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TITLE OF REPORT ___An Investigation of Hmong Students' Performance on Four___

___Standardized Cognitive Ability Measures___

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AN INVESTIGATION OF HMONG STUDENTS' PERFORMANCE

ON FOUR STANDARDIZED COGNITIVE

ABILITY MEASURES

by

Jodi Preston

A Field Study

Submitted in Partial Fulfillment of the
Requirements for the Degree of
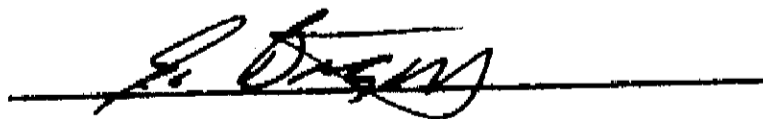Education Specialist
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The Graduate College
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ABSTRACT

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An Investigation of Hmong Students' Performance

(Title)

on Four Standardized Cognitive Ability Measures

Guidance and Counseling	Dr. Douglas Smith	May, 99	31
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This study investigated the parameters of a valid assessment of cognitive ability for students of Hmong origin who are referred for suspected exceptional education needs. Cognitive ability measures included: Wechsler Intelligence Test for Children-Third Edition, Kaufman Brief Intelligence Test, Comprehensive Test of Nonverbal Intelligence, and the Test of Nonverbal Intelligence-Third Edition. The sample consisted of 56 Hmong students aged 6 years 4 months to 13 years 0 months.

Mean scores on instruments that measured crystallized intelligence were in the borderline range reflecting the low verbal fluency of the students in this sample. Mean scores on instruments that measure fluid intelligence were in the average range.

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Results revealed a high correlation between instruments supporting the constructs that each instrument purports to measure.

One implication from this study is the clear need to include a sound nonverbal cognitive ability measure in an assessment battery to minimize the negative effects of low verbal fluency, cultural differences and previous learning. Careful interpretation of assessment results is critical when making decisions regarding special education placement and determining appropriate academic programming for linguistically and culturally diverse students.

ACKNOWLEDGEMENTS

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CHAPTER 1

Introduction

Dunn County, Wisconsin, is home to about 1300 Hmong (pronounced "Mung") residents, displaced Indochinese refugees from the Vietnam conflict. Given that most Hmong children have learned or are learning English as a second language, they often encounter difficulty in educational settings. When Hmong students are referred for psychoeducational evaluations due to educational difficulties, school assessment personnel are continuously faced with the difficult task of assessing these linguistically and culturally diverse students in a manner that fulfills legal requirements and provides fair and accurate data for the Multidisciplinary team to use in determining whether or not a student exhibits an Exceptional Educational Need (EEN).

Statement of the Problem

School personnel are concerned that the current assessment techniques, which utilize standardized tests not normed on the Hmong population, may not be sufficient to properly identify Hmong students with disabilities. The difficulty lies in determining whether a student referred for a special education evaluation exhibits a disability, such as a Learning Disability or Mild Retardation, or if the student's academic difficulties are related to linguistic and cultural differences.

Purpose

This study was designed to investigate the parameters of a valid assessment of cognitive ability for students of Hmong origin who are referred for suspected exceptional education needs.

Definition of Terms

The following definitions are supplied to assist the reader in better understanding this report:

Crystallized Intelligence: refers to acquired skills and knowledge that are strongly dependent for their development on exposure to culture. Crystallized intelligence involves overlearned and well-established cognitive functions and is related to mental products and achievements. Tasks that would measure crystallized intelligence may include vocabulary, general information, abstract word analogies and mechanics of language (Satler, 1988, p. 48).

Fluid Intelligence: refers to essentially nonverbal, relatively culture-free mental efficiency. Fluid intelligence involves adaptive and new learning capabilities and is related to mental operations and processes. Examples of tasks that measure fluid intelligence may include figure classifications, figural analyses, number and letter series, matrices, and paired associates (Satler, 1988, p. 48).

Linguistically and Culturally Diverse (LCD): refers to individuals whose language and cultural experiences are different from that of the majority of the Anglo population.

Limitations

As parent permission was a requisite for subject participation, a random sample was not obtained. Another limitation of this study was the restricted age range (6 years 4 months to 13 years 0 months).

A Special Note

An original goal of this researcher was to prepare a document that could be submitted for journal publication (American Psychological Association or National Association of School Psychologists). Therefore, the format of this paper deviates from that typically used in Field Studies. This paper will follow the format as set forth by the Publication Manual of the American Psychological Association, Fourth Edition (American Psychological Association, 1995).

CHAPTER 2

Introduction

Dunn County, Wisconsin, is home to about 1300 Hmong (pronounced "Mung") residents, displaced Indochinese refugees from the Vietnam conflict. Given that most Hmong children have learned or are learning English as a second language, they often encounter difficulty in educational settings. When Hmong students are referred for psychoeducational evaluations due to educational difficulties, school assessment personnel are continuously faced with the difficult task of assessing these linguistically and culturally diverse (LCD) students in a manner that fulfills legal requirements and provides fair and accurate data for the Multidisciplinary team to use in determining whether or not a student exhibits an Exceptional Educational Need (EEN). The purpose of this study was to investigate the parameters of a valid assessment of cognitive ability for students of Hmong origin who are referred for suspected exceptional educational needs.

