considerations:

Effects of Acculturation:

Test: _____

Rationale:

Behavioral observations noticed in culturally and linguistically diverse students that differs from “U.S. mainstream” students:

Previous experience that may influence familiarity with task:

Developmental differences among students:

Linguistic Acquisition needed to perform task:

Cultural Considerations:

Effects of Acculturation:

Test: _____

Rationale:

Behavioral observations noticed in culturally and linguistically diverse students that differs from “U.S. mainstream” students:

Previous experience that may influence familiarity with task:

Developmental differences among students:

Linguistic Acquisition needed to perform task:

Cultural Considerations:

Effects of Acculturation:

Test: _____

Rationale:

Behavioral observations noticed in culturally and linguistically diverse students that differs from “U.S. mainstream” students:

Previous experience that may influence familiarity with task:

Developmental differences among students:

Linguistic Acquisition needed to perform task:

Cultural Considerations:

Effects of Acculturation:

Test: _____

Rationale:

Behavioral observations noticed in culturally and linguistically diverse students that differs from “U.S. mainstream” students:

Previous experience that may influence familiarity with task:

Developmental differences among students:

Linguistic Acquisition needed to perform task:

Cultural Considerations:

Effects of Acculturation:

Demographics

Please answer the following questions.

Age range: ___ 25-34 ___ 35-44 ___ 45-54 ___ 55-64 ___ 65+

Gender: ___ Male ___ Female

Highest Degree Attained:

___ M.A. ___ Ed.S. ___ Ph.D. ___ Psy. D. Other: _____

Institution attended: _____

Post Graduate Fellowship: _____

Practice Location: ___ Clinic ___ School ___ Hospital Other _____

Practice Setting: ___ Urban ___ Rural ___ Suburban

Practice Name: _____

Years of Practice: ___ 0-2 ___ 3-5 ___ 6-10 ___ 11-15 ___ 16-20 ___ 21+

What is your race?

White _____ Black or African American _____ American Indian _____ Alaska

Native _____ Asian _____ Native Hawaii and Other Pacific Islander _____ Other (please indicate) _____

What is your culture? (You may select more than one)

For the purpose of this study, culture is the identification to a group based on shared beliefs, traditions, and lifestyle.

American _____ Hispanic _____ Asian _____ African _____ Other _____

If more than one was selected, which is dominant? _____

Dominant language spoken at home: _____

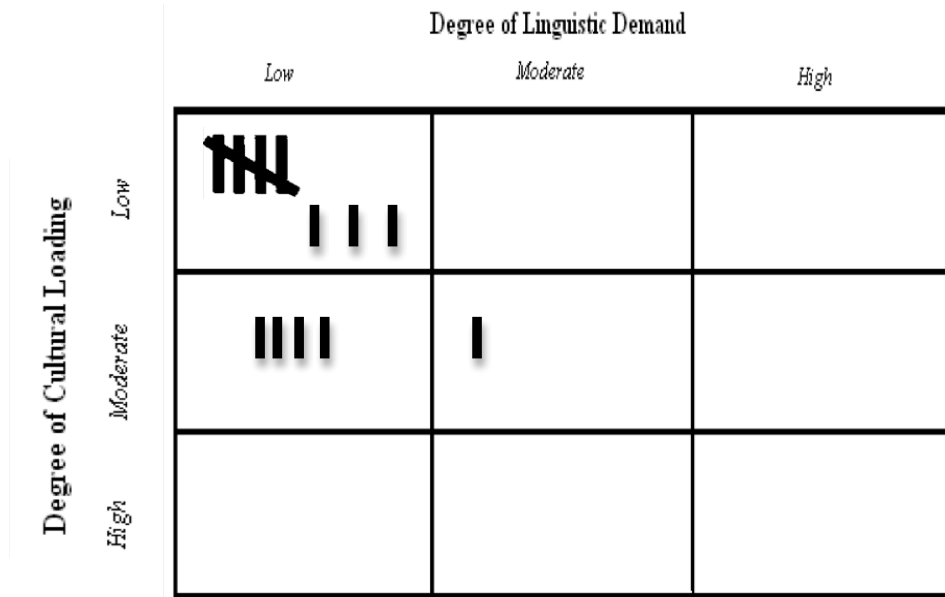
Indicate fluency in any other language: _____

Areas of Research:

