1-1-2002

The Effects of Acculturation Level on Verbal Learning in a Sample of Hispanics of Mexican-American Extraction

Anita S. Blair
George Fox University, psydblair@hotmail.com

This research is a product of the Doctor of Psychology (PsyD) program at George Fox University. Find out more about the program.

Recommended Citation
http://digitalcommons.georgefox.edu/psyd/143

This Paper is brought to you for free and open access by the Theses and Dissertations at Digital Commons @ George Fox University. It has been accepted for inclusion in Doctor of Psychology (PsyD) by an authorized administrator of Digital Commons @ George Fox University.
The Effects of Acculturation Level on Verbal Learning
in a Sample of Hispanics of Mexican-American Extraction

by
Anita S. Blair

Presented to the Faculty of the
Graduate School of Clinical Psychology
George Fox University
in partial fulfillment
of the requirements for the degree of
Doctor of Psychology
in Clinical Psychology

Newberg, Oregon
January 30, 2002
The Effects of Acculturation Level on Verbal Learning in a Sample of Hispanics of Mexican-American Extraction

by
Anita S. Blair

has been approved
at the
Graduate School of Clinical Psychology
George Fox University
As a Dissertation for the Psy.D. degree

Signatures:
Leonardo M. Marmol, Ph.D., Chair

Vice President for Academic Affairs
Date: August 24, 2003

Members:
Wayne V. Adams, Ph.D., ABPP/CI

Leah B. Schock, Ph.D.

Date: ___________________
The Effects of Acculturation Level on Verbal Learning in a Sample of Hispanics of Mexican-American Extraction

Anita S. Blair, M.A.
Graduate Student of Clinical Psychology at
George Fox University
Newberg, Oregon

Abstract

This study is interested in the relationship of acculturation to performance on verbal learning tasks. The hypotheses of the study are that as acculturation to Anglo American culture approaches assimilation, total recall scores on the California Verbal Learning Test-II (CVLT-II) will increase and performance on a nonsense word task will not significantly correlate with acculturation level. A review of the literature on acculturation and test bias in Hispanic populations is followed by research on bilingual performance on memory tasks. As the independent variable, acculturation is examined on three levels: Mexican Oriented, Bicultural Oriented and Anglo Oriented using Scale One of the Acculturation Rating Scale for Mexican Americans-II (ARSMA-II). The dependent variables include recall performance scores on the CVLT-II and on a nonsense word list learning task. Subjects were 57 research volunteers from a rural Washington State community and the Portland, Oregon area.

A 3 X 8 (group X test scores) multivariate analysis of variance (MANOVA) was performed to assess differences between mean raw scores for subjects in the three acculturation groups on the CVLT-II and on the nonsense word list. A 3 X 4 (group X test scores) MANOVA was also performed to assess differences between mean standardized score transformations from the CVLT-II computerized scoring program for subjects in the three acculturation groups for the same verbal learning instruments. Post hoc analyses (Tukey HSD, Scheffe, Dunnet.C) were used to determine which groups were different. The effect of moderator variables was examined in an analysis of covariance (ANCOVA).
The results of the study do not support a significant difference in means by acculturation level on the CVLT-II recall scores or on the nonsense word list. Performance by this bilingual Mexican-American sample was approximately one half standard deviation below the standardizing sample of the CVLT-II. While means were within the average range, further research including larger samples of bilingual Mexican-Americans is recommended in order to support use of the CVLT-II with greater confidence as an accurate measure of verbal learning in this population. This study discusses other results of interest and makes recommendations for further research and for conducting neuropsychological testing with individuals of Mexican-American extraction.
Acknowledgements

No one comes into this world without legacy. The process we use to create our lives, regardless of the challenges we face, we offer to our children, our family and dear friends along with our essence. I would like to thank my grandmother, Kate, who will turn 100 years old this June. When I have despaired of the graduate student process, I visualize my ancient photo of her as a teenager homesteading in Canada with a shotgun in one hand, empty plains behind her and the responsibility of raising her seven brothers and sisters at the cost of her own formal education. I would like to thank my mother who taught me that we get to choose and that I could always find the strength to do anything I needed to do. I would like to thank my sister Toni for her fierce courage in seeking the feminine face of God and for modeling professional dedication to her patients and colleagues. Thanks, too, for my sister Cathy and her determination to be just who she is.

I must especially thank my husband Robbie who has sacrificed his life for me, who always believes in me and taught me what gentle lovers men can be. I am thankful for my young men, Nick and Kris, who have given me the time to become Dr. Mom, who have been willing to go into yet another century without civilized technological entertainment, home cooked meals, and a “normal life” so I might follow my path. Never doubt that you and your sister are the joy in my life. Thanks to my daughter, Michele, for knowing me and loving me so well anyway. Thank you to Madelyn, Ken, Sandy, and Geralyn for their unswerving support and willingness to be surrogate husbands, wives, mothers, and fathers.

Thank you as well to my mental health colleagues that I took hostage into friendship. My love and thanks to Lois for teaching me that God, therapy and psychiatry really do transect, that all I had to do was start, and that God loves us more than we could ever imagine. My thanks as well to Dan, who gave me the “you are here” orientation to cortical and subcortical systems and assured me that terminal strangeness was not an inevitable side effect of over-education. My thanks to Scott for not voicing “Oh, my God, what have I gotten into!” when he allowed me into his practice as a raw practicum student and found out how much I didn’t know that I didn’t know. My thanks to Rich who made a year of forensic neuropsychology a pleasure every single day.
“Thank you” would not be complete without including the faculty of George Fox University. Thanks to Howard Macy and Irv Brendlinger who taught me that no honest question is sacrilegious and that the truth lies in “both / and” not “either / or.” Thanks to Nancy for white sauce Rorschach analogies after suffering years of meaningless sports analogies and for letting her zest for the field splash on us all. Thanks to Wayne Adams for being willing to tell me all the things I didn’t want to hear then patiently waiting for me to come around without an “I told you so.” Many, many thanks to Leo, who invited me on the journey, smiled when I later whined, and has always believed I could do this and do it well.

Thanks to a wonderfully supportive cohort (this means you Renee, George, Jill, Judy, Buffy, Val….) and the many friends that sprouted in the nurturing environment of George Fox University. A last special place of thanks to my dissertation buddy Megan whose fiery spirit sustained me. You are one of the only people who really understand how much neuropsychology has terrified and excited me all at once.

Thanks are most warmly extended to the individual volunteers who gave their time and enthusiasm to take part in testing. Thank you as well to the following individuals and institutions who offered their support, their resources, and community contacts to generate interest in the study: Eva Madrigal and George Garcia at First Fruits of Washington (a division of Brotje Orchards), staff at New Horizon Preschool (a division of Brotje Orchards), staff from Jubilee Ranch, staff and congregation from The Cathedral of Joy, Lts. Lex and Patricia Giron from The Salvation Army Temple, David Cortinas of La Voz, Pat Wright and Mark Morena at Washington State University in Richland, Bruce Carter and staff at Columbia Basin College, Carl Taylor at MacDonalds Corporate Office-TriCities, Oregon Fruit Products, and Angela Perez.

Many more thanks are well deserved and could be given (especially to those of you who know who you are and your names don’t appear). I firmly believe that if we don’t give thanks we begin to lose sense of who we are. Thank you, as Renee would say, not from the depths or heights of my soul, but its center.
Table of Contents

Approval Page................................................................................................................. ii
Abstract......................................................................................................................... iii
Acknowledgements....................................................................................................... v
List of Tables................................................................................................................... ix

Chapter 1 Introduction................................................................................................. 1
  Statement of the Problem......................................................................................... 1
  Acculturation ........................................................................................................ 3
  Test Bias ............................................................................................................... 6
  Bilingualism and Verbal Memory ....................................................................... 11

Chapter 2 Methods..................................................................................................... 14
  Subjects .............................................................................................................. 14
  Measures ........................................................................................................... 15
    Neuromedical Screen ...................................................................................... 15
    Demographic Questionnaire .......................................................................... 15
    Nonsense Words ............................................................................................. 15
    Raven’s Coloured Progressive Matrices (RCPM) .......................................... 15
    The California Verbal Learning Test-II (CVLT-II) ......................................... 16
    Acculturation Rating Scale for Mexican Americans-II (ARSMA-II) .......... 17
  Procedure ......................................................................................................... 18
  Statistical Analysis ......................................................................................... 19

Chapter 3 Results....................................................................................................... 21

Chapter 4 Discussion................................................................................................. 31

References................................................................................................................. 36

Appendix A Neuromedical Screen............................................................................ 41
Appendix B Demographic and Acculturation Scale ................................................. 44
Appendix C Nonsense Word List ........................................................................... 50
Appendix D Phone Contact Script and Consent..................................................... 52
List of Tables

Table 1 Group Demographics by Acculturation Level..........................................................22
Table 2 Country of Origin and Country of Education Demographics by Acculturation Level.....22
Table 3 ARSMA-II Group Mean Performance.................................................................23
Table 4 Correlation of Dependent Variable with Independent Variables............................24
Table 5 Test of Between Subject Effects-MANOVA .......................................................25
Table 6 Tukey HSD Age Differences by Acculturation Level............................................26
Table 7 Education Differences by Acculturation Level....................................................27
Table 8 CVLT-II Trials 1-5 Total Recall Raw Scores by Acculturation and Gender.............28
Table 9 CVLT-II Test of Between Subject Effects for Education-MANOVA ......................29
Table 10 Tukey HSD by Country of Education by Acculturation Level...............................30
Chapter 1

Introduction

Statement of the Problem

Perhaps as part of the rite of passage as a new discipline, neuropsychology is currently experiencing the scrutiny that has so far been reserved for assessment of intelligence, academic achievement, and personality. In 1993, guidelines were published by the American Psychological Association (APA) for the benefit of providers of psychological services to promote and facilitate the equitable treatment of ethnically, linguistically and culturally diverse populations. Culture can be defined as consisting of "learned systems of meaning, communicated by means of natural language and other symbol systems, having representational, directive and affective functions, and capable of creating cultural entities and particular senses of reality" (D'Andrade, 1988, p. 116). In neuropsychological assessment, instruments quantitatively measure an individual's performance and enable comparison to a standardized group of subjects. The neuropsychologist must make sense of the resulting data, taking into consideration the meaning and cultural relevance of test results from subjects endorsing a minority population status that may not be adequately represented within the standardizing population.

Nowhere is concern for equitable treatment more acute than with the bilingual Hispanic culture. When verbal memory is the domain of interest, these concerns include the impact of language on testing results and the subject's level of acculturation to the dominant culture. It is the thesis of this study that as acculturation of Mexican Americans to Anglo American culture increases, performance on verbal learning measures that assume semantic familiarity and employ association to facilitate recall will also increase. Conversely, a measure of rote memory will be unaffected by acculturation level.

By the time of the 2000 census, Hispanics were predicted to become the largest minority group in the United States (Davis, Haub, & Willett, 1983). Also, the US is fifth in the world in number of speakers with Spanish as "mother tongue." The Hispanic population was projected to
Effects of Acculturation

to double between the years of 1991 to 2030 increasing by 9 million (60%) between 1982 to 2008 (U.S. Census, 1990, as cited by Harris, 1992). Mungas (1996) notes that census data indicate that the U.S. population of Hispanics over the age of 65 years increased by 1 million between 1980 and 1990, double the rate of non-Hispanics. Ponton and Ardila (1999) cite U.S. Census figures from 1997 stating that by 2050 Hispanics will equal one fourth of the total population.

With the release of the most recent census data (U.S. Census Bureau, 2000), Hispanics comprised 12.5% of the total U.S. population in 2000. They were exceeded in number as a minority population only by African Americans at 12.9% of the total. In 1990, Hispanics represented 9.0% of the U.S. total population, showing in ten years a 57.9% increase. Fifty-eight and one-half percent of those endorsing Hispanic race were of Mexican origin. The next largest Hispanic subpopulation was Puerto Ricans contributing 9.6% of the Hispanic total. Population estimates based on the current census data project that Hispanics will enlarge to 15.8% of the U.S. population in the next thirteen years.

The effects of this population increase can be predicted to significantly affect the nature of psychological evaluation of vulnerable individuals. These individuals include children in the school system who are learning English as a second language. Other vulnerable individuals are those needing identification of learning disorders, head injured adolescents, and adult workers needing rehabilitation. Aging Hispanic adults experiencing dementia processes will need assessment for accurate diagnosis and recommendations for appropriate levels of supportive interventions.

With the rapid increase in the Hispanic population, older standardization samples may not include appropriate numbers or representative individuals that allow generalization to the presenting problems that led clients to seek treatment. Historically, neuropsychology has assumed that there are "no significant differences" in performance by major racial groups (Lezak, 1983, p.142). A review of the literature reveals only a handful of studies on specific neuropsychological tests (Fogle, 1997/1998; Gasquoine, 2001; Harris, 1992). Fogle's dissertational survey of the effects of race specifically comparing African Americans to Caucasians on neuropsychological tests concluded: "The two racial groups did not differ significantly on the variables related to age, gender and class. Results were insignificant on SES" (Fogle, 1997/1998, p.40).

But statistical significance or calculating the amount of variance one factor attributes to an
effect are only a few ways to measure significance. Small effects can have enormous practical implications, can accumulate into large effects over time, be important theoretically, or be so pervasive and tenacious that they hold under even improbable circumstances (Prentice & Miller, 1998). Prentice and Miller (1998) state, "Many studies are not designed to account for a lot of variance and are no less impressive for the statistical size of the effects they produce" (p. 171). Studies that will be discussed in this introduction compare Hispanic or African-American performance on measures to Anglo American norms and conclude that there is a small, persistent difference that does not reach statistical significance. But what does that small difference mean, and should we ignore a persistent effect because of small size if the result is differential treatment in educational and vocational goals? APA guidelines urge that “psychologists consider the validity of a given instrument or procedure and interpret resulting data, keeping in mind the cultural and linguistic characteristics of the person being assessed” (APA, 1993, p.165) without mention of a prerequisite effect size. Guidelines state that psychologists must be aware of the reference population for instruments and how generalizing standardization data to a minority population might be inappropriate.