Review of the Literature

The Vietnam War was nearly a 20 year conflict, which lasted from the mid 1950s until 1975, that had momentous ramifications in Southeast Asia, the United States and throughout the world. One such ramification was the displacement of hundreds of thousands of Indochinese refugees to the United States, following the fall of Saigon in 1975. "The Hmong are the most recent arrivals, with over 100,000 refugees concentrated primarily in California, Wisconsin, Minnesota, Texas and Rhode Island" (McInnis, 1991, p. 571). Dunn County, Wisconsin is home to about 1,300 Hmong

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residents (Dunn County News, January 28, 1998).

The Hmong are one of sixty ethnic groups, belonging to several linguistic families that are found in Laos. They dwell in isolated villages in mountainous highland regions at elevations of above three thousand feet (Chan, 1994).

The Hmong were recruited to aid the United States during the Vietnam war. Hmong mountain strongholds became radar relay stations, and Hmong guerrillas regularly rescued downed pilots in North Vietnam and fought in battles (Moore,1989). Following the Vietnam war, the Lao Communist government attempted to punish and eradicate individuals who aided the United States. In the wake of this retribution, thousands of Hmong fled to refugee camps in Thailand (Meyers, 1992). Most families would have preferred to return to Laos or remain in Thailand, but both countries were either unwilling or unable to resettle them. The Hmong are unique in that they were unwilling refugees to the United States (McInnis, 1991).

Hmong refugees migrated from refugee camps to western countries, including France, Australia, Canada and the United States. The majority of refugees chose the United States because General Pao Vang, a prominent Hmong military leader, was granted political asylum in the United States in 1978 (Quincy, 1995).

The first group of Hmong immigrants was sponsored by churches and small communities. A second, larger group of immigrants then entered the United States after initial immigrants became citizens. This was made possible by the 1965 Immigration Act which granted naturalized citizens the "right to bring in members of their extended families through regular immigration channels" (Quincy, 1995, p. 219).

Family ties are important to the Hmong people, extending beyond the nuclear unit to include relatives who belong to the extended family "clan." Hmong families belong to one of 18 clans (McInnis, 1991). In the United States clan names serve as surnames and in American Hmong life the clan leaders have two roles. The first is to

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serve as a liaison between the non-Hmong and Hmong communities. The second role is to serve as arbitrators in resolving intraclan and interclan conflict (McInnis, 1991). Families within a particular clan are represented by a clan leader. Hmong society is strictly patriarchal with obligations to fathers, elder brothers, and leaders. In traditional Hmong culture, women have no official status in the authority system. Forming alliances between clans and providing many children are the most important roles that women fulfill (Walker-Moffat, 1995).

Prior to 1952, the Hmong had no formal written language, therefore history was committed to memory and shared orally from generation to generation. Yang (1992) refers to legends of how the Hmong once had a writing system, but it was destroyed in order to conceal it from the Han Chinese. According to this story, books were thrown into the Yellow River and the characters were integrated into Hmong embroidery and *paj ntaub* (flower cloths). French and American missionaries formalized their written language, using a romanized alphabet in 1952 and 1953 (Walker-Moffat, 1995).

Before U.S involvement in the recruitment of Hmong as fighters, few, if any, Hmong had any formal schooling (Vangyi, 1980). Everyone in the clan took part in the informal teaching of children in the practical ways of their culture (Walker-Moffat, 1995). Around 1961 the United States Agency for International Development (AID) began to build primary schools in the areas to which the Hmong had been relocated.

In Laos, formal education, like positions of leadership was reserved for men. Hmong girls were allowed to attend school, but few did (Walker-Moffat, 1995). Estimates were that no more than 63% of children, aged 7 to 14, were in school and by grade six only 11% of those students were girls (Walker-Moffat, 1995). Prior to their arrival in the United States, many Hmong students received little or no formal educational training (McNall, 1994). Parents of current Hmong students, therefore, received little or no formal education.

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A high degree of support for academic success, however, is provided for by Hmong families and the larger Hmong community (McNall, et al., 1991). McNall, et al. (1994) surveyed a random sample of Hmong and non-Hmong students over a four year period. Results of this study indicated that Hmong students reported more time spent on homework per night, higher grade point averages, and a lower school drop-out rate than their general population peers. While the Hmong community emphasizes a separate Hmong identity, they emphasize mainstream education as a means to success.

Given that most Hmong children have learned, or are learning English as a second language, they often encounter difficulties in our existing educational settings. When Hmong students are referred for psychoeducational evaluations due to educational difficulties, school personnel are concerned that the current assessment techniques may not be sufficient to properly identify Hmong students with disabilities. The difficulty lies in determining whether a student referred for a special education evaluation exhibits a disability, such as a Learning Disability or Mild Retardation, or if the student's academic difficulties are related to linguistic and cultural differences.

There has been little empirical research published on the use of any standardized tests with Hmong students. Jacobs (1991) presented an ethnographic study of four Hmong third grade students. Poor academic performance may be for reasons other than cognitive ability including: teachers' misconceptions of students' abilities, cultural gaps, and stress factors. Given the fact that most LCD students learn better in a small group or one-to-one setting, many well-intentioned teachers opt for a Learning Disabilities (L.D.) identification for Hmong students who are experiencing difficulty in school. Typically, learning accelerates once the student grasps English, but the effects of being labeled L.D. may be long reaching (Jacobs, 1991).

Assessment of cognitive abilities is conducted for several reasons, the most

common of which is to determine eligibility for special education programs. Under Wisconsin Department of Public Instruction guidelines, an ability assessment is necessary for the determination of most disabilities. Through the Multidisciplinary Team process, special education identifications are at least partially determined by the student's I.Q. score. The use of standardized I.Q. tests to assess LCD populations has been a controversial topic and claims that such tests are culturally biased have received some empirical support as well as attention in several court cases (Slate and Jones, 1993; Lam, 1993).