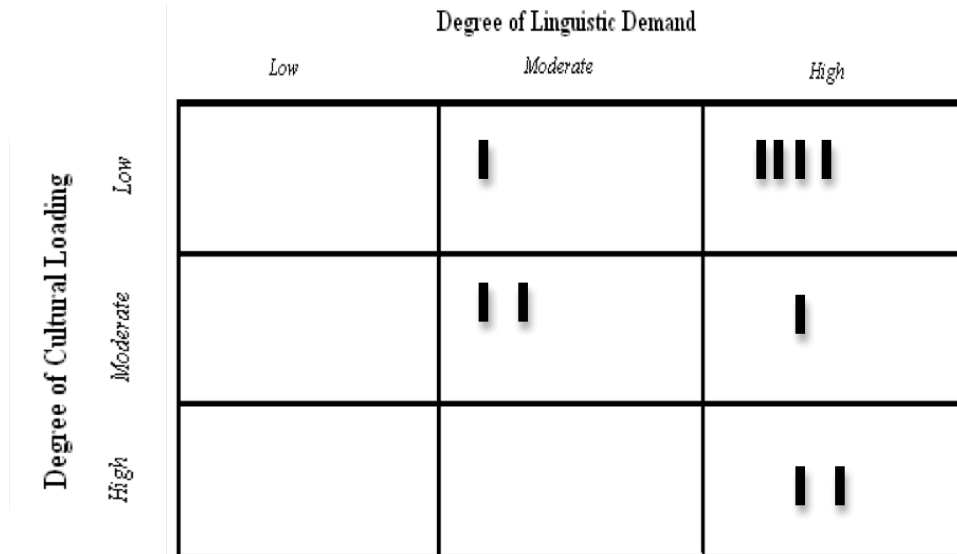
Thank you for your participation

Appendix C: Raw Median Data



RCFT






BNT



JLO

		Degree of Linguistic Demand		
		<i>Low</i>	<i>Moderate</i>	<i>High</i>
Degree of Cultural Loading	<i>Low</i>			
	<i>Moderate</i>			
	<i>High</i>			

COWA

		Degree of Linguistic Demand		
		<i>Low</i>	<i>Moderate</i>	<i>High</i>
Degree of Cultural Loading	<i>Low</i>			
	<i>Moderate</i>			
	<i>High</i>			

SF*

		Degree of Linguistic Demand		
		<i>Low</i>	<i>Moderate</i>	<i>High</i>
Degree of Cultural Loading	<i>Low</i>			█
	<i>Moderate</i>			
	<i>High</i>			███

TMT-A

		Degree of Linguistic Demand		
		<i>Low</i>	<i>Moderate</i>	<i>High</i>
Degree of Cultural Loading	<i>Low</i>	████	███	
	<i>Moderate</i>	████		
	<i>High</i>		█	

TMT-B

		Degree of Linguistic Demand		
		<i>Low</i>	<i>Moderate</i>	<i>High</i>
Degree of Cultural Loading	<i>Low</i>			
	<i>Moderate</i>			
	<i>High</i>			

WCST

		Degree of Linguistic Demand		
		<i>Low</i>	<i>Moderate</i>	<i>High</i>
Degree of Cultural Loading	<i>Low</i>	 		
	<i>Moderate</i>			
	<i>High</i>			

Appendix D: Raw Qualitative Data

Information written in italics are direct quotations. “No’s” or their equivalent were omitted. Letters in parentheses refer to the participants. **Items in bold were made by more than one respondent.**

RCFT

Behavioral observations noticed in culturally and linguistically diverse students that differs from “U.S. mainstream” students

A lot of kids seem to approach this as a neat puzzle. Others seem baffled. (A)

None observed, except for instruction clarification. (J)

Previous experience that may influence familiarity with task

Where’s Waldo and other games like that. My kids have workbooks that they spend hours with that seem to be prep books for this test. I don’t know in what other cultures this is common. (E)

Previous experience that may influence familiarity with task

Students’ opportunity for exposure to drawing, copying, fine motor tasks may be more limited in some cultures. (L)

Developmental differences among students

Between 8-10 years complexity of task with lower performance. (J)

Definitely is ability to identify “gestalt” of figure. (K)

Younger students performance affected by fine motor skills as well as other cognitive factors. (L)

Linguistic Acquisition needed to perform task

Minimal Instructions. No verbal output. (I)

This test can be given with gestured cues. (J)

Directions are verbal-although the copying and immediate memory portions could be given through gestures/ pantomime, the delayed recall portion directions would require comprehension of verbal instructions. (L)

Low level understanding and simple. (M)

Cultural Considerations

I've often wondered whether kids who grow up using the Chinese system of characters are helped or hindered in this task. The more complicated characters have simpler characters embedded in them. But they follow specific rules that the RCFT doesn't follow. (D)

Islamic art is made up of small motifs repeated and embedded in a larger whole. It might make this task more familiar to us. (C)

Angles and shapes culture bound, especially in Western cultures. Task does not have inherent relevance for many cultures—so performance may be influenced by those use to a “testing” paradigm. (I)

I'd not think that culturally there would be much impact. (K)