Defining and identifying cultural bias is challenging. Research with minorities is made more difficult because of reluctance of these subjects to participate in studies, perhaps due to suspicion of investigator’s motives or because the significance of participation cannot be communicated. Matching samples on variables can be lengthy and difficult. The confounds of education, the heterogeneity of the Hispanic population and the influence of differing language proficiency, as well as acculturation all need to be assessed in order to consider their impact on the ability to remember verbal material (Dana, 1998).

**Acculturation**

In Harris’ (1992) review of the literature, she summarizes Hispanic studies by stating that education and age appear consistently as performance variables yet the effects of ethnicity are not always effectively reduced by controlling them. She elaborates that while bilingual performance on non-categorized lists has been equivalent, regardless of English or Spanish presentation, categorized word list performance has been inconsistent. Numerous hypotheses are presented by Harris. Acculturation level is one potential factor which is supported by Cuellar, Arnold, and
Gonzalez (1995), who assert that acculturation impacts language and cognitive aspects of functioning. Their development of the Acculturation Rating Scale for Mexican Americans (ARsMA) and later revision of that same scale (ARsMA- II) was motivated by the need for an index of acculturation that could serve as a moderator variable. According to Cuellar, Arnold, and Gonzales, their instrument and other scales developed have been used to interpret validity on the Minnesota Multiphasic Personality Inventory (MMPI; Montgomery & Orozco, 1985; Montgomery, Arnold, & Orozco, 1990), Halstead Reitan Neuropsychological Battery (Arnold, Montgomery, Castaneda, & Longoria, 1994), the Mattis Dementia Rating Scale (Arnold, Cuellar, & Guzman, 1994), the Psychological Screening Inventory (Negy & Woods, 1993) and the Millon Clinical Multiaxial Inventory II (Arnold, 1994) with the conclusion that acculturation processes in Mexican Americans influence test scores. All of the above references are cited in the 1995 article by Cuellar, Arnold, and Gonzales.

Acculturation is defined by Berry (1989) and cited in Dana (1996) as “the process of adaptation or assimilation by an ethnic or racial group to a host culture and can occur in sedentary or migrant individuals” (p. 317-318) on a voluntary or involuntary basis whether one is a refugee or indigenous resident. Dana (1996) elaborates that acculturation can be a group or individual phenomenon. He reviews five different scales stating there are no published studies comparing the relative utility of one over another for specific assessment agendas. He supports use of the ARsMA in diagnosis of Mexican American psychopathology due to its impressive history of research data and use with the MMPI. Until “culturally fair” tests exist, he recommends acculturation scales as a corrective factor in assessment. In a separate work, Dana (1998) asserts that ethnic group moderator variables affect English language usage and fluency. Dawson, Crano, and Burgoon (1996) also support the validity and reliability of the ARsMA and define acculturation as a process of socialization into an unfamiliar culture with greater acculturation reflected in greater adoption of the unfamiliar culture’s language, customs, values, identity, attitudes, and behaviors. Dawson et al. refined the ARsMA using the phi approach to determine which items best predicted a total score. Those that best predicted were retained and those items that failed to predict were eliminated. In examining responses of 790 Hispanics used to standardize the refined ARsMA, they found the instrument “correlated significantly with generation,
education, and income. Hispanics who have been in the U.S. for more generations, who are of higher education level and greater income, score higher on the ARSMA” (Dawson et al., 1996, p.106).

Referring to the Social Science Citation Index (1980-1993), Cuellar, Arnold, and Maldonado (1995) report that the ARSMA was originally published in 1980 and by 1993 had been cited in 85 different scientific journals and 159 journal articles. Cuellar, Arnold, and Maldonado (1995) eventually modified their linear model to reflect bidimensionality, or in other words, a model where the extent of identification with Anglo American culture did not necessitate a corresponding relinquishing of Mexican American culture. This conceptualization of acculturation as a more complex phenomenon is discussed by Magana, de la Rocha, Amsel, Magana, Fernandez, and Rulnick (1996), who present biculturalism as the ability to become fluent in two cultures. Magana et. al. found that individuals who incorporate Spanish and English speaking cultures and those who assimilated into English speaking culture have significantly more years of education and have lived longer in the U.S. than those identifying with the Spanish speaking culture. A bidimensional acculturation model is mirrored in other Hispanic acculturation measures such as the Bidimensional Acculturation Scale for Hispanics (Marin & Gamba, 1996), which was pared down to four items by Norris, Ford, and Bova (1996); the Cultural Lifestyle Inventory (Mendoza, 1989); the Bicultural/Multicultural Experience Inventory (Ramirez, 1984); and the Bicultural Involvement Questionnaire, developed for Cuban Americans by Szapocznik, Kurtines, and Fernandez in 1980 (as cited in Dana, 1996). However, as yet there are few empirical studies that relate acculturation to psychological processes (Cuellar, Arnold, & Gonzales, 1995).

The linear model of the original ARSMA best measures assimilation as described by Berry (1980, as cited by Dana, 1996), where the individual loses the old cultural identity in absorbing the new culture. The opposite phenomenon, integration, is successfully holding both the old and new culture in tension, identifying with both simultaneously. Separation as described by Cuellar, Arnold, and Maldonado (1995) results when an individual resists acculturation, supposedly without experiencing acculturative stress. Marginalization is described in the same article but is a term originated by Park (1928) and Stonequist (1937). In marginalization, the old culture is surrendered only for members of the new culture to refuse to accept the individual, a kind of
cultural limbo. The opposite might be transmutation, a concept described by Cheney and also Mendoza (as cited in Cuellar, Arnold, & Maldonado, 1995), where both old and new cultures are blended into a third entity. Obviously the permutations far exceed good measures of the phenomenon let alone its impact on testing performance. This should serve to encourage the use and refinement of existing acculturation measures and foster the development of new measures to accommodate an evolving understanding of the measurement of culture.

Test Bias

Bias exists when the same test score has a different predictive relationship in two samples, or, on the item level, “when individuals with the same amount of an underlying trait from different subpopulations have different probabilities of responding to an item correctly” (Hulin, Drasgow, & Parsons, 1983, cited in Mungas, 1996, p.38). Mungas (1996) notes that no qualifications are made regarding an individual’s ability to respond to items successfully resulting from inheritance, acquisition through experience, or as a confound of education. Different neuropsychological measures have been examined for bias when used with Hispanic individuals and different foci have been used to explain the source of the bias. The following survey of studies have examined bias based on the variables of ethnicity, education, language, the heterogeneity of the Hispanic people, the influence of culture on cognition, sampling issues, and error variance.

A study of the impact of ethnicity on word fluency used the FAS and Animal Naming tests (Johnson-Selfridge, Zalewski, & Aboudarham, 1998). Recruiting a sample of Caucasian, African American and Hispanic subjects, researchers found “a significant relationship between ethnic group membership and word fluency both before and after covarying for income, education and reading scores” (Johnson-Selfridge et al., p.322). They determined that only a small proportion of the variance was explained by ethnicity. Taussig and Ponton (1996) chose to look at education and language as the key variables, commenting on older Hispanics having an average of 6 years of formal education with many never having attended school. They emphasize that Hispanics are not a homogeneous group, that an informal education history cannot be correlated with the U.S. educational system in norms, and that Spanish and English language issues transcend colloquial difficulties. They propose differential semantic functioning for bilinguals. They state strongly that bilingualism and acculturation are profoundly bound issues. Certainly a review of items on
Effects of Acculturation

acclimation measures reveals many questions directed at language use. Marin, Sabogal, Marin, Otero-Sabogal, and Perez-Stable (1987), in developing their short acculturation scale, found that language and ethnic loyalty explained 40% of the variance in acculturation, ethnic and social relations 14.1%, and media preferences 10%. Taussig and Ponton (1996) recommend measuring both acculturation and degree of bilingualism as well as carefully considering what language would be most appropriate to use in testing.

Ponton and Ardila (1999) elaborate on issues of ethnicity, stating that Latin Americans are a highly multicultural, multiethnic peoples. They are the product of Spaniards and a mixed indigenous peoples at the time of the Conquista (mestizaje), a mixture of Spaniards with African peoples (mulataje), and a blend from the immigrating peoples of Europe, Asia and the Middle East between the 1940’s and 1970’s. Regarding language, they advise that bilingualism is not just a measure of how well English may be spoken but may demonstrate differential performance between speaking, reading, and writing. They caution that self identification of fluency may not reflect a balanced proficiency in all arenas of language use. They support advancing age and education especially as large performance variables in their work on the Neuropsychological Battery for Hispanics (NeSBHIS).

Perez-Arce (1999), in discussing the influence of culture on cognition, criticizes the field of neuropsychology for “treating the brain as an organ whose processes proceed independent of fundamental socioenvironmental variables” (p.582). She alleges a heavy reliance on empiricism and linear logic and urges the field to examine how culture impacts attributed meaning. Just as psychology gave up on a universal personality theory, Perez-Arce (1999) questions a search for universals in cognitive operations. She states, “The task of cross-cultural neuropsychology is to identify and differentiate between what is universal, what is culturally variable, and what is unique to the individual” (p.584). She maintains an ethnolinguist perspective where language is seen as serving a culture by interpreting, classifying and structuring reality. She acknowledges the confluence of teaching language and teaching culture in the public school system which ultimately impacts socioeconomic status (SES) and area of residence.

Rey, Feldman, Rivas-Vazquez, Levin, and Benton (1999) advocate for the development of valid and reliable test measures for the Hispanic population recognizing “a dearth of empirical
Effects of Acculturation 8

research” (p. 594) in the field of test development for assessment of Hispanics. They claim equivalent findings for Hispanics and English speakers from the original normative studies of the Wisconsin Card Sorting Test and the measures from the Multilingual Aphasia Examination attributing “small differences in performance” (p. 595) to sampling variance. Their sample was “primarily” Spanish speaking, requiring the translation of English instructions into Spanish for test administration. The sample was limited in region and acknowledged to have a high average education level. No acculturation measure was utilized.

Llorente, Ponton, Taussig, and Satz (1999) further investigated bias resulting from sampling issues by examining the effect of patterns of immigration on the acquisition of neuropsychological norms for Hispanics. In reviewing immigration patterns of the last six decades from several Hispano-American countries to the US, they conclude that “Cuban immigration reached its peak during the decade between the 1970’s and 1980’s with decreasing American immigration during the last decade while Mexico’s immigration to the U.S. has been steadily increasing during the same period” (p. 607). They contrast these patterns with Argentinean migrations that have remained constant and low in number for the last 30 years. Mexican immigrants were over represented in farming and forestry as occupations and under represented in other categories. Residential preference is distinct between immigrants with 34% of Mexican immigrants designating Los Angeles, CA, as intended residence and 72% of Cubans reporting a preference for Miami, FL. This presents a potential confound if Hispanic samples from different countries of origin are not carefully matched for age, gender, and education. Norms established on one Hispanic subculture in the US cannot be generalized equitably to another subculture. The authors note acculturation level as yet another potential confound in establishing norms.

Cultural bias embedded in evaluation of mental status was explored by Ortiz, LaRue, Romero, Sassaman, and Lindeman (1997) utilizing a sample of elderly Hispanic non-immigrants in New Mexico whose roots in that state date back 400 years. In this sample, 83% self identified as Spanish-American and 10% identified as Mexican-American. A majority were bilingual. Of that majority, 80% spoke an equal or greater amount of the time in Spanish yet 77% elected to take the exams in English. With a sample reported to consist of elderly non-immigrants with roots in New Mexico of 400 years, a more integrated language usage was implied, yet Spanish was used with
family members in spite of English fluency. How this was established is not clear. Researchers reported differential outcome between the Mini-Mental Status Exam (MMSE) and the Fuld Object-Memory Exam. Lower education and SES affected the MMSE. Ortiz et al. (1997) provided a rich description of their sample that allows speculation regarding bias because they have responsibly inquired and reported on the ethno-cultural roots of their sample. While no acculturation tool was utilized, a detailed demographic survey tapped some aspects of acculturation.

Jacobs, Sano, Albert, Schofield, Dooneief, and Yaakov (1997) support careful sample selection, asserting that analysis of covariance was intended to correct for errors of randomization, not to correct for preexisting demographic differences such as education level. The subjects in their study were Caribbean Hispanic immigrants matched on variables such as age and education. A formal measure of acculturation was not used but acculturation was estimated based on English fluency. English instructions for the tests administered were translated into Spanish. This comparative study of Spanish and English speaking older adults on a battery of neuropsychological tests found that Spanish speakers who did not speak English well scored significantly lower on several verbal and nonverbal measures.

Saccuzzo and Johnson (1995) describe yet another source of bias from the proportionate representation model, stating, “A test is considered fair only if individuals from different genders and ethnic backgrounds are selected in proportion to the population of the community from which they are selected” (p. 183). They compared performance of a sample of 26,300 children from eight ethnic backgrounds over a 9 year period on the Wechsler Intelligence Scale for Children-Revised (WISC-R) and the Standard Raven Progressive Matrices (SPM) test. In contrast to Jacobs, Sanos, et al. (1997), the authors state, “Because its stimuli are nonverbal, the SPM can be administered fairly to individuals who speak a language other than English” (p. 184). While other studies are cited to have supported the “culture fair” aspects of the SPM (Powers & Barkan, 1986; Sidles & MacAvoy, 1987), perhaps it is time to question the assumption that because a test is nonverbal, it is culturally fair. The authors acknowledge that when bias is considered under differential validity standards, both the WISC-R and the SPM had approximately equivalent predictive validity. This was not the case if a model of proportionate representation was used as a measure of bias. Neither test did well under the proportionate model, but the SPM is a non-verbal measure that appears to
correlate highly with Spearman’s g factor, as do tests of language achievement, yet does not rely on a culture bound explicit knowledge base. Saccuzzo and Johnson (1995) cite a study by Carlson and Wiedl (1979) where the SPM in combination with a “dynamic testing approach.... were able to eliminate Hispanic-White and Black-White differences in IQ” (p. 193).