Concerns about the utilization of standardized intelligence tests with children of non-European descent or non-English speaking background have long been raised (French & Hale, 1990 in Kamphaus, 1993). Allegations of item bias and a priori assumptions concerning a white, middle-class orientation of test content have been prominent in professional literature and court cases (Ross-Reynolds & Reschly, p. 144, 1983). Litigation dating to the 1970s forced professionals to consider the types of ability tests and their specific uses when assessing LCD students. Assessment practices were significantly impacted by several judicial decisions involving cognitive ability testing for the assessment of minority groups, including linguistically and culturally diverse students (Holtzman & Wilkinson, 1991).

The case of Hobson vs. Hansen (1967) was one of the first court cases to question the use of cognitive ability tests in special education placement decisions. This case resulted in the dissolution of a tracking system, based on group-administered achievement tests, that resulted in a disproportionate number of African-

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American students being placed in the "mental retardation" track (Kamphaus, 1993, p. 445). Baca and Cervantes (1984) note three of the most important cases to affect assessment practices were Arreola v. Board of Education (1968), Diana v. State Board of Education (1973), and Covarrubias v. San Diego Unified School District (1970). In each of these cases, retests indicated that the plaintiff students were not mentally retarded and had been educationally misplaced. It was also determined that these students suffered damage from the misplacement (Holtzman & Wilkinson, 1991). An important outcome of the landmark Diana case was the identification of the criterion of two standard deviations below the mean as the cut-off for ability for mental retardation special education placement (Kamphaus, p. 446).

Following these court cases and others, Section 504 of the Rehabilitation Act of 1973 and Public Law 94-142, the Education for all Handicapped Children Act of 1975, addressed nondiscriminatory assessment standards and specified criteria for the selection and use of measures such as intelligence tests. Both of these regulations borrowed principles that resulted from earlier employment litigation. Following this litigation, the Equal Employment Opportunity Commission (EEOC) developed guidelines and regulations that a test must be specifically validated for the purpose for which it is being used (Anastasi, 1988). Intelligence tests would be held to this standard in later cases.

"During the last two decades, educators, lawyers, and legislators have argued that current intelligence-testing procedures with minority and Limited-English Proficient (LEP) pupils are partially responsible for the current over representation of

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minority youngsters in special education programs" (Jones, 1988 in Palmer, Olivarez,

Wilson & Fordyce, 1989, p. 261). Studies in response to these allegations have

focused on the issues of bias, including item bias, and predictive validity bias. Bias is

defined as "a tendency to produce erroneous or misleading conclusions because of

the use of data that are incomplete or drawn from a sample that is not representative of

the group studied" (Goldenson, 1984,p.97). As investigators have studied the issue of

bias for minority groups, the analysis of item bias has received increased attention. In

psychometric terms, biased items can be defined as "items for which equally able

persons from different cultural groups have different probabilities of success"

(Anastasi,1988, p. 228).

In general, bias studies have not identified substantial evidence of bias in

modern tests of intelligence (Kamphaus, 1993). Studies regarding predictive bias

have been less conclusive. Predictive validity refers to the ability of a test, such as the

Wechsler Intelligence Scale for Children-Third Edition (WISC-III) (Wechsler, 1991), to

predict relevant outcomes. The most important of these outcomes is academic

achievement. Few studies have specifically addressed LCD students referred for

potential learning disabilities (LD) placement. "A critical definitional marker of

learning disabilities is the presence of a severe discrepancy between a student's

general cognitive ability and achievement. An important assumption underlying this

concept of discrepancy is that the predictive relationship between IQ and achievement

measures is similar across students, regardless of ethnic or other demographic

differences" (Olivarez, Palmer, & Guillemard, 1992, p. 175). Investigators (Reynolds &

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Gutkin, 1980, Reynolds & Hartlage, 1979; Svanum & Bringle, 1982 Glutting, 1986; Naglieri & Hill, 1986) have reported that the majority-group regression equation tends to over-predict the minority-group performance.

Studies that have found no evidence of predictive validity bias include those conducted by Reynolds & Hartlage (1979), Reynolds & Gutkin (1980) and Glutting (1986). These studies used the Wechsler Intelligence Scale for Children-Revised (WISC-R) and Kaufman Achievement Battery for Children (K-ABC) with Anglo, African-American, Puerto Rican and Mexican-American children.

The first study to find evidence of predictive validity bias was Goldman and Hartig (1976). Adequate predictive validity coefficients were found for Anglo children using the WISC-R, however, coefficients for African-American and Mexican-American children were not adequate. This study was criticized on methodological grounds (Reynolds & Kaiser, 1990) because it used school grades as a measure of academic achievement. Studies conducted by Palmer, et al. (1989) and Olivarez, et al. (1992) have supported the evidence of predictive bias for LCD students . These researchers found that for both the referred and non-referred samples, the WISC-R and K-ABC IQ measures overpredicted Black and Hispanic students' achievement functioning when compared to a white sample of students. The results of both of these studies indicate that reliance on statistical approaches to identify learning disabilities in LCD students may result in misidentification of these students (Olivarez, 1992, p. 188).