Effects of Acculturation

Better able to take verbal instruction. (J)

Recent immigrants may have difficulty with task unless directions given in native language. (L)

BNT

Behavioral observations noticed in culturally and linguistically diverse students that differs from “U.S. mainstream” students

This is a tricky test to use with children from other cultures and languages. I would hesitate to use, except where the child might present as very acculturated and high verbal. And only when looking for insult to the language system. (D)

Would need to be given opportunity to respond in native language if English skills are not proficient. Also, some pictures may be culture-specific to US. (L)

Previous experience that may influence familiarity with task

Definitely exposure to the various pictures depicted. (K)

Exposure to vocabulary in English, exposure to pictured items. (L)

Developmental differences among students

There is a subtle difference in the way objects are represented in different countries. I don't exactly know what I mean by this, but these pictures look very "American" or "Western" to me. I don't know whether that affects kids recognition or not. I would think that would affect younger kids more. (D)

Again, exposure. (K)

Taken into account in norms. (L)

Linguistic acquisition needed to perform tasks

This is a hard question because partially you are measuring how much language has been acquired. (B)

Verbal output. (I)

Limited, as there is not much demand made for verbal output. (K)

Vocabulary knowledge-expressive. (L)

Must use primary language. (M)

Cultural Considerations

The items on this test are commonly known by Americans and cannot be assumed to be in the same order of difficulty for kids of other cultures. Abacus is hard for US kids but not for some other kids. (G)

Objects very culture bound. Noose item needs to be eliminated. (I)

Exposure to the specific items pictured (K, L)

Effects of Acculturation

This test might not only be a measure of vocabulary, but of acculturation. Many of these objects will be known in one language but not in the other. (C)

Some of these objects are “home words,” things not talked about in school—so whether kids know them in English or the parents’ language depends on whether the parents are trying to speak English at home. (D)

See cultural considerations. (L)

JLO

Behavioral observations noticed in culturally and linguistically diverse students that differs from “U.S. mainstream” students

For behavioral observations. Most students from Cape and Islands are mainstream culturally. (K)

Previous experience that may influence familiarity with task

Could be impacted by exposure to matching type task. (K)

Understanding of the concept of visual comparisons. (L)

Developmental differences among students

Different with younger students continuing to attend to task. Younger kids have a difficult time attending throughout. (K)

Taken into account in norms (L)

Linguistic Acquisition needed to perform task

Little Linguistic needs. Cultural model task is limited English needs. (K)

Low level understanding of simple directions. (M)

Cultural Considerations

I remember reading about something in University about some cultures having difficulty with straight lines because their culture had so few of them and the feature detectors in the eyes become inactive. So maybe with non city folks from some cultures like Hmong. (D)

Minimal cultural loading, very simple stimuli. (I)

Linguistic acquisition needed to perform task

No verbal output. (I)

COWA

Behavioral observations noticed in culturally and linguistically diverse students that differs from “U.S. mainstream” students

Of course. Profound differences. I speak pretty good Spanish, but I don't know the names of a lot of birds or kitchen utensils. Food names, Okay. This might be a good test as a baseline for an individual to see whether recovery is occurring, but not to compare to native speaking populations. (B)

Timing is a theme throughout many of these tests. We tell kids to work hard and fast, but we're not sure that they are. Some of that lack of speed might be due to TBI. Some of it might be due to culture. Some of it may be just due to the fact that they don't know who we are and why they should do as we say. I think I see kids from other cultures work at a lower level of speed and effort sometimes. I think I see them react negatively more often when I stop them at the end of 3 minutes in this test. But I can't be sure. (C)

Must be in primary language. (M)

Previous experience that may influence familiarity with task

We play first letter games in the US. (B)

There are “round games where you have to come up with a word beginning with a specific letter. Kids play them in some elementary schools. (E)

There are games played on TV in US and Germany where people have to do things quickly and then are cut off after a period of time. That becomes fun and exciting, but some children might not be exposed to that, and so when you cut them off, they are hurt or embarrassed. (H)

Vocabulary development. (L)

Developmental differences among students

This measures ability to spell our crazy language. Younger kids and kids from phonetically regular language might be at a disadvantage. (F)

Linguistic Acquisition needed to perform task

Lengthy instructions. Must be familiar with basic English grammar principles/ rules. Performance related to educational level and amount of words in one's lexicon. (I)

Students would need to have basic phonics skills developed to be able to respond appropriately. (L)

Must be in primary language. (M)

Cultural Considerations

Timing (A,B,E,F,H)

Some cultures may put higher value on producing "larger or less frequent words" and thus fluency would be decreased. (M)

SF

Behavioral observations noticed in culturally and linguistically diverse students that differs from "U.S. mainstream" students