In contrast to the several preceding studies that focused on the sampling method, another potential source of bias is embedded in a test’s underlying constructs. Construct bias has been defined as existing “when a test measures constructs differently for one group than it does for another group” (Keith, Quirk, Schartzer, & Elliot, 1999, p.250). Keith et al. (1999) examined the Differential Ability Scales (DAS) for evidence of construct bias concluding that when a sample of 600 African American, Hispanic and Caucasian subjects’ performance were compared there was no evidence of bias across groups. In their discussion section, however, the authors note that for children 3 years, 6 months to 5 years, 0 months and 6 years, 0 months to 11 years, 0 months, the DAS “appears to measure different attributes across the three ethnic groups” (p. 265). They attribute the across group differences to unique and error variances.

In summary, there are numerous ways to investigate test bias for ethnic groups. Variables considered in this limited review touched on age, ethnicity itself as the Hispanic culture is heterogeneous, qualitative and quantitative issues in equating education level, and language proficiency across several domains of use including issues of the propriety of translation and language based cognitive differences. Numerous studies acknowledged the importance of assessing acculturation level and urged attention to sampling bias whether as a factor of matching variables, using restricted numbers, or inappropriate generalizing between subcultures. An examination of assumptions is urged as nonverbal measures may not eliminate bias simply by reducing the effect of language within the instrument. Use of analysis of variance may be inappropriate when other controls are indicated and available. Is self identification adequate for assignment? Can small effects be written off instead of fully explored? Finally, if a test appears culturally fair but still results in a disproportionate representation of selection for benefits, further exploration is warranted. There should be a consistent approach to evaluating a test as “culturally fair” especially when culture is such a complex construct and the use of acculturation measures will move the field closer to unbiased assessment of the Hispanic population.
**Bilingualism and Verbal Memory**

While the factor of language in acculturation has been briefly discussed, how does bilingualism impact a Hispanic subject's ability to remember verbal material on memory tasks? Little research is available to enlighten the field. Five studies were identified from a literature review of the last decade with Harris involved in research on two of the five projects (Harris, 1992; Harris, Cullum, & Puente, 1995).

Harris et al. (1995) investigated the effect of bilingualism on verbal learning and memory by constructing a list learning task in Spanish based on the California Verbal Learning Test (CVLT). They compared performance on the Spanish task and on the CVLT in a sample of 44 Hispanics of varying English proficiency and 22 monolingual English adults. Age, education, and gender were controlled. They found that non balanced bilinguals, those stronger in Spanish but still conversant in English, clustered words significantly less than balanced bilinguals but to the same extent as monolinguals. “Performance differences among the three groups were not evident when individuals were assessed using verbal learning lists constructed in their dominant languages” (p.14) and balanced bilinguals were able to recall, retain, and organize equally well in both languages. That non balanced bilinguals recalled and retained fewer words from the English list than balanced bilinguals or the monolingual group is consistent with early findings of Nott and Lambert (1965) and Champagnol (1973), both of whom are cited in the article’s introduction. These older studies demonstrated that semantic clustering of bilinguals is significantly greater in their stronger language even when categories are provided and words are presented in groups. Harris (1992) had previously studied language effects on verbal memory in bilingual adults as a dissertation focus with similar findings.

Jacobs, Winston, and Polanco (1997) utilized “two frequency-matched, semantically categorized word lists that were designed to permit the assessment of qualitative as well as quantitative aspects of memory performance in Spanish-speakers” (p.120). Dependent variables were the subjects’ country of origin (Dominican Republic, Cuba, Puerto Rico) and self reported English language fluency. Unfortunately, the authors found their two matched Spanish lists, based on the Spanish Verbal Learning Test, did not prove of equivalent difficulty for their non demented elderly sample and no significant differences were found based on the dependent variables.
Ponton et al. (1996) report normative data for the NeSBHIS based on a sample of 300 Hispanic subjects, 70% monolingual Spanish speakers, who were stratified by age, gender, and education. An acculturation scale “by Marin,” presumably the Bidimensional Acculturation Scale (BAS), was administered; however, the relationship of acculturation to the variables was to be “presented elsewhere” (p. 99). Results were interpreted to strongly support the confound of education in performance, including verbal memory measures, regardless of the verbal or nonverbal nature of the neuropsychological instruments. Additional confounds were age, gender, acculturation, and bilingualism.

Jitendra and Rohena-Diaz (1996) present a case study of an 8-year-old Puerto Rican boy who was referred for special education services by a teacher. This study demonstrates the inadequacy of English norm referenced instruments in evaluating linguistically diverse students, but the authors note that simply providing a test in Spanish normed on a Spanish speaking population outside the U.S. is inadequate as well. Their observations echo previously cited comments of authors regarding the heterogeneity of the Hispanic population. The boy in Jitendra and Rohene-Diaz’s study (1996) spoke Spanish in the home and English in the classroom. He demonstrated delays in both languages typified by difficulties in English “when answering questions, requesting information, expressing feelings, describing solutions, and expressing imagination. In Spanish, he demonstrated difficulties when he had to use academic-oriented vocabulary” (p. 47). These difficulties were interpreted to reflect normal acquisition challenges in learning a second language and a lack of formal education in his primary language. The authors argue for investigation of the details of language acquisition in bilingual people who are being evaluated.

In summary, the few studies completed this decade emphasize the crucial interplay between language and memory that is difficult to parcel out from other confounding variables. The confounds challenge ingenious design in proposed studies and reinforce the importance of acquiring detailed demographic information on subjects. There is evidence that differential performance on memory measures can be eliminated by administering Spanish instruments to non-balanced Spanish speakers and certainly providing assessment in the client’s language of choice is mandated by the APA (1993). But this mandate presents a formidable challenge given the growth
of the Hispanic population and the lack of bilingual neuropsychologists. Without further studies exploring the full nature of the differential performances on verbal measures by bilingual Hispanics, it will be dangerous to assume that language or education alone explain all the variance.

The purpose of this study is to assess the relationship between acculturation level, performance on the CVLT-II, and performance on a nonsense word task by bilingual Mexican Hispanics. Measures of verbal memory at the word level usually rely on association via word meanings (i.e., semantic clustering) as an aide to encoding and retrieval (Delis, Kramer, Kaplan, & Ober, 1987; Delis, Kramer, Kaplan, & Ober, 2000; Lezak, 1995). This author hypothesizes that lack of familiarity with a culture’s language and practices, as measured by acculturation, will impede association and recall. A second hypothesis is that performance on a rote memory task, such as a nonsense word task, will not vary with acculturation level.
Chapter 2

Method

Subjects

Subjects were recruited with the support and cooperation of a Southeastern Washington rural community farming operation that employed a large number of Mexican American workers, through local churches, community colleges, and through contact with local minority business owners. Subjects were also recruited in the Portland, Oregon area, most of whom were employees of a cooperating fruit processing company. It was anticipated that this variety of community structures would provide a sample of subjects that meet a diverse range of socioeconomic status (SES), education and acculturation levels.

Participants were required to be between the ages of 18-60 years and to have completed at least 6 years but not more than 16 years of education. Subjects were screened by telephone interview prior to participation in the study. Subjects with a history of head injury, major psychiatric disorders, or substance abuse were excluded by their responses to items on a neuromedical screen. Individuals with medical conditions that required treatment with medications determined to have high probability of impairing cognition (e.g., barbiturates, benzodiazepines, opiate pain relievers) were also excluded. All participants were screened at the beginning of the testing session for significant intellectual impairment with Raven's Coloured Progressive Matrices (Raven, 1956). Those obtaining a raw score below grade IV- (below 10th percentile) were excluded from the study.

The Hispanic culture was selected for study based on need as this population was predicted to be the largest ethnic minority in the U.S. by the year 2000 (Davis et al., 1983) and U.S. census figures from 1986 had further predicted that the year 2000 figures would double by 2030 (U.S. Census Bureau, 1986). Equivalent percentages of males and females, and an equal distribution of age, education, SES, and handedness were a goal in the different levels of acculturation groups.
Measures

Neuromedical screen. The neuromedical screen was a semi-structured interview adapted from a scale used by Harris (1992) and consisted of questions regarding individuals’ medical and psychiatric histories, past neurological insults, hypoxic events, birth trauma and substance use. An interview was completed with all potential participants to operationalize the exclusion criteria. A copy of the Screen is provided in Appendix A. This is not a standardized instrument.

Demographic questionnaire. Demographic items that served as exclusion criteria were included in the neuromedical screen (e.g., age, education, monolingualism, alternative identified culture) and at the beginning of the self administered acculturation scale (e.g., gender, date of birth, specific educational variables, employment). These scales are found in Appendices A and B.

Nonsense words. First used by Ebbinghaus in 1885 to study retention and forgetting of verbal material, Lezak (1995) states that this task may be “the stimulus of choice when the examiner wants to study verbal functions while minimizing or controlling the confounding effects of meaning” (p.435). To parallel the structure of the California Verbal Learning Test-II, a list of 32 syllables (consonant-vowel-consonant; see Appendix C) were selected from Noble’s tables (1961), as referenced in Lezak (1995), of 2100 nonsense syllables with low association and meaningfulness values. Sixteen of these constitute List A which were given repetitiously in five free recall trials. Another sixteen syllables made up an interference list (List B) to be administered after the fifth trial of list A. After the interference task a short delay free recall of List A was administered. No reliability or validity information was available on this task.

Raven’s Coloured Progressive Matrices (RCPM). The decision to use this instrument as a screen for developmental disability was based on research by Anastasi (1988) and endorsement by Paniagua (1998) as an instrument recommended for intelligence assessment in culturally diverse groups. While there is a spectrum of opinions on whether it is appropriate to use “good enough” instruments reflecting the least bias, or whether no testing should be performed pending the development of “culturally fair” instruments, it was determined that the benefit of screening out disabled subjects for this study outweighed any perceived risk of potentially excluding appropriate subjects with a minimal bias instrument.
The RCPM (Raven, 1956) is a 36 item measure consisting of a series of visual patterns on brightly colored backgrounds requiring completion with a matching “piece” that the subject selects based on ability to conceptualize overall design, spatial and numerical relationships. The patterns are nonrepresentational which may remove cultural bias based on the advantage of familiarity. There is no time limit and the items progress in difficulty (Lezak, 1995). Originally designed for use with children and the elderly adults, it has also been studied for use in those who do not understand English and are not English speaking and generally found to be reliable with no major differences between Caucasian and Hispanic scores (Carlson & Jensen, 1981; Valencia, 1979, 1984). A limitation of using this instrument lies in its being a performance versus verbal measure of intelligence and, as Raven cautioned, it may not reflect general intelligence when used as an exclusive IQ estimate. However, Birkmeyer (1965) reports a moderate correlation (.76 to.90) between the CPM and conventional tests of intelligence. As a nonverbal measure it has an improved correlation with tests such as the Leiter International Performance Scale (Musgrove & Counts, 1975, as cited in Kayser & Sweetland, 1984). Its predictive validity for academic performance in situations of nontraditional learning is superior to intelligence tests (Wiedl, 1978, as cited in Kayser & Sweetland, 1984).

The California Verbal Learning Test-II (CVLT-II). The CVLT-II (Delis et al., 2000) is a recent revision of the CVLT (Delis et al., 1987) that became available for use in 2001. The original CVLT was generally considered a test of verbal memory. Lezak (1995) states, “This test does not examine rote verbal memory in itself but, rather, some level of interaction between verbal memory and conceptual ability” (p. 445). Words selected for use were considered for frequency of occurrence in the English language based on “popular English reading” and another frequency index that utilized words from textbooks and “popular English reading” (Delis et al., 1987, p. 21). The structure of the revised instrument is essentially the same with improvements in the standardizing sample size, use of target words that were deemed easier to understand, and selection of words that occurred at a higher frequency than on the original version. These are all changes that would potentially decrease difficulty for non-balanced bilingual individuals. Alternate and short-form administrations were created in addition to a standard form. The standard form was used exclusively in this study.
The CVLT-II consists of 32 words divided into a "list A" and "list B" format. List B is used as an interference task after five learning trials of list A. Each of the items can be categorized as either furniture, vegetables, ways of traveling, or animals. A short delay free recall is administered after list B. After a twenty minute delay, there is a free and a cued recall of list A followed by a recognition task. An optional forced-choice recognition task has been added to the new version. While subjects were administered items through the recognition task, only data from lists administered before the long delay were analyzed for the purpose of the current study.

The CVLT-II is rich in material to analyze. The format provides data on the rate of learning, learning strategy (serial order versus semantic cluster), serial position of recalled items, comparisons between learning trials, recall trials, cued recall, recognition and forced choice tasks as well as over 200 other scores. Reliability and validity data for the standard form are provided from the manual. Split-half reliability estimates based on immediate recall for list A for the total norming sample was .94, reliability within age groups was "largely above .90" (Delis et al., 2000, p.81). Reliability figures based on other trials ranged from .79 and higher. Validity was established through comparison to the original CVLT and factor analysis in both a clinical and non-clinical samples. Demographic variables and correlation to verbal intelligence were also considered. In comparison to the CVLT, the CVLT-II “r” values ranged from .63 to .86. In regards to internal validity, six factors reflecting General Verbal Learning accounted for 75.67% of the total variance for the norm group and a five factor solution in the mixed clinical sample explained 75.79% of the total variance. Demographic variable data is discussed briefly in the discussion section of this study but Hispanics range from 16.7 to 0.9% of the total norming sample as categorized by age groups. Their percentages consistently and dramatically decline over the 45 to 59 year old range range. Correlation between the CVLT-II Total Immediate recall and the Wechsler Abbreviated Scale of Intelligence Vocabulary Raw Score was .46 ($p < .001$).

**Acculturation Rating Scale for Mexican Americans-II (ARSMA-II).** This acculturation scale (see Appendix B) is a revision by the authors of the original Acculturation Rating Scale for Mexican Americans (Cuellar, Arnold, & Maldonado, 1995). It was revised to address criticisms of its linear model which was embedded with the inherent assumption that the more Anglized one became, the less Mexican one appeared because answers in the Anglicized direction were
Effects of Acculturation

subtracted from the Mexican direction. The instrument contains two scales. Scale one is a 30 item self rating scale consisting of an Anglo Orientation Subscale (AOS) and a Mexican Orientation Subscale (MOS). This scale generates five acculturative subtypes as listed below. Scale two generates additional acculturative types reflecting three subscales for Anglo, Mexican, and Mexican American Marginality. As the Mexican Marginality subscale was reported by the authors to have poor internal reliability, only Scale One was utilized. This limited the independent variable to five levels: Very Mexican Oriented (<-1.33), Mexican Oriented to Approximately Balanced Bilingual (>1.33 to <-.07), Slightly Anglo Oriented Bicultural (.07 to <1.19), Strongly Anglo Oriented (1.19 to <2.45) and Very Assimilated, Anglicized (>=2.45).