While bias internal to intelligence tests is rare, test overuse, misuse, and misinterpretation are still problems. The question remains regarding how an

intelligence test user should proceed when issues of linguistic and cultural factors may confound test results. The best alternative for a standardization sample for LCD students is one based on local norms. To date, no such data exist for students of Hmong origin to aid school personnel and parents in making decisions about appropriate educational programming. Whenever possible, it would be best to refer the case to an examiner who shares some linguistic similarity to the student referred for evaluation. However, numerous difficulties arise when intelligence tests are translated, the most important of which is the unknown effect on the psychometric properties of the test. Kamphaus (1993, p. 459-460) outlines several considerations when evaluating LCD students:

1. The examiner should collect detailed background information on each case. The diversity of these students' backgrounds requires the collection of information that may not be part of traditional developmental history questionnaires.

2. The examiner should attempt to refer the student to a clinician who speaks the student's native language. If this is not a possibility, the examiner should consult with another individual familiar with the student's language and culture before proceeding with the evaluation. This individual may be able to give suggestions regarding how to best interact with the student or may participate in the evaluation to help make the student feel at ease.

3. The examiner may choose to use one or several less verbal measures of intelligence.

4. The examiner should make use of "therapeutic testing" where an educational plan is implemented on the basis of test results. The student's progress with this educational plan should be evaluated on a frequent basis with modifications made as necessary. In this approach, testing is viewed as "the beginning of the assessment process, not the end result." (Kamphaus, 1993 p. 460).

School personnel are concerned that the current assessment techniques may not be sufficient to properly identify Hmong students with disabilities. The difficulty lies in determining whether a student referred for a special education evaluation exhibits a disability, such as a Learning Disability or Mild Retardation, or if the student's academic difficulties are related to linguistic and cultural differences. Therefore, this study was designed to investigate the parameters of a valid assessment of cognitive ability for students of Hmong origin who are referred for suspected exceptional education needs.

Methodology

Subjects:

Subjects for the study included 56 Hmong students, ages 6 years 4 months to 13 years 0 months, with an average age of 9 years 3 months. The students were in Kindergarten through grade 6. Twenty-three males and thirty-three females from four of the district's seven elementary schools, in which there was a primary concentration of Hmong students, participated in this study. Hmong was the dominant language in all but one subject's home. The remaining subject's parents indicated that both Hmong and English were spoken in the home.

Subject Selection:

In June 1995, when this study was organized, there were 104 students of Hmong heritage, enrolled in kindergarten through grade six, in the School District of

the Menomonie Area who were eligible to participate in the study. Efforts to involve parents included two community meetings with two Bilingual Specialists to explain the intent of the study. This was followed by individual phone calls by the Bilingual Specialists as an attempt to increase subject participation rate. A participation rate of 54% was achieved. As parent permission was a requisite for participation, a random sampling was not possible.

Parents of each student completed a questionnaire that addressed the following variables:

1. Student place of birth
2. Number of years the student has been in the United States
3. Parents level of formal education
4. Language spoken in the home

Instrumentation:

All subjects were tested using the following instruments:

1. Wechsler Intelligence Scale for Children-Third Edition (WISC-III)
2. Comprehensive Test of Nonverbal Intelligence (CTONI)
3. Test of Nonverbal Intelligence-Third Edition (TONI-3)
4. Kaufman Brief Intelligence Test (K-BIT)

These tests were chosen for the following reasons:

1. All tests yield a nonverbal or non-language measure of cognitive abilities.
2. The WISC-III, as was the WISC-R, continues to be the most frequently used test for the cognitive evaluation of school aged children and is often administered LCD students (Holtzman & Wilkinson, 1991, p. 258)
3. The K-BIT was chosen to determine whether this brief measure was a valid substitute for the lengthier WISC-III.

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4. The CTONI was selected because of its design as a valid language-free measure of cognitive abilities.

5. The TONI-3 was chosen as a second language-free measure. It is similar in design but shorter in length than the CTONI.

6. All tests were available, familiar and currently used in the assessment of Hmong students.

Following is a brief description of each of the tests administered in this study:

The WISC-III is a widely used instrument in the assessment of children's cognitive ability (Kramer & Conoley, 1992). The WISC-III consists of 13 subtests divided into two scales: a Verbal Scale and a Performance Scale. The Verbal Scale consists of test items that are language-based. Visual-motor items that are less language dependent comprise the Performance Scale. Ten subtest scores (five from both the Verbal and Performance scales) produce a Full Scale IQ score (Kramer & Conoley, 1992). Average reliability coefficients for the WISC-III for subjects ages 6 years to 16 years for Verbal, Performance and Full Scale I.Q. were .95, .91, and .96 respectively (Wechsler, 1991).

The CTONI is a non-language measure that tests nonverbal intellectual abilities in both pictured object and geometric design contexts. The battery consists of six subtests which yield a Pictorial Nonverbal Intelligence Composite, a Geometric Nonverbal Intelligence Composite and a Nonverbal Intelligence Composite. It was designed for use with persons ages 6-0 through 18-11 (Hammill, Pearson, & Wiederholt, 1996). The CTONI can be administered with pantomime or verbal directives. In estimating reliability (of the CTONI), coefficient alphas for subtests were calculated and range from .86 -.92; for composite scores, .93 -.97. Criterion-related validity evidence was presented by comparing CTONI scores with the WISC-III, the Test of Nonverbal Intelligence-Second Edition, and the Peabody Picture Vocabulary

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Test-Revised (PPVT-R), in a sample of 43 "elementary level" students attending a school that exclusively serves learning disabled students. Geometric Analogies, Pictorial Sequences, and Geometric Sequences had the highest correlations with the WISC-III PIQ (rs=.53); Pictorial Sequences had the highest correlation with the PPVT-R (r= .53). As expected, CTONI composite quotients had higher correlations with both subtest and composite criterion IQ scores. The Pictorial Nonverbal Intelligence Quotient had a particularly low correlation with the TONI-2 Quotient (.43), in comparison to the Geometric Nonverbal Intelligence Quotient or the Nonverbal Intelligence Quotient (.64 and .62 respectively) (Conoley & Impara, 1996, p. 311).