Non-English speakers unable to take test. (J)

Must be accomplished in primary language to be valid. (M)

Previous experience that may influence familiarity with task

Length with time exposed to English. (J)

Verbal categorizing skills, breadth of acquired knowledge. (L)

Developmental difference among students

Categorized vs. phonetic development differences supported in literature. (J)

Attention/ focus less for younger-taken into account in norms. (L)

Linguistic Acquisition needed to perform task

Same as COWA, although less influence of knowledge of English grammar. (I)

This requires considerable familiarity with English. (J)

Vocabulary development appropriate for age level in English. (L)

Cultures that are more methodical than those having an emphasis on speed would affect norms. (M)

Cultural Considerations

Unable to effectively score or norm with non-English speakers or English as second language clients. (J)

Response may depend on exposure to specific information in one's culture. (L)

Effects of Acculturation

Acculturation may help participation but does not allow effective scoring or use with norms. (J)

TMT-A

Previous experience that may influence familiarity with task

Trace the dot books. (A)

Workbook and worksheets from school. (B)

Games like "connect the dots" (J)

Number sequencing skills and number recognition. (L)

Developmental differences among students

Younger children from some cultures are less familiar with Arabic number system. (D)

While there are developmental differences, I would have suggested a question for every test that asked about SES. US kids who have parents who buy them workbooks have had a lot of experience with problems like this. Poor kids, not so much. Actually, not at all. It's common to make home visits here in America and find no reading or writing materials at all available to children. Children watch TV, and because they only have one, they watch adult TV. They are not coloring, writing, reading, solving problems, doing workbooks. Watching low-level adult TV. (H)

Students more familiar with letters/numbers would do better → taken into account in norms. Focus/attention lower in younger students. (L)

Linguistic acquisition needed to perform task

No verbal output, but instructions somewhat lengthy. (I)

Minimal, given this test can be given with gesture. (J)

Low level linguistic for directions. (M)

Cultural Considerations

Timed, numbers, connect the dot paradigm, all culture-dependent. (I)

Effects of acculturation

Some children mostly from poor rural areas who are recent arrivals may have difficulty with the number system. This is rare. (D)

TMT-B

Behavioral observations noticed in culturally and linguistically diverse students that differs from “U.S. mainstream” students

I’ve had difficulty getting the idea of alternating across. (B)

Need to demonstrate/practice needs. (J)

Previous experience that may influence familiarity with task

I don’t know whether kids coming from schools in other countries have been given the practice we give kids in alphabetizing. (C)

We play alphabet games in the US and UK, such as name a vegetable beginning with a,b,c. (F)

Number and letter recognition/ sequencing. (L)

Developmental differences among students

Number and letter sequences get more automatic with age. (C)

8-10 years of age represents complexity “cutoff” (J)

Taken into account in norms. Focus/attention may be less in younger students. (L)

Linguistic acquisition needed to perform tasks

Difficulty with instructions. (A,D,F)

Instructional comprehension needs. (J)

While task is demonstrated, some ability to understand verbal directions would also help student understand task. (L)

Must be country using A-Z. (M)

Cultural Considerations

I get the impression we alphabetize more things than other cultures: therefore the ease in knowing alphabetical order is lower in some cultures. I don't know which one's they are. (H)

Not all languages have the same alphabet/some letters that are part of English are missing in other languages. (A,C,D,E,F)

Familiarity with English alphabet required. (L)

Verbal comprehension. (J)

Same as TMT-A. Slightly more culture loading due to use of letters, however, I don't think it is enough to move its position in the matrix (compared to TMT-A). (I)

If a different alphabet then test must be modified or omitted. (M)

Effects of Acculturation

Better verbal comprehension. (J)

WCST

Behavioral observations noticed in culturally and linguistically diverse students that differs from "U.S. mainstream" students

CLD students seem slow-to-warm-up to this test sometimes; its "vagueness" seems to throw them, but this is also true of some USM students. (E)

Cultural mindset of dealing with frustration. (M)

Previous experience that may influence familiarity with task

Experience with using feedback for problem-solving. (L)

Developmental differences among students

I don't use this with "young" children as it seems to baffle them. (E)

Focus and attention span less for younger students. (L)

Linguistic acquisition needed to perform task

Instructions somewhat lengthy. (I)

Ability to understand initial directions (L)

Must have command of language to understand directions as well as continued feedback. (M)

Cultural Considerations

Some culturally different children might do better at this than mainstream Americans because of the emphasis on drawing and geometry in other cultures. I have never noticed differences, but I don't use this test often with children. (G)

Shapes/stimuli culture bound, but not as much as BNT for example. (I)

Cultural differences in dealing with frustration of negative feedback. (L, M)

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