With the exception of Scale Two mentioned above, all other internal reliabilities range from 0.83 to 0.91. A test-retest reliability coefficient ranged from 0.94 (AOS) to 0.96 (MOS) with retest after a one week delay. Concurrent validity was established in a comparison to the original ARSMA scale with a Pearson product moment correlation coefficient of 0.89. As far as generational status and acculturation, there is a proportional increase in acculturation scores towards the Anglo culture with a Pearson product moment correlation of 0.61. A factor analysis of the ARSMA II replicated only three of the four factor original ARSMA scales such that the scale with items assessing contact with Mexico was eliminated. Correlations between age and acculturation were not significant, females had a mean acculturation score of 0.73 and males of 0.36, and while SES was positively correlated with acculturation, grade and Anglo orientation, acculturation still accounted for three times as much variance as SES (Cuellar, Arnold, & Maldonado, 1995).

Procedure

With the exception of the informed consent regarding participation in the study and the acculturation scale, all verbal and written communication with subjects was conducted in English as the goal of the study was to simulate the experience and performance of bilingual Hispanics in a monolingual English speaking assessment setting. After a brief description of the study and the estimated time commitment (approximately one and one half hours), subjects were screened via telephone for inclusion in the study by a review of the neuromedical screener. If the screening was
passed, subjects were given an appointment time to discuss the study in greater detail, review the consent information once again and test with a single examiner (see Appendix D).

At the testing session, after a review of the consent (see Appendix E), all subjects completed the RCPM. Subjects were then alternately administered tests according to one of two formats (see Table 1).

Table 1

*Testing Formats*

<table>
<thead>
<tr>
<th>Protocol One</th>
<th>Protocol Two</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVLT-II</td>
<td>Nonsense Words</td>
</tr>
<tr>
<td>BNT</td>
<td>ARSMA-II (including Demographics)</td>
</tr>
<tr>
<td>COWA</td>
<td>CVLT-II</td>
</tr>
<tr>
<td>CVLT-II Long Delay</td>
<td>BNT</td>
</tr>
<tr>
<td>ARSMA-II (including Demographics)</td>
<td>COWA</td>
</tr>
<tr>
<td>Nonsense Words</td>
<td>CVLT-II Long Delay</td>
</tr>
</tbody>
</table>

The nonsense words were recorded onto an audiotape by a native Spanish speaker and used in the testing setting to provide a consistent administration. The words were given a Spanish pronunciation. The Boston Naming Test (BNT) and Controlled Oral Word Association Test (COWAT) were administered in conjunction with the instruments for this study in order to analyze verbal fluency and naming in the same population sample by another researcher. At the conclusion of the testing subjects were given food coupons or packaged food items valued at $5.00 in return for their participation. Subjects were provided this compensation regardless of whether they were included pending the results of the RCPM.
Statistical Analysis

This research is interested in the relationship of acculturation to performance on verbal learning tasks. The hypotheses of the study are 1) as acculturation to Anglo American culture approaches assimilation, total recall scores on the CVLT-II will increase and 2) performance on the nonsense word task will not significantly correlate with acculturation level. As the independent variable, acculturation was originally to be examined on five levels: Very Mexican Oriented, Mexican Oriented to Approximately Balanced Bilingual, Slightly Anglo Oriented Bicultural, Strongly Anglo Oriented, and Very Assimilated to Anglicized. After data collection, these cells were collapsed into three acculturation levels given the limited number of individuals in the Strongly Anglo Oriented and Very Assimilated to Anglicized groups. The collapsed cells were created as follows: The Very Mexican and Mexican Oriented to Approximately Balanced Bilingual groups became group 1 “Mexican Oriented.” The Slightly Anglo Oriented Bicultural became group 2 “Bicultural.” The Strongly Anglo Oriented and Very Assimilated, Anglicized groups became group 3 “Anglo Oriented.” The dependent variables were the following recall performance scores on the CVLT-II and the nonsense word task: CVLT trial 1, trials 1-5, list B, short delay free recall, nonsense word trial 1, trials 1-5, list B, and short delay free recall.

A 3 X 8 (group X test scores) multivariate analysis of variance (MANOVA) was performed to assess differences between mean raw scores for subjects in the three acculturation groups on the CVLT-II and on the nonsense word list. A 3 X 4 (group X test scores) MANOVA was also performed to assess differences between mean standardized score transformations from the CVLT-II computerized scoring program for subjects in the three acculturation groups for the same verbal learning instruments. Post hoc analyses (Tukey HSD, Scheffe, Dunnet C) were used to determine which groups were different. The effect of moderator variables was examined in an analysis of covariance (ANCOVA).
Chapter 3

Results

The final $N$ resulted in 57 subjects with 33 other individuals eliminated from participation. Ten potential subjects chose to withdraw from participation in the study after initial contact with the researchers. Ten volunteers were unable to participate due to exclusion criteria regarding education level, bilingualism, or Mexican-American heritage. Five individuals did not successfully pass the neuromedical screen due to pre-existing medical conditions, history of psychiatric illness, prior head injury or the administration of medication that would potentially confound performance. Six subjects who passed the neuromedical screen were eliminated after failure to keep three scheduled appointments for testing. Two subjects were eliminated for performance on the RCPM below the tenth percentile, roughly equivalent to an IQ score of 80 on either Verbal or Performance subtests of the Wechsler Adult Intelligence Scale-III.

The 57 subjects who participated were apportioned by their responses on the ARSMA-II into three acculturation levels. Twenty-five were Mexican Oriented, 21 were Bicultural Oriented, and 11 were Anglo Oriented. The gender of the volunteers was nearly equivalent in numbers with 30 men and 27 women participating. The Bicultural group had a younger mean age than the other two groups, the Mexican Oriented group had the lowest education levels and lower average scores on the RCPM (See Table 1). Twenty-five subjects were born in Mexico and 32 were born in the United States. Most of the subjects in the Mexican Oriented group were born in Mexico, while the majority of the Bicultural and the Anglo Oriented groups were born in the United States. A similar pattern emerged for country of education (See Table 2). Group mean performance by acculturation level is reported in Table 3. Overall, the sample conformed to a normal distribution. Raw data is presented in Appendix F.
Table 1

*Group Demographics by Acculturation Level*

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>M</th>
<th>F</th>
<th>Mean Age (SD)</th>
<th>Mean Ed (SD)</th>
<th>Mean RCPM (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexican Oriented</td>
<td>25</td>
<td>15</td>
<td>10</td>
<td>32.4 (9.1)</td>
<td>10 (2.9)</td>
<td>30 (4.8)</td>
</tr>
<tr>
<td>Bicultural Oriented</td>
<td>21</td>
<td>9</td>
<td>10</td>
<td>26.8 (8.9)</td>
<td>12 (1.6)</td>
<td>32 (4.1)</td>
</tr>
<tr>
<td>Anglo Oriented</td>
<td>11</td>
<td>6</td>
<td>7</td>
<td>35.6 (10.2)</td>
<td>14 (1.3)</td>
<td>32 (2.4)</td>
</tr>
</tbody>
</table>

*Note.* Ed=Education, RCPM= Raven’s Coloured Progressive Matrices.

Table 2

*Country of Origin and Country of Education Demographics by Acculturation Level*

<table>
<thead>
<tr>
<th>Group</th>
<th>United States</th>
<th>Mexico</th>
<th>Mexico and United States</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country of Origin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mexican Oriented</td>
<td>7</td>
<td>18</td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>Bicultural Oriented</td>
<td>14</td>
<td>7</td>
<td></td>
<td>21</td>
</tr>
<tr>
<td>Anglo Oriented</td>
<td>11</td>
<td>0</td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>Country of Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mexican Oriented</td>
<td>7</td>
<td>14</td>
<td>4</td>
<td>25</td>
</tr>
<tr>
<td>Bicultural Oriented</td>
<td>17</td>
<td>0</td>
<td>4</td>
<td>21</td>
</tr>
<tr>
<td>Anglo Oriented</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>11</td>
</tr>
</tbody>
</table>
Table 3

ARSMA-II Group Mean Performance

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group 1 Mean (SD)</th>
<th>Group 2 Mean (SD)</th>
<th>Group 3 Mean (SD)</th>
<th>Total Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVLT-II (raw scores)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1</td>
<td>6 (2)</td>
<td>6 (2)</td>
<td>6 (1)</td>
<td>6 (2)</td>
</tr>
<tr>
<td>T 1-5</td>
<td>44 (14)</td>
<td>50 (9)</td>
<td>52 (10)</td>
<td>48 (12)</td>
</tr>
<tr>
<td>List B</td>
<td>5 (2)</td>
<td>6 (2)</td>
<td>5 (1)</td>
<td>5 (2)</td>
</tr>
<tr>
<td>SDFR</td>
<td>10 (4)</td>
<td>11 (3)</td>
<td>11 (3)</td>
<td>11 (3)</td>
</tr>
<tr>
<td>Nonsense Words (raw scores)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1</td>
<td>2 (1)</td>
<td>2 (1)</td>
<td>2 (1)</td>
<td>2 (1)</td>
</tr>
<tr>
<td>T 1-5</td>
<td>14 (9)</td>
<td>19 (8)</td>
<td>23 (12)</td>
<td>19 (9)</td>
</tr>
<tr>
<td>List B</td>
<td>2 (1)</td>
<td>1 (1)</td>
<td>2 (1)</td>
<td>2 (1)</td>
</tr>
<tr>
<td>SDFR</td>
<td>4 (2)</td>
<td>4 (3)</td>
<td>4 (3)</td>
<td>4 (3)</td>
</tr>
<tr>
<td>CVLT-II (Standard Scores)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1</td>
<td>-.66 (.27)</td>
<td>-.67 (.2)</td>
<td>-.45 (.79)</td>
<td>-.62 (1.2)</td>
</tr>
<tr>
<td>T 1-5</td>
<td>42.8 (14.6)</td>
<td>47.3 (10)</td>
<td>51.1 (12)</td>
<td>46 (12.8)</td>
</tr>
<tr>
<td>List B</td>
<td>-.76 (.95)</td>
<td>-.62 (.76)</td>
<td>-.64 (.64)</td>
<td>-.68 (.82)</td>
</tr>
<tr>
<td>SDFR</td>
<td>-.44 (1.26)</td>
<td>-.12 (.96)</td>
<td>-.04 (.99)</td>
<td>-.25 (1.1)</td>
</tr>
</tbody>
</table>

Note. T1= Trial 1; T 1-5= Trials 1-5; SDFR= Short Delay Free Recall.
A Pearson $R$ correlation matrix was calculated. Acculturation level was significantly correlated with performance on the CVLT-II 1-5 trial total scores, CVLT-II short delay free recall scores and Nonsense word 1-5 trial total scores. Age was not significantly correlated with either CVLT-II or Nonsense Word performance. Education level, similar to acculturation, was correlated with CVLT-II 1-5 trial total scores, CVLT-II short delay free recall scores, and Nonsense word 1-5 trial total scores. Performance on the RCPM was highly correlated with six of eight scores on the CVLT-II and Nonsense word list (See Table 4).

Table 4

Correlation of Dependent Variable with Independent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Ed</th>
<th>Age</th>
<th>ARSMA</th>
<th>RCPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVLT-II T1</td>
<td>.08</td>
<td>.01</td>
<td>.18</td>
<td>.30*</td>
</tr>
<tr>
<td>CVLT-II T1-5</td>
<td>.39**</td>
<td>.04</td>
<td>.46**</td>
<td>.49**</td>
</tr>
<tr>
<td>CVLT-II List B</td>
<td>.17</td>
<td>-.16</td>
<td>.14</td>
<td>.35**</td>
</tr>
<tr>
<td>CVLT-II SDFR</td>
<td>.34*</td>
<td>-.01</td>
<td>.38**</td>
<td>.39**</td>
</tr>
<tr>
<td>NW T1</td>
<td>.18</td>
<td>.03</td>
<td>.20</td>
<td>.17</td>
</tr>
<tr>
<td>NW T1-5</td>
<td>.40**</td>
<td>-.14</td>
<td>.31*</td>
<td>.44**</td>
</tr>
<tr>
<td>NW List B</td>
<td>.11</td>
<td>-.11</td>
<td>-.01</td>
<td>.13</td>
</tr>
<tr>
<td>NW SDFR</td>
<td>.23</td>
<td>-.12</td>
<td>.12</td>
<td>.36**</td>
</tr>
</tbody>
</table>

*Note. NW = Nonsense Word, T1 = Trial 1, T1-5 = Trials 1 through 5 total score, SDFR = Short Delay Free Recall, Ed=Education Level.
*p <.05 (2-tailed) **p <.01 (2-tailed)
To control for type 1 error, a MANOVA was performed to compare raw score means between acculturation groups on eleven dependent variables (see Table 5). Significant multivariate effects were obtained Pillai’s Trace=.706, $F\ (26,\ 86)=1.81,\ p < .05$. Analysis of the univariate effects demonstrated significant effects for age $F\ (2,\ 54)=3.86,\ p < .05$ and education $F\ (2,\ 54)=12.15,\ p < .001$. However, no other significant univariate effects were observed among the remaining variables. For this sample, acculturation level would not appear to have a significant effect on subject’s ability to recall as measured by the CVLT-II and Nonsense Word variables.