The TONI-3 is also a language free measure of abstract/figural problem solving (Brown, Sherbenou, and Johnson, 1997). At the time of testing, the TONI-3 norming version was used as reliability and validity data were being collected. Coefficients Alpha were calculated at 20 age intervals for the entire TONI-3 normative sample. "All equal or exceed .89 and all but four are in the .90s" (Brown, Sherbenou, & Johnson, p. 80). The TONI-3 was correlated with the CTONI, the WISC-III, and the Wechsler Adult Intelligence Scale-Revised (WAIS-R) (Wechsler, 1981). Correlations with the CTONI Pictorial Nonverbal IQ, the Geometric Nonverbal IQ, and the Overall Nonverbal IQ were .74, .64, and .76 respectively for Form A and .72, .64, and .74 for Form B respectively. The correlations with the WISC-III Verbal, Performance and Full Scale IQ were .59, .56, and .63 respectively for Form A and .59, .59, and .63 respectively for Form B. The correlations with the WAIS-R for Verbal, Performance and Full Scale IQ were .57, .75,.73 respectively for Form A and .51, .76, and .71 for Form B (Brown, Sherbenou, and Johnson, p. 96).

The K-BIT is a brief measure of verbal (crystallized) and nonverbal (fluid) intelligence. It consists of two subtests: Vocabulary and Matrices. The K-BIT was developed specifically to be used for screening and related purposes (K-BIT manual).

Mean split-half reliability coefficients for children and adolescents (aged 4 to 19) were .91 for Vocabulary (range = .89 to .93), .85 for Matrices (range = .74 to .92), and .92 for IQ Composite (range = .88 to .95). Test-retest coefficients for 232 children, adolescents, and adults tested twice averaged .94 for Vocabulary, .85 for Matrices, and .94 for IQ Composite. (Kaufman & Wang, 1992).

Procedures:

The testing was completed by qualified teachers employed by the School District of the Menomonie Area and by School Psychology Graduate Students from both the University of Wisconsin-Stout and the University of Wisconsin-River Falls. These students were in their final year of preparation for certification as School Psychologists. The subjects were tested during two individual testing sessions. The CTONI, WJ-R subtests and the TONI-3 were administered by district staff in counterbalanced order during the same testing session. The order of administration of the CTONI and the TONI-3 was alternated. The WISC-III and the K-BIT were administered by the graduate students in counterbalanced order during the same testing session. The order of presentation was counterbalanced so half of the subjects received the WISC-III, K-BIT combination initially and half of the subjects received the CTONI and TONI-3 combination initially. All testing was completed during the subjects' school day in a quiet one-to-one setting. All tests were administered as outlined in each respective manual. Both the CTONI and the TONI-3 were administered using the pantomime approach to convey the test directions.

Results and Discussion

Table 1 provides descriptive statistics for the mean, range and standard deviation of scores for all tests administered. Mean scores reflecting crystallized

intelligence on the verbal reasoning ability scales (WISC-III Verbal IQ and K-BIT Vocabulary Score) are in the borderline range reflecting the low verbal fluency of Hmong students. At the same time, some students did score within the average range of performance on verbal measures. All scales designed to measure fluid intelligence on the nonverbal reasoning ability scales are in the average range. Some students however, did score in the borderline range.

For these scales the range of scores was consistent with those obtained in the standardization sample as indicated by the standard deviation. Consequently, this does not represent a sample restricted in the range of overall ability. It should be noted however that for most measures, the range of scores peaks at the High Average/Superior range of ability rather than the superior range.

The data presented in Table 2 show the full scale ability correlations for all tests given. The data are supportive of the validity of each instrument. Correlations of the WISC-III Full Scale with the K-BIT composite and the CTONI composite suggest that the constructs being measured by these three instruments are similar. While still significant, the lower correlations between the WISC-III Full Scale and the CTONI composite and the TONI-3A and TONI-3B perhaps reflect the absence of verbally mediated items on the TONI-3A and TONI-3B. The CTONI utilizes abstract geometric designs, as does the TONI-3, but also has pictorial verbal items that lend themselves to verbal mediation. An example of such an item from the CTONI Pictorial Categories subtest presents a strawberry, a banana and an empty box. The subject must select the missing item that fits in the category of "fruit" from an array of cherries, an egg, a loaf of bread, an onion and a slice of pie. From the Pictorial Sequences subtest, an example of an item that lends itself to verbal mediation includes a series of pictures with a house on fire, a child yelling, a fire truck and an empty frame. The subject selects a picture to complete the sequence from an array of pictures that includes a

fireman, a doctor, a baker, a butcher and a farmer. From the Pictorial Analogies subtest, a sample analogy signifying diamonds with a diamond mine is followed by an incomplete analogy of a pearl necklace with an empty frame. The subject selects an item to complete the analogy from an array of a woman wearing a necklace, an octopus, a clam, a safe and a treasure chest.

Table 3 provides correlations between total test or subtests that purport to measure nonverbal or fluid cognitive abilities examining whether they are measuring similar constructs. The TONI-3A and TONI-3B, being presented as alternate or comparable forms correlate at a high level of .80 suggesting they are measuring similar constructs. While correlations are all significant ($p < .01$), ranging from .42 to .64, they are not as high as expected. Even though the CTONI and TONI-3 overlap, there are some differences in the constructs they measure.

The K-BIT Matrices subtest showed significant correlations with all other non-verbal measures. Again, this indicates a moderate overlap in constructs measured, but there are differences. The data support that K-BIT Matrices primarily measures fluid abilities while the WISC-III Performance measure is a combination of fluid and visual intelligence. The K-BIT Matrices correlations with the CTONI and TONI-3 are significant, but not as high as expected. As the TONI-3 is purely geometric, it was expected that the correlation between the K-BIT Matrices and TONI-3 would be lower than the correlation between the K-BIT Matrices and CTONI. The range of correlations (.55 to .62) between the K-BIT Matrices and WISC-III Performance, CTONI, and TONI-3 suggest moderate to strong overlap of constructs measured.

Table 4 provides correlations between subtests that are purported to measure verbal or crystallized cognitive ability. The correlation of .82 between the WISC-III Verbal IQ and the K-BIT Vocabulary is significant indicating substantial overlap in the constructs being measured. Both tests utilize items that intertwine cultural knowledge

and verbal mediation. If what is needed in a student evaluation is a score of verbal development, either would produce very similar results. The CTONI Pictorial Nonverbal IQ was included in these correlations to determine whether a subject's use of verbal mediation in responding to test stimuli adds a verbal component to this measurement. Although the CTONI is a nonverbal measure of cognitive ability, the Pictorial scale correlations of .50 and .61 with the K-BIT Vocabulary and the WISC-III Verbal IQ, respectively, suggest there are still some verbal components being measured.

Implications

Results of this research study have numerous implications in regard to its purpose of investigating the parameters of a valid assessment of cognitive ability for students of Hmong origin who are referred for suspected special education needs. Implications apply to the area of evaluation, test interpretation and programming.

In the area of evaluation, the need to include a sound nonverbal cognitive ability measure in an assessment battery to minimize the negative effects of low verbal fluency, cultural differences and previous learning is imperative. For an initial evaluation, a nonverbal measure (CTONI or TONI-3) should be given in addition to the practitioner's usual battery, which likely includes the widely-used and more comprehensive WISC-III. However, given the high correlation between the K-BIT and the WISC-III, the K-BIT would fulfill the need for a measure of verbal development in a more time efficient manner. Reevaluations could be completed with the use of the K-BIT and the CTONI or the TONI-3.

Several factors need to be considered in interpreting test scores obtained by Hmong students. Caution should be taken to avoid placing students in special education programs when their true need is to develop the language skills necessary to allow them to function at their true level of cognitive ability. Low verbal reasoning

ability scores reflect the highly verbal nature of the WISC-III and the K-BIT. Although performance on the WISC-III and the K-BIT may be the best indicator of academic success, higher scores as obtained on the nonverbal cognitive ability measures may represent average abilities that are not clearly evidenced in the classroom. Instruments that rely heavily on verbal fluency may well lead to erroneous special education placements. Educational difficulties experienced by students who have verbal ability scores that fall in the borderline range of performance and nonverbal ability scores that fall in the average range are probably due to their cultural and linguistic differences. Diagnostically, students who present with verbal and nonverbal scores in the borderline range may indeed be exhibiting a cognitive disability. In regard to learning disabilities identification, a critical factor to be considered, beyond performance on formal testing measures, is whether the student has made academic progress when provided with appropriate regular education intervention (English as a Second Language or ESL programming). A student may be learning disabled if they exhibit advancement in English skills, but not in academic skills. When evaluating a student, practitioners may also want to examine educational success of siblings. A student who is not demonstrating academic success and who has siblings that are achieving successfully academically may be demonstrating more than the effects of being a student that is linguistically and culturally different.

The educational programming needs of the students who exhibited better developed nonverbal skills in comparison to their verbal skills are probably best met in a specialized program (ESL or a communication based classroom) targeting intensive language development. Techniques aimed at teaching to these students' stronger visual channels, in combination with verbal instruction, are probably the most effective. Addressing these needs continues to be increasingly important as these students are included in statewide assessments and may impact overall district scores.

Recommendations for Further Study

Numerous areas for additional further study exist. A limitation of this study was the restricted age range of the subjects. Additionally, as parental permission for individual subjects to participate in this study was a prerequisite, a random sample was not possible. Studies designed to investigate the variables that were limitations in this study should be conducted.

Following a group of students, such as the group in this study, longitudinally to determine how nonverbal and verbal scores change as a result of increased verbal fluency may yield valuable information, both diagnostically and educationally. A study of this nature may show which scores are predictive of academic success and which scores may be more of an indicator of true cognitive ability given appropriate intervention and language development. It may also address the issue of whether or not, with appropriate remediation, academic achievement will ever be commensurate with nonverbal ability scores.

An original goal of this study was to examine whether language spoken in the home had an impact on test performance. As Hmong was the primary language spoken in the home of all students that agreed to participate in the study, the opportunity to compare performance of subjects whose families spoke English, Hmong, or Hmong and English did not exist. It would be predicted that exposure to English in the home environment should increase performance on measures that rely on verbal fluency, particularly if English were the primary language spoken in the home. It would also be expected that with increased exposure to American culture, there would be an increase in scores on items that lend themselves to verbal

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mediation to arrive at the correct answer, as it would be difficult to verbally mediate an item, either in an individual's native language or second language, if the individual had not been exposed to the item culturally.