Table 5

Test of Between-Subjects Effects-MANOVA

<table>
<thead>
<tr>
<th>Variable</th>
<th>$F$</th>
<th>Significance</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVLT-II T1</td>
<td>0.14</td>
<td>0.87</td>
<td>.01</td>
</tr>
<tr>
<td>CVLT-II T1-5</td>
<td>2.37</td>
<td>0.10</td>
<td>.08</td>
</tr>
<tr>
<td>CVLT-II List B</td>
<td>0.72</td>
<td>0.49</td>
<td>.03</td>
</tr>
<tr>
<td>CVLT-II SDFR</td>
<td>1.65</td>
<td>0.20</td>
<td>.06</td>
</tr>
<tr>
<td>NW T1</td>
<td>0.68</td>
<td>0.51</td>
<td>.02</td>
</tr>
<tr>
<td>NW T1-5</td>
<td>1.35</td>
<td>0.27</td>
<td>.05</td>
</tr>
<tr>
<td>NW List B</td>
<td>0.48</td>
<td>0.62</td>
<td>.02</td>
</tr>
<tr>
<td>NW SDFR</td>
<td>0.25</td>
<td>0.78</td>
<td>.01</td>
</tr>
<tr>
<td>RCPM</td>
<td>2.93</td>
<td>0.06</td>
<td>.10</td>
</tr>
<tr>
<td>Age</td>
<td>3.86</td>
<td>0.03*</td>
<td>.13</td>
</tr>
<tr>
<td>Education</td>
<td>12.2</td>
<td>0.00**</td>
<td>.31</td>
</tr>
</tbody>
</table>

Note. NW = Nonsense Word, T1 = Trial 1, T1-5 = Trials 1 through 5 total score, SDFR = Short Delay Free Recall (based on raw scores).

*p < .05, **p < .01
Effects of Acculturation 26

Post hoc analyses were performed comparing age (Table 6) and education differences (Table 7) by acculturation level. Significant differences in means were revealed. Because Levine’s Test for Equality of Error Variance revealed a significant difference for education, a Dunnett C test was used for post hoc analysis on that dependent variable. This data supports the significant influence of these variables in research with this population. Table 8 is provided to facilitate a comparison of CVLT-II trials 1-5 total recall scores in this sample with the standardization sample from the CVLT-II normative study.

Table 6
Tukey HSD Age Differences by Acculturation Level

<table>
<thead>
<tr>
<th>Group Comparison</th>
<th>Mean Difference</th>
<th>Standard Error</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mex. Bicult.</td>
<td>5.64</td>
<td>2.74</td>
<td>.11</td>
</tr>
<tr>
<td>Anglo.</td>
<td>-3.24</td>
<td>3.35</td>
<td>.60</td>
</tr>
<tr>
<td>Bicult. Mex.</td>
<td>-5.64</td>
<td>2.74</td>
<td>.11</td>
</tr>
<tr>
<td>Anglo.</td>
<td>-8.87*</td>
<td>3.45</td>
<td>.03</td>
</tr>
<tr>
<td>Anglo. Mex.</td>
<td>3.24</td>
<td>3.35</td>
<td>.60</td>
</tr>
<tr>
<td>Anglo. Bicult.</td>
<td>-8.87</td>
<td>3.45</td>
<td>.03</td>
</tr>
</tbody>
</table>

Note. Mex.= Mexican Orientation; Bicult.=Bicultural Orientation; Anglo.= Anglo Orientation. *p <.05
Table 7

Education Differences by Acculturation Level

<table>
<thead>
<tr>
<th>Group Comparison</th>
<th>Mean Difference</th>
<th>Standard Error</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dunnett C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mex.</td>
<td>Bicult.</td>
<td>-2.06*</td>
<td>0.67</td>
</tr>
<tr>
<td>Anglo.</td>
<td></td>
<td>-3.86*</td>
<td>0.82</td>
</tr>
<tr>
<td>Bicult.</td>
<td>Mex.</td>
<td>2.06*</td>
<td>0.67</td>
</tr>
<tr>
<td>Anglo.</td>
<td></td>
<td>-1.80*</td>
<td>0.84</td>
</tr>
<tr>
<td>Anglo.</td>
<td>Mex.</td>
<td>3.86*</td>
<td>0.82</td>
</tr>
<tr>
<td>Ang.</td>
<td>Bicult.</td>
<td>1.80*</td>
<td>0.84</td>
</tr>
<tr>
<td>Tukey HSD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mex.</td>
<td>Bicult.</td>
<td>-2.06*</td>
<td>0.67</td>
</tr>
<tr>
<td>Anglo.</td>
<td></td>
<td>-3.86*</td>
<td>0.82</td>
</tr>
<tr>
<td>Bicult.</td>
<td>Mex.</td>
<td>2.06*</td>
<td>0.67</td>
</tr>
<tr>
<td>Anglo.</td>
<td></td>
<td>-1.80</td>
<td>0.84</td>
</tr>
<tr>
<td>Anglo.</td>
<td>Mex.</td>
<td>3.86*</td>
<td>0.82</td>
</tr>
<tr>
<td>Ang.</td>
<td>Bicult.</td>
<td>1.80</td>
<td>0.84</td>
</tr>
</tbody>
</table>

*p < .05
Table 8
CVLT-II Trials 1-5 Total Recall Raw Scores by Acculturation Level and Gender

<table>
<thead>
<tr>
<th>Group</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean Score (SD)</td>
</tr>
<tr>
<td>Mex.</td>
<td>15</td>
<td>37.5(11.5)</td>
</tr>
<tr>
<td>Bicult.</td>
<td>9</td>
<td>51.7(8.3)</td>
</tr>
<tr>
<td>Anglo</td>
<td>6</td>
<td>48.5(10.0)</td>
</tr>
</tbody>
</table>

Note. Mex.= Mexican Orientation; Bicult.=Bicultural Orientation; Anglo.= Anglo Orientation; Norm T=CVLT-II normative T score equivalent.

A second MANOVA was performed utilizing standard score transformations on four dependent variables provided by the CVLT-II computer scoring program. No significant multivariate effects were obtained for gender, age, and acculturation level. Education approached significance Pillai’s Trace=.153, $F(4,48)=.09$, $p <.05$. Analysis of the univariate effects demonstrated significant results for Education on CVLT-II Trials 1-5 “T” scores, $F(2,54)=4.62$, $p <.05$ and CVLT-II SDFR, $F(2,54)=4.63$, $p <.05$. No other significant univariate effects were observed among the remaining variables. For this sample, gender, age, and acculturation did not appear to have a significant effect on subjects ability to recall as measured by CVLT-II standardized scores. Education was significant for differences on two variables but did not account for a large amount of the variance (see Table 9).
Table 9

CVLT-II Test of Between Subjects Effects for Education - MANOVA

<table>
<thead>
<tr>
<th>Variable</th>
<th>F</th>
<th>Significance</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>.03</td>
<td>.86</td>
<td>.00</td>
</tr>
<tr>
<td>T1-5</td>
<td>4.62</td>
<td>.04*</td>
<td>.08</td>
</tr>
<tr>
<td>List B</td>
<td>.88</td>
<td>.35</td>
<td>.02</td>
</tr>
<tr>
<td>SDFR</td>
<td>4.63</td>
<td>.04*</td>
<td>.08</td>
</tr>
</tbody>
</table>

*Note. T1= Trial 1, SDFR= Short Delay Free Recall (based on standard scores).

*p < .05

An ANOVA was performed to compare the 3 acculturation groups based on country of origin and country of education. A significant effect was found for country of education, $F(2) = .02$, $p < .05$. A posthoc analysis was conducted to assess whether the differences would remain significant after adjusting for multiple comparisons made on the ANOVA. The posthoc analysis using the Tukey (HSD) demonstrated a significant difference between acculturation groups for those educated in the United States and those educated in Mexico. There was also a significant difference between those educated in the United States and those educated in Mexico and the United States (See Table 10).
Table 10

*Tukey HSD by Country of Education*

<table>
<thead>
<tr>
<th>Countries Compared</th>
<th>Mean Difference</th>
<th>Standard Error</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. &amp; Mexico</td>
<td>1.11*</td>
<td>.19</td>
<td>.00</td>
</tr>
<tr>
<td>U.S. &amp; U.S./Mexico</td>
<td>.61*</td>
<td>.24</td>
<td>.03</td>
</tr>
</tbody>
</table>
Chapter 4

Discussion

This study looked at the performance of a sample of bilingual Hispanic individuals of Mexican-American extraction on two measures of verbal learning. Individuals of three acculturation levels were examined to evaluate if a memory task utilizing the association value of real words would provide differential results in comparison to a rote memory task. This was an idea generated by review of Ponton and Ardila’s (1999) attempts to broaden thinking about the impact and interaction of language and culture. They examine the issue of test translation asserting that equivalency of content does not create equivalency of meaning because it ignores the importance of cultural relevance. It seemed that the ability to rapidly associate the auditory presentation of words should also be subject to cultural relevance.

The first hypothesis of the study stated that as subjects moved in the direction of Anglo oriented acculturation they would demonstrate higher recall scores on the CVLT-II. This hypothesis was based on the logic that an increased facility with the English language and familiarity with objects from Anglo culture would advantage association. The study found that there was no significant difference in the mean raw or mean standardized scores of this sample attributable to acculturation level.

Overall the CVLT-II recall scores for this sample appear comparable to those reported in the CVLT-II manual for the standardizing population. The standard scores for the entire Mexican-American sample do reflect performance approximately 1/2 standard deviation below the mean and the Mexican Oriented males did not compare as favorably to the standardizing sample as the Mexican Oriented females. Delis et al. (2000) found that women tended to recall an average of five words more than men on the CVLT-II Trial 1-5 totals. For this sample, Mexican Oriented females scored an average of almost seventeen more words than Mexican Oriented males across the five trials of List A. It is unclear what contributed to the differential performance for Mexican Oriented males as other demographic factors appear equivalent, including the standard deviation scores for all the acculturation groups across Trial 1-5 scores. Bicultural Oriented men performed slightly
better than women with an average of two more words over the five trials. Anglo Oriented women averaged almost eight words more than men across the five trials.

The second hypothesis of the study stated that performance on a nonsense word task would not significantly correlate with acculturation level. Nonsense words were postulated to offer little or no associative value and to therefore be equally difficult to recall regardless of language facility or familiarity with Anglo culture. This hypothesis was upheld. Nonsense word performance means did not vary significantly between acculturation levels for this sample.

The results of the study suggest that a significant effect based on Hispanic and Anglo cultural differences cannot be demonstrated for these measures of verbal learning in this sample. While further research with larger samples of Hispanics is needed, this preliminary examination encourages confidence in the potential utilization of an instrument in neuropsychology that provides a rich data base of information on verbal memory skills.

In the initial review of literature, several authors note the importance of education as a confound to interpreting the impact of culture on performance (Jacobs et al., 1997; Ponton & Ardila, 1999; Taussig & Ponton, 1996). They emphasize consideration of the quality of a subject’s education as well as quantity including where the education was obtained. Ponton et al. (1996) question if education might not be more relevant than ethnicity which raises interesting speculation that perhaps public education in the United States is a primary acculturation tool. Of course, as Harris et al. (1995) observe regarding their experience, not all of the performance variability in their sample could be accounted for by education, age, and ethnicity combined.

With these references in mind, analyses were conducted to examine the educational background of this sample in more detail. Education created significant differences between acculturation levels. The mean years of education increased by two years between groups (i.e., 10 years of education for Mexican Oriented to 14 years of education for Anglo Oriented). In addition to different levels of education, differences were also noted based on the location of the schooling. Significant differences were noted between subjects educated in the United States and Mexico as well as between those with education in the United States and a mixed education from the US and Mexico. A significant difference in the latter two groups is somewhat surprising as the subjects with mixed education reported early grades in Mexico with secondary, and in some cases, college
level work in the United States. There was the exception in this group of one individual who was born in the United States and educated in Mexico. Nearly one half of the subjects were born in Mexico yet no significant differences were based on country of origin. This would seem to punctuate the educational differences between acculturation groups.

Of interest as well are the scores of the Bicultural individuals who performed better than Mexican Oriented individuals and certainly equal to Anglo Oriented individuals who averaged two more years of education. Harris et al. (1995) also made observations about the performance of balanced bilinguals on an English list learning task modeled on the CVLT. Balanced bilinguals tended to cluster words to a greater extent than either Spanish dominant bilinguals or English monolingual speakers. Nonbalanced speakers recalled and retained fewer words on the English list but clustered to the same extent as monolinguals. Performance differences between groups evened out when lists were given in their subjects' dominant languages. Both Jitendra and Rohena-Diaz (1996) and Taussig and Ponton (1996) raise interesting questions about the characteristics particular to different languages including facility of expressive uses and semantic functions. This seems a rich area of potential research given the interest shown by the subjects in this sample.

Subjects who were the first born children in their families 20 or 30 years ago frequently commented that in childhood they were strongly encouraged by their parents to speak only English. They expressed a desire to teach both languages to their own children from an early age and asked many questions about how and when to introduce a second language. Further research in the study of the influence of bilingualism on brain development would be valuable in answering such questions.

There are a number of limitations to the present study. First, the number of individuals in the Anglo acculturated group was small. This may be attributable in part to the use of the ARSMA to assess acculturation in a bilingual Mexican-American sample. As is true of most acculturation scales, the ARSMA items rely heavily on patterns of language use to estimate acculturation. When individuals retain some use of both English and Spanish it appeared much more difficult to rank in the Anglo acculturated range. The ARSMA has five formal acculturation levels that were collapsed to provide adequate sample size for comparison in this study. It is possible that a larger sample utilizing all five levels, perhaps with inclusion of monolinguals, would yield finer distinctions.
between acculturation levels. There is also the possibility that language use as measured by a self-report scale will not necessarily address fluency issues adequately. Utilizing an objective measure of language ability might produce differential performance.

Secondly, while nonsense words were selected with care, it would have been possible to associate some of the sounds created by letter combinations with existing English or Spanish words. The use of associative strategy by some subjects could decrease the contrast in performance between an associative and a rote memory task. A choice was made in the recording of the nonsense words to use a Spanish pronunciation versus Anglicized consonants and vowels. It is possible this choice may have negatively influenced the recall of subjects less fluent in Spanish.