In addition to linguistic variables, a study of the effects of educational level of parents and family socioeconomic status on Hmong students performance on these standardized measures needs to be explored. Another possible comparison would be to examine how Hmong students who attend school in more rural areas, such as Menomonie, WI, compare with Hmong students who attend schools in a more urban area such as Wausau or Green Bay, WI. The possibility of conducting a similar battery of tests on a different minority group may indicate whether the pattern of performance of the Hmong students in this study is unique or if it is able to be generalized to other groups of LCD students.

Currently there is a thrust in test development in the area of specialized non-verbal measures. These instruments need to be studied to determine if they are more useful and efficient in identifying the needs of this population. Since this research study began, the Universal Nonverbal Intelligence Test (UNIT) (Bracken & McCallum, 1998) has been developed. The tasks of the UNIT, which rely on non-verbal responses, were designed to measure cognitive ability of school age children, who may have been disadvantaged by traditional verbal and language-loaded measures. The UNIT measures a broad range of complex memory and reasoning abilities, including those lending themselves to internal processes of verbal (symbolic) mediation as well as those that are less conducive to such mediation (nonsymbolic) (Bracken & McCallum, 1998, p. 1). Practitioners may find the UNIT useful as an adjunct to other testing for suspected special educational needs.

The assessment of Hmong and other LCD students will continue to present a challenge to practitioners. Data presented in this study should aid practitioners in

making an informed selection of the appropriate cognitive battery to limit or neutralize the effects of bias. The results indicate it is imperative that practitioners employ assessment techniques, including nonverbal measures of ability, designed to fairly and accurately assess LCD students in order to arrive at appropriate decisions in regards to their educatic il programming. In addition to proper test selection, careful interpretation of assessment data is another key factor in making appropriate and accurate placement decisions. Practitioners need to be continually aware of these special considerations when evaluating students from this and other LCD populations in order to guard against erroneous special education placements.

TABLE 1
Range and Mean Scores

Tests	Range of Scores	Mean Scores
WISC-III Verbal IQ	46-115	73
WISC-III Performance IQ	60-123	94
WISC-III Full Scale IQ	50-118	81.9
K-BIT Vocabulary	40-106	70
K-BIT Matrices	56-125	95
K-BIT Composite	44-117	80.9
TONI-A Composite	70-125	100.3
TONI-B Composite	74-122	105.1
CTONI Pictorial	64-121	91.82
CTONI Geometric	72-141	95.8
CTONI Composite	65-123	93

TABLE 2
Full Scale Ability Correlations

	Full Scale WISC-III	K-BIT Composite	TONI-A	TONI-B
K-BIT Composite	.83			
TONI-A	.60	.70		
TONI-B	.52	.61	.80	
Composite CTONI	.74	.70	.64	.56

TABLE 3
Non-Verbal Cognitive Ability Correlations

	WISC-III Performance IQ	K-BIT Matrices	TONI-A	TONI-B
K-BIT Matrices	.62			
TONI-A	.64	.61		
TONI-B	.60	.55	.80	
CTONI Nonverbal Intell. Compos.	.74	.62	.64	.56

TABLE 4
Verbal Cognitive Abilities Correlations

	WISC-III Verbal IQ	K-BIT Vocabulary
K-BIT Vocabulary	.82	
CTONI Pictoral Nonverbal IQ	.61	.50

TABLE 5
Nonverbal Visual Spatial Cognitive Abilities

	WISC-III Block Design	TONI-A	TONI-B	K-BIT MATRICES
TONI-A	.41(<.01)			
TONI-B	.38(<.01)	.80		
K-BIT Matrices	.46	.61	.55	
CTONI Geometric Composite	.46	.55	.42	.63

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References

Anastasi, A. (1988). _Psychological testing_ (6th ed.). New York: MacMillan.

Baca, L.M., & Cervantes, H.T. (1984). _The bilingual special education interface_. St. Louis: Times Mirror/Mosby College Publishing.

Brown, L, Sherbenou, R. J., Johnsen, S.K. (1997). _Test of Nonverbal Intelligence_. Austin, TX: Pro-Ed.

Chan, S. (Ed.). (1994). _Hmong means free: life in Laos and America_. Philadelphia, PA: Temple University Press.

Close, J.C. & Impara, J. C. (Eds.) (1998). _The thirteenth mental measurements yearbook_. Lincoln, NE: The Buros Institute of Mental Measurements of the University of Nebraska-Lincoln.

Conoley, J.C. & Impara, J.C. (1995). _The twelfth mental measurements yearbook_. Lincoln, NE: The Buros Institute of Mental Measurements of the University of Nebraska-Lincoln.

Elliot, R. (1987). _Litigating intelligence: IQ tests, special education, and social science in the courtroom_. Dover, MA: Auburn House.

French, J.L., & Hale, R.L. (1990). A history or the development of psychological and educational testing. IN C.R. Reynolds & R.W. Kamphaus (Eds.), _Handbook of psychological and educational assessment of children_ pp. 3-28). New York: Guilford.

Glutting, J.J. (1986). Pothoff bias analysis of K-ABC, MPC and nonverbal scale IQs among Anglo, Black, and Puerto Rican kindergarten children. _Professional School Psychology_, 4, 225-234.

Goldenson, R.M. (Ed.) (1984). _Longman dictionary of psychology and psychiatry_. New York, NY: Longman Inc.