Thirdly, there was some concern after testing subjects with the RCPM that current North American norms may underestimate IQ in this population. While the RCPM may be postulated to be more culturally fair than other verbal IQ measures for use with a bilingual population (Paniagua, 1998; Sidles & MacAvoy, 1987), the issue of cultural relevancy seemed to surface based on qualitative observation. Subjects who owned and ran small private businesses or held professional level jobs scored in the lower average range on the RCPM. A preliminary error analysis was performed to determine if a pattern of errors atypical of a logical progression of item difficulty existed. This was accompanied by a search for disproportionate endorsement of particular incorrect items. The results suggest a small number of potentially problematic items. Further research on this instrument with the Hispanic population seems indicated.

One study was conducted at the University of Baja California and published in Mexico in 1996 (Backhoff-Escudero, 1996). It examined undergraduate admission scores on the Raven’s Standard Test of Progressive Matrices over a four year period in an effort to establish Mexican norms. The scores of their students in the 5th percentile converts to the mean of this study’s lowest scoring group, Mexican Oriented individuals. Use of the RCPM as an IQ estimate for exclusion criteria in studies may distort the sample. Restricting subjects to higher performance levels on the RCPM or Standard Progressive Matrices using North American norms may screen out less acculturated individuals and preclude any potential culture bound effects.

A final concern is the possibility of examiner effect resulting from monolingual Anglo researchers conducting verbal tasks with bilingual Hispanic subjects of various English fluency
effects. While this construct was very intentional to mimic actual neuropsychological practice by English speaking professionals, it is still a potential bias for self selection in the subject's willingness to participate. Subjects with limited English fluency may have been less comfortable with monolingual examiners or examiners may not have interpreted responses correctly. The services of a professional translator were offered. The consent and acculturation scales were dually printed in English and Spanish and the consent was available on tape in Spanish as well. Few subjects chose to utilize the Spanish versions and no subject requested a translator.

While there are a number of potential limitations to the current study, it is also makes a worthwhile contribution to the field in a number of ways. Based on a literature review spanning the last two decades by the author and a recent review article by Gasquoine (2001), this study provides the only published neuropsychological data available on a Mexican-American sample in the Pacific Northwest. The subjects ranged in age from 18 to 51 years of age. As reported by Gasquoine (2001), 16 of the 21 studies of Hispanics over the last decade have focused on the elderly and only 8 studies have used community dwellers. The sample comprising the current study are of nearly equal numbers by gender and by status as urban/rural community dwellers.

In summary, this study lends preliminary support to the use of the CVLT-II with bilingual Hispanics of Mexican-American extraction as an accurate measure of verbal learning abilities with an added caution regarding the need for further studies with larger and more diverse Hispanic samples. This study supports the use of acculturation instruments and inquiry into cultural issues during interview in a systematic fashion that will enhance interpretation of results. Using both a functional and empirical approach to evaluating cultural impact in assessment seems logical. The study also calls for the cautious interpretation of testing results in this population when using North American normative data especially if an acculturation scale is not utilized. It encourages continued research to broaden the data base of normative values on commonly used neuropsychological instruments. Finally, the author encourages a broader research interest in bilingualism and its effects on brain function.
References


Effects of Acculturation 38


Appendix A

Neuromedical Screen
NEUROMEDICAL PHONE SCREENER

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age: _____ *If under 18 or over 60 exclude.</td>
</tr>
<tr>
<td>2.</td>
<td>How many years of school did you complete? _____</td>
</tr>
<tr>
<td>3.</td>
<td>Do you have problems hearing?  Yes _____ No _____</td>
</tr>
</tbody>
</table>
| 4. | Were you born prematurely (early)?  
   Yes _____ (How early?) _____ weeks _____ months  
   No _____ Don’t Know _____ |
| 5. | Did your mother have any problems with your birth?  
   Yes _____ (What problems?)  
   No _____ Don’t Know _____ |
| 6. | Have you ever fainted, passed out, lost consciousness, or been hospitalized after getting hit in the head in a fight, fall, or car accident?  
   Yes _____ (Explain.)  
   No _____ Don’t Know _____ |
| 7. | If you were unconscious, for how long? _____ days _____ minutes  
   *If unconscious for more than 15 minutes, exclude. |
| 8. | If you were hospitalized, afterwards, did you return to a normal life?  
   Yes _____ No _____ (Explain.)  
   No _____ Don’t Know _____ |
| 9. | Have you ever passed out or been unconscious because of an overdose of drugs or alcohol, heart trouble, low blood pressure, or low blood sugar?  
   Yes _____ (Explain.)  
   No _____ Don’t Know _____ |
| 10. | Do you take any of the following medications?  
   No   Yes  
   _____   _____ Blood Pressure  
   _____   _____ Pain Pills  
   _____   _____ Antidepressants*  
   _____   _____ Sleeping Pills  
   _____   _____ Seizure Medication*  
   _____   _____ Antipsychotic Medication*  
   Dosage and frequency if known:  
   *If on antidepressants, seizure medication, or antipsychotics, exclude. Evaluate dosage for other medications. |
| 11. | Have you ever had problems related to your use of drugs or alcohol?  
   Yes _____  
   No _____ |
| 12. | Do you have or have you ever had:  
   No   Yes  
   _____   _____ Brain Surgery  
   _____   _____ Brain Tumor  
   _____   _____ Encephalitis |
<table>
<thead>
<tr>
<th>Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meningitis</td>
</tr>
<tr>
<td>Multiple Sclerosis</td>
</tr>
<tr>
<td>Parkinson's Disease</td>
</tr>
<tr>
<td>Poisoning</td>
</tr>
<tr>
<td>Syphilis</td>
</tr>
<tr>
<td>Stroke</td>
</tr>
<tr>
<td>Huntington's Disease</td>
</tr>
<tr>
<td>High Blood Pressure</td>
</tr>
<tr>
<td>Diabetes</td>
</tr>
<tr>
<td>Arteriosclerosis</td>
</tr>
<tr>
<td>Coronary Heart or Pulmonary Disease</td>
</tr>
<tr>
<td>Emphysema (COPD or CAO)</td>
</tr>
<tr>
<td>Systemic &quot;Lupus&quot; Erythematosus, AIDS, HIV+</td>
</tr>
<tr>
<td>Alzheimer's Disease</td>
</tr>
</tbody>
</table>

13. **Have you ever had a seizure or convulsion?**
   - Yes ______ (Explain.)
   - No ______ Don't Know

14. **Have you ever had artificial respiration? (Have you ever stopped breathing or has your heart stopped and someone else had to breathe for you?)**
   - Yes ______
   - No ______

15. **Have you ever gone to see a neurologist or neurosurgeon?**
   - Yes ______ (Why?)
   - No ______ Don't Know

16. **Have you ever had a mental health evaluation or gone to see a mental health counselor?**
   - Yes ______ (Explain.)
   - No ______

17. **Are you currently seeing a mental health counselor?**
   - Yes ______ (For what treatment?)
   - No ______

18. **Have you ever been hospitalized for psychiatric (mental health) problems?**
   - Yes ______
   - No ______

*If hospitalized for psychiatric care, exclude.
Appendix B
Demographics and Acculturation Scale
### Acculturation Rating Scale-II

**English Version**

1. **Male:**  
2. **Female:**  
3. **Date of Birth:**  
4. **Last grade completed in school?**  
   - Elementary-6  
   - 7-8  
   - 9-12  
   - 1-2 years college  
   - 3-4 years college  
   - College graduate/Higher  
5. **Which grades did you attend in Mexico?**  
   - 1  
   - 2  
   - 3  
   - 4  
   - 5  
   - 6  
   - 7  
   - 8  
   - 9  
   - 10  
   - 11  
   - 12  
   - 13  
   - 14  
   - 15  
   - 16  
6. **Did you have problems learning the following skills?**  
   - Reading  
   - Writing  
   - Spelling  
   - Math  
7. **Did you ever attend special education classes?**  
   - No  
   - Yes  
8. **What was your overall grade in school?**  
   - A  
   - B  
   - C  
   - D  
   - F  
9. **What is your job?**

### Español

1. **Masculino:**  
2. **Femenino:**  
3. **Día de Nacimiento:**  
4. ¿Hasta qué grado fue a la escuela?  
   - Primaria-6  
   - Secundaria 7-8  
   - Universidad 1-2 años  
   - Universidad 3-4 años  
   - Graduado, o grado mas alto de  
   - Universidad  
5. ¿Cuántos grados asistió en México?  
   - 1  
   - 2  
   - 3  
   - 4  
   - 5  
   - 6  
   - 7  
   - 8  
   - 9  
   - 10  
   - 11  
   - 12  
   - 13  
   - 14  
   - 15  
   - 16  
6. ¿Tu Ud. tuvo problemas aprendiendo lo siguiente?  
   - Lectura  
   - Escritura  
   - Ortografía  
   - Aritmética  
7. ¿Asistió Ud. clases especiales?  
   - No  
   - Sí  
8. ¿Cuáles fueron sus promedios de notas?  
   - 10  
   - 9  
   - 8  
   - 7  
   - 6  
   - 5  
   - 4  
   - 3  
   - 2  
   - 1  
9. ¿Cuál es su empleo?
(Circle the generation that best applies to you. Circle one only.)

1. **1st generation =** You were born in Mexico or other country.

2. **2nd generation =** You were born in USA; either parent born in Mexico or other country.

3. **3rd generation =** You were born in USA, both parents born in USA and all grandparents born in Mexico or other country.

4. **4th generation =** You and your parents born in USA and at least one grandparent born in Mexico or other country with remainder born in USA.

5. **5th generation =** You and your parents born in USA and all grandparents born in USA.

(Indique con un círculo el número de la generación que considere adecuada para usted. De salúmente una respuesta.)

1. **1a. generación =** Usted nació en México u otro país (no en los Estados Unidos, USA).

2. **2a. generación =** Usted nació en los Estados Unidos Americanos (USA), sus padres nacieron en México o en otro país.

3. **3a generación =** Usted nació en los Estados Unidos Americanos (USA), sus padres también nacieron en los Estados Unidos (USA) y sus abuelos nacieron en México o en otro país.

4. **4a generación =** Usted nació en los Estados Unidos Americanos (USA) sus padres nacieron en los Estados Unidos Americanos (USA) y por lo menos uno de sus abuelos nació en México o algún otro país.

5. **5a generación =** Usted y sus padres y todos sus abuelos nacieron en los Estados Unidos (USA).
### Effects of Acculturation

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Not at all</strong></td>
<td><strong>Very little or not very often</strong></td>
<td><strong>Moderately</strong></td>
<td><strong>Much or very often</strong></td>
<td><strong>Extremely often or almost always</strong></td>
<td><strong>Nada</strong></td>
</tr>
<tr>
<td>1. I speak Spanish</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I speak English</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I enjoy speaking Spanish</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I associate with Anglos</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I associate with Mexicans and/or Mexican Americans</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I enjoy listening to Spanish language music</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I enjoy listening to English language music</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. I enjoy Spanish language TV</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. I enjoy English language TV</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. I enjoy English language movies</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. I enjoy Spanish language movies</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. I enjoy reading (e.g., books in Spanish)</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>13.</td>
<td>I enjoy reading</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(e.g., books in English)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>I write (e.g., letters in Spanish)</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>I write (e.g., letters in English)</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>My thinking is done in the English language</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>My thinking is done in the Spanish language</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>My contact with Mexico has been</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>My contact with the USA has been</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>My father identifies or identified himself as “Mexicano”</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>My mother identifies or identified herself as “Mexicana”</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>My friends, while I was growing up, were of Mexican origin</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nada</td>
<td>Us poco quito o aveces</td>
<td>Moderatamente</td>
<td>MUCHO o muy frecuentemente</td>
<td>Muchísimo</td>
<td></td>
</tr>
</tbody>
</table>

<p>| 13. | Me gusta leer (e.g., libros en inglés) | 1 2 3 4 5 |
| 14. | Escribo (e.g., cartas en Español) | 1 2 3 4 5 |
| 15. | Escribo (e.g., cartas en inglés) | 1 2 3 4 5 |
| 16. | Mis pensamientos ocurren en el idioma Inglés | 1 2 3 4 5 |
| 17. | Mis pensamientos ocurren en el idioma Español | 1 2 3 4 5 |
| 18. | Mi contacto con México ha sido | 1 2 3 4 5 |
| 19. | Mi contacto con Estados Unidos Americanos ha sido | 1 2 3 4 5 |
| 20. | Mi padre se identifica (o se identificaba) como Mexicano | 1 2 3 4 5 |
| 21. | Mi madre se identifica (o se identificaba) como Mexicana | 1 2 3 4 5 |
| 22. | Mis amigos(as) de mi niñez eran de origen Mexicano | 1 2 3 4 5 |</p>
<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>Very little or not very often</td>
<td>Moderately</td>
<td>Much or very often</td>
<td>Extremely often or almost always</td>
</tr>
</tbody>
</table>

23. **My friends, while I was growing up, were of Anglo origin** 1 2 3 4 5

24. **My family cooks Mexican foods** 1 2 3 4 5

25. **My friends now are of Anglo origin** 1 2 3 4 5

26. **My friends now are of Mexican origin** 1 2 3 4 5

27. **I like to identify myself as an Anglo American** 1 2 3 4 5

28. **I like to identify myself as a Mexican American** 1 2 3 4 5

29. **I like to identify myself as a Mexican** 1 2 3 4 5

30. **I like to identify myself as an American** 1 2 3 4 5

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nada</td>
<td>Usualmente o a veces</td>
<td>Moderadamente</td>
<td>Mucho o muy frecuentemente</td>
<td>Muchísimo casi todo el tiempo</td>
</tr>
</tbody>
</table>