Hamayan, E.V., & Damico, J.S. (1991). _Limiting bias in the assessment of bilingual students_. Austin, TX: Pro-Ed.

Hamilton-Merritt, J. (1993). _Tragic mountains: the Hmong, the Americans, and the secret wars for Laos, 1942-1992_. Bloomington, IN: Indiana University Press.

Hammil, D.D., Pearson, N.A., Wiederholt, J.L. (1996). Comprehensive Test of Nonverbal Intelligence. Austin, TX:Pro-Ed.

Holtzman, W.H., Jr., Ortiz, A.A., & Wilkinson, C.Y. (1986). Characteristics of limited English progicient Hispanic students in programs for the mentally retarded: Implications for policy, practice and research. Austin, TX: The University of Texas, Handicapped Minority Research Institute on Language Proficiency.

Holtzman, W.H. & Wilkinson, C.Y. (1991). Assessment of cognitive ability. In E.V. Hamayan & J.S. Damico (Eds.) Limiting bias in the assessment of bilingual students. (pp. 248-280). Austin, TX: Pro-Ed.

Jacobs, L. (1991). Assessment concerns: a study of cultural differences, teacher concepts, and inappropriate labeling. Teacher Education and Special Education. 14 (1). 43-48.

Kamphaus, R.W. (1993). Clinical assessment of children's intelligence. Needham Heights, MA: Allyn and Bacon.

Kaufman, A.S. & Wang, J. (1992). Gender race, and education differences on the K-BIT at ages 4 to 90 years. Journal of Psychoeducational Assessment. 10. 219-229.

Kramer, J.J., & Conoley, J.C. (Eds.) (1992). The eleventh mental measurements yearbook. Lincoln, NE: The Buros Institute of Mental Measurements of the University of Nebraska-Lincoln.

Lam, T.C. (1993). Testability: a critical iss   in testing language minority students with standardiz d achievement tests. Measurement and Evaluation in Counseling and Development.46. 179-191.

McInnis, K. (1991). Ethnic sensitive work ·   Hmong refugee children. Child Welfare. 5. 571-580.

McNall, M., Dunnigan, T., & Mortimer, J.T. (1994). The educational achievement of the St. Paul Hmong. Anthropology and Education Quarterly. 25(1), 44-65.

Meyers, C. (1992). Hmong children and their families:consideration of cultural influences in assessment. The American Journal of Occupational Therapy.46 (8), 737-744.

Moore, D. (1989). Dark sky, dark land. Eden Prairie, MN:Tessara.

Naglieri, J.A., & Hill, D.S. (1986). Comparison of WISC-R and K-ABC regression lines for academic prediction with Black and White children. Journal of Clinical Child Psychology, 15(4), 352-355.

Olivarez, A., Palmer, D.J., & Guillemard, L. (1992). Predictive bias with referred and nonreferred Black, Hispanic and White pupils. Learning Disabilities Quarterly, 15, 175-186.

Palmer, D.J., Olivarez, A., Wilson, L.V., & Fordyce, T. (1989). Ethnicity and language dominance-influence on the prediction of achievement based on intelligence test scores in nonreferred and referred samples. Learning Disability Quarterly, 12 (4), 261-274.

Publication manual of the American Psychological Association (4th ed.). (1994). Washington, DC: American Psychological Association.

Quincy, K. (1995). Hmong history of a people. Cheney, WA:Eastern Washington University Press.

Reynolds, C.R., & Gutkin, T.B. (1980). A regression analysis of test bias on the WISC-R for Anglos and Chicanos referred for psychological services. Journal of Abnormal Child Psychology, 8(2), 237-243.

Reynolds, C.R., & Hartlage, L. (1979). Comparison of WISC-R and WISC-III Regression lines for academic prediction with Black and with White referred children. Journal of Consulting and Clinical Psychology, 47(3), 589-591.

Ross-Reynolds, J. & Reschly, D.J. (1983). An investigation of item bias on the WISC-R with four sociocultural groups. Journal of Consulting and Clinical Psychology, 51(1), 144-146.

Satler, J. (1988). Assessment of Children, Third Edition. San Diego,CA: Jerome M. Satler, Publisher.

Slate, J. R., & Jones, C.H. (1995). Preliminary evidence of the validity of the WISC-III for African American students undergoing special education evaluation. Educational and Psychological Measurement, 55 (6) 1039-1046.

Svanum, S., & Bringle, R.G. (1982). Race, social class, and predictive bias: An evaluation using the WISC, WRAT, and teacher ratings. Intelligence, 6, 275-286.

Walker-Moffat, W. (1995). The other side of the Asian American success story. San Francisco, CA: Jossey-Bass Publishers.

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Wechsler, D. (1981). Wechsler Adult Intelligence Scale-Revised. San Antonio: Psychological Corporation.

Wechsler, D. (1991). Wechsler Intelligence Scale for Children-Third Edition. San Antonio: Psychological Corporation.

Wood, C. (1998, January 28). Menomonie man loses family in Laos to ethnic cleansing. The Dunn County News. pp. A1, A13.

Vangyi, X.V. "The Needs for the Education for Laotian Refugees." Paper presented at the First National Indochinese Conference, Santa Ana, CA, May 8-9, 1980.

Yang, D. (1992). The Hmong: enduring traditions. In J. Lewis (Ed.), Minority cultures of Laos: Kammu, Lua', Lahu, Hmong and Iu-Mien (pp. 253-258). Rancho Cordova, CA: Southeast Asia Community Resource Center.