23. **Mis amigos(as) de mi niñez eran de origen Anglo Americano** 1 2 3 4 5

24. **Mi familia cocina comidas mexicanas** 1 2 3 4 5

25. **Mis amigos recientes son Anglo Americanos** 1 2 3 4 5

26. **Mis amigos recientes son Mexicanos** 1 2 3 4 5

27. **Me gusta identificarme como Anglo Americano** 1 2 3 4 5

28. **Me gusta identificarme como Norte Americano (México-Americano)** 1 2 3 4 5

29. **Me gusta identificarme como Mexicano** 1 2 3 4 5

30. **Me gusta identificarme como un(a) Americano(a)** 1 2 3 4 5
Appendix C

Nonsense Word List
### NONSENSE WORDS

#### LIST A

<table>
<thead>
<tr>
<th>Trial 1</th>
<th>Trial 2</th>
<th>Trial 3</th>
<th>Trial 4</th>
<th>Trial 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
</tr>
<tr>
<td>DIX</td>
<td>DIX</td>
<td>DIX</td>
<td>DIX</td>
<td>DIX</td>
</tr>
<tr>
<td>ZAH</td>
<td>ZAH</td>
<td>ZAH</td>
<td>ZAH</td>
<td>ZAH</td>
</tr>
<tr>
<td>SUH</td>
<td>SUH</td>
<td>SUH</td>
<td>SUH</td>
<td>SUH</td>
</tr>
<tr>
<td>LEC</td>
<td>LEC</td>
<td>LEC</td>
<td>LEC</td>
<td>LEC</td>
</tr>
<tr>
<td>GAH</td>
<td>GAH</td>
<td>GAH</td>
<td>GAH</td>
<td>GAH</td>
</tr>
<tr>
<td>NES</td>
<td>NES</td>
<td>NES</td>
<td>NES</td>
<td>NES</td>
</tr>
<tr>
<td>RES</td>
<td>RES</td>
<td>RES</td>
<td>RES</td>
<td>RES</td>
</tr>
<tr>
<td>POY</td>
<td>POY</td>
<td>POY</td>
<td>POY</td>
<td>POY</td>
</tr>
<tr>
<td>LUP</td>
<td>LUP</td>
<td>LUP</td>
<td>LUP</td>
<td>LUP</td>
</tr>
<tr>
<td>VEL</td>
<td>VEL</td>
<td>VEL</td>
<td>VEL</td>
<td>VEL</td>
</tr>
<tr>
<td>ROP</td>
<td>ROP</td>
<td>ROP</td>
<td>ROP</td>
<td>ROP</td>
</tr>
<tr>
<td>ZID</td>
<td>ZID</td>
<td>ZID</td>
<td>ZID</td>
<td>ZID</td>
</tr>
<tr>
<td>YAL</td>
<td>YAL</td>
<td>YAL</td>
<td>YAL</td>
<td>YAL</td>
</tr>
<tr>
<td>MOG</td>
<td>MOG</td>
<td>MOG</td>
<td>MOG</td>
<td>MOG</td>
</tr>
<tr>
<td>FEP</td>
<td>FEP</td>
<td>FEP</td>
<td>FEP</td>
<td>FEP</td>
</tr>
<tr>
<td>RIV</td>
<td>RIV</td>
<td>RIV</td>
<td>RIV</td>
<td>RIV</td>
</tr>
</tbody>
</table>

#### LIST B

<table>
<thead>
<tr>
<th>Interference</th>
<th>Recall</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOS</td>
<td>DIX</td>
</tr>
<tr>
<td>PEH</td>
<td>ZAH</td>
</tr>
<tr>
<td>HUX</td>
<td>SUH</td>
</tr>
<tr>
<td>CEM</td>
<td>LEC</td>
</tr>
<tr>
<td>RUY</td>
<td>GAH</td>
</tr>
<tr>
<td>DER</td>
<td>NES</td>
</tr>
<tr>
<td>GEN</td>
<td>RES</td>
</tr>
<tr>
<td>TIZ</td>
<td>POY</td>
</tr>
<tr>
<td>DEG</td>
<td>LUP</td>
</tr>
<tr>
<td>DIV</td>
<td>VEL</td>
</tr>
<tr>
<td>SAB</td>
<td>ROP</td>
</tr>
<tr>
<td>KUG</td>
<td>ZID</td>
</tr>
<tr>
<td>LAV</td>
<td>YAL</td>
</tr>
<tr>
<td>NAD</td>
<td>MOG</td>
</tr>
<tr>
<td>MIB</td>
<td>FEP</td>
</tr>
<tr>
<td>CAL</td>
<td>RIV</td>
</tr>
</tbody>
</table>
Appendix D
Phone Contact Script and Consent
Phone Contact Script

Hello, my name is Anita Blair, I’m a graduate student at George Fox University. I am calling to answer questions about the research study we’re doing. Let me give you some basic information, then see if you have any other questions about what you might be doing.

Would you like to continue in English or listen to a tape in Spanish?

(Informed consent.) First, we ask that you answer a few questions over the phone. These questions will be about your medical history, cultural background, and your use of alcohol and drugs. At the end of the telephone survey, we will either schedule you for a time to meet or thank you for completing the survey. When we schedule to meet, you’ll be asked to complete tests to help us find out how persons who speak both Spanish and English respond when given tests that measure memory skills. Even after we meet your help is voluntary. You may withdraw at any point and you will still get a gift valued at $5 as our thanks for your help. The telephone survey that I’d like to give you today will take about five to ten minutes, the testing that we will schedule for a later time will take about two hours to complete. The survey and testing are kept private because your open and honest answers are very much needed. By answering the survey you are giving your consent to be part of the study. You may choose to not continue the study at any time by telling one of us you want to stop.

If you’re interested in the results of this study, you can print your name and address on a 3 X 5 card that we can give you.

Would you like to complete the telephone survey?

If no: Thank you, good-bye.

If yes: Continue with Neuromedical Screen attached.
TELEPHONE SCRIPT

Primeramente le vamos a hacer algunas preguntas por teléfono acerca de su historia médica, su fondo cultural, y el uso de alcohol y drogas. Al final de esta encuesta telefónica, le daremos las gracias por participar en la encuesta y puede que le ofrezcamos una cita para tener una entrevista en persona. Si hacemos la cita, le pediremos que complete unas pruebas con las cuales queremos aprender como las personas que hablan ambos el Inglés y el Español responden acerca de sus habilidades de memoria. Su participación es voluntaria, puede usted retirarse en cualquier momento y recibirá un regalo con valor de cinco dólares a manera de gracias por su ayuda.

La encuesta telefónica tomará unos cinco minutos, las pruebas que haremos después tomarán unas dos horas para completar. Tanto la encuesta como las pruebas se mantendrán en privado porque sus respuestas sinceras serán muy necesarias. Al contestar la encuesta estará usted dando su consentimiento en participar en el estudio. Usted puede escoger terminar su participación en cualquier momento con solo solicitarlo.

Si usted está interesado en los resultados del estudio, puede poner su nombre y dirección en una pequeña tarjeta cuando nos veámos.
Appendix E

On Site Testing Script and Consent
Hello, my name is Anita Blair, I’m a graduate student at George Fox University. And you are?... Nice to meet you! I’m glad you could make it today, before we get started let me give you some basic information, then see if you have any other questions about what you might be doing.

Would you like to continue in English or read information in Spanish?

(Informed consent.) You’ll be asked to complete tests to help us find out how persons who speak both Spanish and English respond when given tests that measure memory skills. Your help is voluntary, you may withdraw at any point and you will still get a gift valued at $5 as our thanks for your help. The testing today will take about two hours to complete. The survey information you gave us on the phone and testing results today are kept private because your open and honest answers are very much needed. By completing the testing you are giving your consent to be part of the study. You may choose to not continue the study at any time by telling one of us you want to stop.

If you’re interested in the results of this study, you can print your name and address on a 3 X 5 card that I can give you.

Would you like to continue?

If no: Well, I’m sorry for any inconvenience, here is your gift and our thanks.

If yes: Begin testing. See attached Schedule of Test Presentations.
BOLETIN DE INFORMACION

Le vamos a pedir que complete unas pruebas con el fin de aprender como las personas que hablan ambos el Inglés y el Español responden a pruebas que miden las habilidades de memoria. Su ayuda es voluntaria. Usted puede retirarse en cualquier momento y aún así recibirá un regalo con valor de cinco dólares como agradecimiento por su ayuda. La entrevista hoy tomará aproximadamente dos horas para completar. La información que usted nos dió por teléfono y el resultado de estas pruebas se mantendrán privados puesto que sus respuestas sinceras y honestas son muy necesarias. En completar estas pruebas usted estará dando su consentimiento en participar en el estudio. Usted puede descontinuar el estudio en cualquier momento con solo decirlo.

Si usted está interesado en los resultados de este estudio, puede escribir su nombre y dirección en una pequeña tarjeta que le vamos a dar.

Desea usted continuar?

Si no- Bueno, siento la molestia, aquí está su regalo y nuestras gracias.

Si sí- Comenzaremos el estudio.
Appendix F

Raw Data Tables
Explanation of Raw Data

<p>| Column 1: | Order of Data Entry |
| Column 2: | Subject Identification Number |
| Column 3: | Gender |
| Column 4: | Years of Education |
| Column 5: | Age |
| Column 6: | Boston Naming Test, Number of Correct Items |
| Column 7: | Controlled Oral Word Association Test, Number of Correct Items |
| Column 8: | Acculturation Rating Scale for Mexican-Americans, Raw Score |
| Column 9: | Acculturation Rating Scale for Mexican-Americans, Acculturation Level |
| Column 10: | Raven’s Coloured Progressive Matrices, Number of Correct Items |
| Column 11: | California Verbal Learning Test-II, Trials 1 to 5 Raw Score |
| Column 12: | California Verbal Learning Test-II, List B Raw Score |
| Column 13: | California Verbal Learning Test-II, Short Delay Free Recall Trial Raw Score |
| Column 14: | Nonsense Word Task, Trials 1 to 5 Raw Score |
| Column 15: | Nonsense Word Task, List B Raw Score |
| Column 16: | Nonsense Word Task, Short Delay Free Recall Trial Raw Score |
| Column 17: | California Verbal Learning Test-II, Trial 1 Raw Score |
| Column 18: | Nonsense Word Task, Trial 1 Raw Score |</p>
<table>
<thead>
<tr>
<th>subj_id</th>
<th>gender</th>
<th>educ</th>
<th>age</th>
<th>bmi</th>
<th>cows</th>
<th>arsma_s</th>
<th>arsma_c</th>
<th>rpm</th>
<th>ovlt10s</th>
<th>ovlt_to</th>
<th>ovltadfr</th>
<th>none10s</th>
<th>none_to</th>
<th>nonaddfr</th>
<th>ovlt_t1</th>
<th>none_t1</th>
</tr>
</thead>
<tbody>
<tr>
<td>39</td>
<td>females</td>
<td>12</td>
<td>26</td>
<td>42</td>
<td>19</td>
<td>-0.02</td>
<td>2</td>
<td>23</td>
<td>55</td>
<td>8</td>
<td>13</td>
<td>9</td>
<td>2</td>
<td>0</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>40</td>
<td>females</td>
<td>10</td>
<td>18</td>
<td>31</td>
<td>22</td>
<td>-0.38</td>
<td>1</td>
<td>29</td>
<td>64</td>
<td>6</td>
<td>11</td>
<td>24</td>
<td>1</td>
<td>4</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>41</td>
<td>females</td>
<td>13</td>
<td>21</td>
<td>34</td>
<td>42</td>
<td>-0.23</td>
<td>1</td>
<td>29</td>
<td>42</td>
<td>4</td>
<td>7</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>42</td>
<td>males</td>
<td>8</td>
<td>51</td>
<td>30</td>
<td>26</td>
<td>-0.23</td>
<td>1</td>
<td>32</td>
<td>50</td>
<td>5</td>
<td>11</td>
<td>21</td>
<td>0</td>
<td>8</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>43</td>
<td>females</td>
<td>8</td>
<td>51</td>
<td>30</td>
<td>26</td>
<td>-0.23</td>
<td>1</td>
<td>32</td>
<td>50</td>
<td>5</td>
<td>11</td>
<td>21</td>
<td>0</td>
<td>8</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>44</td>
<td>males</td>
<td>12</td>
<td>29</td>
<td>41</td>
<td>30</td>
<td>-0.22</td>
<td>2</td>
<td>32</td>
<td>49</td>
<td>4</td>
<td>10</td>
<td>25</td>
<td>2</td>
<td>6</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>45</td>
<td>females</td>
<td>13</td>
<td>38</td>
<td>37</td>
<td>21</td>
<td>-0.08</td>
<td>2</td>
<td>31</td>
<td>53</td>
<td>7</td>
<td>12</td>
<td>20</td>
<td>2</td>
<td>4</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>46</td>
<td>males</td>
<td>8</td>
<td>33</td>
<td>35</td>
<td>12</td>
<td>-1.11</td>
<td>1</td>
<td>28</td>
<td>49</td>
<td>4</td>
<td>16</td>
<td>18</td>
<td>3</td>
<td>8</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>47</td>
<td>females</td>
<td>15</td>
<td>29</td>
<td>64</td>
<td>40</td>
<td>-0.09</td>
<td>1</td>
<td>33</td>
<td>53</td>
<td>2</td>
<td>12</td>
<td>29</td>
<td>0</td>
<td>6</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>48</td>
<td>males</td>
<td>8</td>
<td>46</td>
<td>10</td>
<td>11</td>
<td>-2.94</td>
<td>1</td>
<td>20</td>
<td>21</td>
<td>4</td>
<td>5</td>
<td>8</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>49</td>
<td>males</td>
<td>12</td>
<td>37</td>
<td>17</td>
<td>18</td>
<td>-2.88</td>
<td>1</td>
<td>31</td>
<td>35</td>
<td>5</td>
<td>7</td>
<td>18</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>50</td>
<td>males</td>
<td>8</td>
<td>38</td>
<td>9</td>
<td>6</td>
<td>-2.64</td>
<td>1</td>
<td>22</td>
<td>25</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>51</td>
<td>males</td>
<td>8</td>
<td>21</td>
<td>32</td>
<td>14</td>
<td>-2.44</td>
<td>1</td>
<td>29</td>
<td>30</td>
<td>3</td>
<td>6</td>
<td>18</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>52</td>
<td>males</td>
<td>8</td>
<td>24</td>
<td>14</td>
<td>8</td>
<td>-2.67</td>
<td>1</td>
<td>22</td>
<td>25</td>
<td>2</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>53</td>
<td>males</td>
<td>12</td>
<td>27</td>
<td>25</td>
<td>18</td>
<td>-2.28</td>
<td>1</td>
<td>35</td>
<td>30</td>
<td>5</td>
<td>7</td>
<td>21</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>54</td>
<td>males</td>
<td>10</td>
<td>30</td>
<td>14</td>
<td>8</td>
<td>-2.21</td>
<td>1</td>
<td>29</td>
<td>28</td>
<td>5</td>
<td>6</td>
<td>14</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>55</td>
<td>males</td>
<td>14</td>
<td>27</td>
<td>67</td>
<td>38</td>
<td>1.74</td>
<td>3</td>
<td>34</td>
<td>38</td>
<td>8</td>
<td>9</td>
<td>31</td>
<td>2</td>
<td>7</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>56</td>
<td>males</td>
<td>13</td>
<td>27</td>
<td>58</td>
<td>46</td>
<td>1.76</td>
<td>3</td>
<td>36</td>
<td>37</td>
<td>5</td>
<td>8</td>
<td>35</td>
<td>4</td>
<td>7</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>57</td>
<td>males</td>
<td>16</td>
<td>29</td>
<td>58</td>
<td>48</td>
<td>3.08</td>
<td>3</td>
<td>36</td>
<td>60</td>
<td>5</td>
<td>11</td>
<td>22</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>
Appendix G

Curriculum Vita
Effects of Acculturation 63

Curriculum Vita

Anita S. Blair
7406 60th. St. W. #201
University Place, WA 98467
(509) 521-7686
asblair@georgefox.edu

Education and Honors

09/97-Present
George Fox University  
Graduate School of Clinical Psychology Newberg, Oregon

01/80-06/81
Columbia Basin College
Pasco, Washington
A.S. Degree in Registered Nursing

09/73-12/76
University of California, Davis
Davis, California
B.A. Degree with Honors
Additional Honors:
California State Scholar 1973-1976
Appointed member Dean's Student Advisory Council

Supervised Clinical Experience

09/01-Present
Western State Hospital, Steilacoom, Washington
APA approved internship position with rotations selected in geriatrics, community based forensic evaluation, and a six month specialty rotation in neuropsychology. State hospital setting in the urban Seattle/Tacoma area. Site offers ongoing weekly forensic seminars via University of Washington faculty and numerous inservice training opportunities. Intern conducts groups, individual therapy, civil court evaluations, behavioral modification/treatment planning, mental status evaluation, neuropsychological screening for dementia, psychological assessment, comprehensive neuropsychological evaluation, psychoeducational assessment, forensic evaluation of competency, dangerousness, diminished capacity, and sanity. Population: Chronically mentally ill. Admission is almost exclusively by civil or criminal commitment. Population is ethnically and clinically diverse.
Effects of Acculturation

Supervised Clinical Experience (Cont.)

Supervisor: Geriatrics-Nancy Larson, Ph.D.; Neuropsychology- Audrey Mattson, Ph.D.; Forensics -TBA.

07/00-06/01  Richard Kolbell, Ph.D., ABPP, Portland, Oregon
Paid Practicum position as a psychometrist for a forensic neuropsychologist. Contracted with two other psychologists at the practice location to administer Social Security Disability and L & I batteries.
Population: TBI, Forensic cases, L&I claims, Social Security Disability claims with an ethnically and clinically diverse population.
Supervisor: Richard Kolbell, PhD., ABPP

08/00-present  Tualatin Valley Centers, Portland, Oregon
Individual psychotherapy with adults in a large, urban, outpatient community mental health clinic.
Population: APA internship site serving a diverse cultural, clinical (Axis I and II), and sexually oriented population.
Supervisor: Ken Ihli, Ph.D.

01/00-06/00  Northwest Occupational Medicine Center, Portland, Oregon
Neuropsychological testing and assessment of adults, pain management groups
Population: TBI, Chronic Pain, L&I claims, Social Security Disability claims, pre-employment interviews of police and fire department personnel.
Supervisors: Sherry Hardin, Psy.D. and Michael Leland, Ph.D.

09/99-12/99  Tri-Cities Neuropsychology Clinic, Richland, Washington
07/00-08/00  Neuropsychological testing and assessment of children and adults in a rural, private practice setting.
Population: TBI, LD, psychiatric and neurological referrals.
Supervisor: Scott Grewe, Ph.D.

09/98-05/99  George Fox University Health and Counseling Center Newberg, Oregon
Providing outpatient mental health therapy services to young adult undergraduates and mature students in graduate studies.
Population: College Students
Supervisor: William Buhrow, Psy.D.
Supervised Clinical Experience (Cont.)

09/97-04/98  **George Fox University**, Newberg, Oregon  
Providing weekly counseling to students as part of practicum preparation.  
Population: Undergraduate students, peers  
Supervisor: Wayne CoIwell, Ph.D.

Professional Licensure

Washington RN License #RN00074054

Related Work Experience (paid clinical positions not included as supervised practicum)

12/98-08/01 StaffRN  
08/9&08/97 **Sunderland Family Treatment Services**, Kennewick, Washington  
04/91-10/95  
Duties included medication management of OP chronically mentally ill patients, individual therapy, case management out of facility, nursing home consultation, co-leader of Bipolar group and latency aged girls' social skills group for one year each, crisis on-call coverage, obtained managed care authorizations for clinic physicians.  
Population: Chronically mentally ill children and adults, developmentally disabled children and adults, sexual and culturally diverse clients.  
Supervisor: Sandra Caggiano, RNC

03/98-10/98 StaffRN  
03/98 Portland Crisis Triage Center, Portland, Oregon  
Duties included evaluation and treatment of patients in psychiatric crisis and in need of respite care. Frequent employment of Involuntary Treatment Act and coordination of transport for inpatient care. Administration of breath analysis for alcohol level, urine drug screens, seclusion monitoring.  
Population: Acute psychiatric care of adults and children, substance abusers, sexual and culturally diverse clients.  
Supervisor: Bill Blaylock, RN

10/89-04/91 Charge Nurse  
**Carondelet Psychiatric Care Center**, Richland, Washington  
Duties included supervision of night shift personnel on child/adolescent unit and relief supervision of 40 bed hospital for last six months of employment. Supervised two to five staff, administered medication, evaluated physical and mental status of patients, crisis intervention.  
Population: Adult, adolescent and child psychiatric inpatients
Related Work Experience (Cont.)

Supervisor: Sandra Caggiano, RNC

01/86-10/86
RN-II
Atascadero State Hospital, Atascadero, California
Duties included evaluating physical and mental status of patients in a 1000 bed maximum security psychiatric hospital. Administered medication, ordered and reviewed lab work, provided first aid, and held psychoeducational groups on a competency restitution ward.
Population: Adult males in a forensic setting, sexually and culturally diverse population.
Supervisor: Sam Douglas, MHT

10/81-01/86
General Nursing Experience
Pediatrics, med-surg, oral surgery, weight loss, burn unit and plastic surgery experience.

Teaching Assistantships

01/01-4/01
Graduate School of Clinical Psychology, George Fox University
Conducted one hour per week lab and lecture sessions on neuropsychological testing instruments.
Supervisor: Wayne Adams, Ph.D., ABPP

01/00-4/00
Conducted one hour per week lab and lecture sessions on cognitive intellectual testing instruments, created worksheets, scored/graded testing protocols. Produced professional quality video of interview, WAIS and WRAT administration for training of future classes.
Supervisor: Wayne Adams, Ph.D., ABPP

08/00-12/00
Graduate School of Clinical Psychology, George Fox University
Provided adjunctive support for instruction of undergraduate psychology classes and assisted in research
Supervisor: Wayne Adams, Ph.D., ABPP

08/99-12/99
Graduate School of Clinical Psychology, George Fox University

Research Experience and Presentations
Dissertation Title: The Effects of Acculturation on Verbal Learning in a Bilingual Hispanic Sample of Mexican American Extraction
Status:
Dissertation proposal approved October 19, 2000
Data collection completed November 2001
Data analysis completed December 2001
Draft of Dissertation completed January 2002
Dissertation Defense passed March 16, 2002
Research Experience and Presentations (Cont.)

06/01-present  Review of sensitivity and specificity literature in preparation for review article to be co-authored with R. Kolbell, Ph.D., ABPP

10/01-12/01  Forensic Seminar Case Presentation (staff presentation)
Neuropsychology at Western State Hospital (high school group)
TBI (nursing staff orientation) at Western State Hospital

08/97-04/2001  Research Vertical Team
Met biweekly to discuss and evaluate the progress, methodology, design, and procedures related to a wide range of research projects being conducted by students and faculty.
George Fox University
Supervisor: Leonardo Marmol, Ph.D., ABPS

11/2000  Panel Member representing CBT orientation
Grand Rounds Presentation
George Fox University

10/2000  Sharing the Breath of God GW-Psychology Department Chapel Presentation


10/98  Advances in Psychopharmaceutical Treatment of Bipolar Disorder
George Fox University Health and Counseling Center

08/7~08/76  Theatre Department, University of California at Davis
Assisted in research of theatre history leading to publication of a book.
Supervisor: Robi Sarlos, Ph.D.

Clinical Administrative Work

11/00  National Academy of Neuropsychology
2000 Annual Conference, Orlando, FL Student Volunteer

00-01  Student mentor
99-00  Student mentor
Memberships and Professional Affiliations

INS (Student Affiliate) 12/01-present
Pacific Northwest Neuropsychological Society 09/01-present
APA Division 40 (Student Affiliate) 06/01-present
Adult Neuropsychology List Serve 2000-present
National Academy of Neuropsychology (Student Affiliate) 1998-present
Pediatric Neuropsychology List Serve 1998-2000
American Psychological Association (Student Affiliate) 1997-present

Professional Seminars Attended

10/01  A.R. Luria: Clinical Relevance to Neuropsychological Practice  
       L.V. Majovski, Ph.D., ABCN  
       Pacific Northwest Neuropsychological Society

03/01  Why Memory is a Fiction  
       Regina Pally, M.D.  
       Oregon Psychoanalytic Society and Institute

11/00  Annual Conference, Orlando, FL  
       National Academy of Neuropsychology

11/00  Grounding Integration in Relational Theology and Psychology  
       Hendrika Vande Kemp, Ph.D.  
       Professor of Psychology at Fuller Theological Seminary

10/00  Introductory Workshop in Clinical Hypnosis (20 CEU)  
       Portland Academy of Hypnosis

05/00  Mind-Body Medicine and the Brain  
       John M. Moti, M.D./INR

02/00  Annual Conference, Fort Meyers, FL  
       American Neuropsychiatric Association

06/99  Third International Conference on Bipolar Illness  
       University of Pittsburgh School of Medicine/ Stanley Institute

10/98  Using the 16 PF in Clinical Practice Michael Karson, Ph.D.

09/98  Clueless in California: Agenesis of the Corpus Callosum  
       Warren Brown, Ph.D.
Professional Seminars Attended (Cont.)

07/98  Psychoneuroimmunology
       University of Washington, Seattle

05/98  Race and Racism in Psychotherapy
       Alice Chang, Ph.D. & Nelson de Jesus, Ph.D.

04/98  Explicit, Implicit, Intentional Clinical Integration: Galileo and Wesley,
       Two old, but ever-new integration models.
       Newton Maloney, Ph.D. ABPP

03/98  Reflections on a Career
       Joseph Matarazzo, Ph.D.

12/97  Psychology Ethics and Clinical Practice
       Gerald Koocher, Ph.D.

12/97  Trends and Changes in the Practice of Clinical Psychology Wayne Colwell, Ph.D.

10/97  Postmodernism
       Kathleen Kleiner, Ph.D.

10/97  Neuropsychological Issues of Head Injury Julia Wong-Ngan, Ph.D.

09/97  Mild Cognitive Impairment
       University of Washington, Seattle

Professional References

Leonardo Marmol, Ph.D., ABPS
Chair, Department of Graduate Psychology
Seattle Pacific University
Seattle, Washington 98177
(206) 281-2987

Wayne Adams, Ph.D., ABPP
Director of the Graduate School of Clinical Psychology
George Fox University
Newberg, Oregon 97132
(503) 554-2761
Professional References (Cont.)

Richard Kolbell, Ph.D., ABBP
19 23 N.E. Broadway St.
Portland, Oregon 97232
(503) 284-2372

Ken Ihli, Ph.D.
Tualatin Valley Centers
14 600 NW Cornell Rd.
Portland, Oregon 97229
(503) 645-3581

Tests Administered (Adults) (as of 12/01)

Cognitive Intellectual and Achievement
  Gates (1)
  Mini Battery of Achievement (5)
  Raven's Progressive Matrices (1)
  Raven's Coloured Progressive Matrices (27)
  Shipley (1)
  Wechsler Adult Intelligence Scale-III (47)
  Wechsler Abbreviated Scale of Intelligence (11)
  Wechsler Memory Scale-III (43)
  Wide Range Achievement Test-III (16)
  Wide Range Assessment of Memory and Learning (2)
  Writing Sample (1)

Personality
  16PF(1)
  Minnesota Multiphasic Personality Inventory II (17)
  Personality Assessment Inventory (4)

Projective
  House Tree Person (4)
  Rorschach (Exner) (10)
  Sentence Completion Test (2)
  Thematic Apperception Test (2)

General Psychological
  Beck Depression Inventory (47)
  Beck Anxiety Inventory (17)
  Cognistat (3)
  Folstein Mini Mental Status Exam (15)

Malingering
  21 item test (22)
  Rev 15 item (11)
  Test Of Memory and Malingering (5)
Neuropsychological

- Booklet Category Test (2)
- Boston Diagnostic Aphasia Exam-Ill (1)
- Boston Naming Test (37)
- California Verbal Learning Test (14)
- California Verbal Learning Test-II (28)
- Cancellation Test (1)
- Clock Drawing Test (2)
- Controlled Oral Word Association Test (47)
- Finger Tapping Test (4)
- Grooved Pegboard Test (11)
- Hooper Visual Organization Test (8)
- Judgment of Line Orientation Test (3)
- Line Bisection Test (1)
- Reitan Indiana Aphasia Screening Test (9)
- Reitan Klove Sensory Perceptual Exam (3)
- Repeatable Battery for Assessment of Neuropsychological Status (2)
- Rey Auditory Verbal Learning Test (1)
- Rey Osterrieth Complex Figure Test (20) Taylor (1)
- Seashore Rhythm Test (2)
- Speech Sounds Perception Test (2)
- Stroop (18)
- Symbol Digit Modalities (9)
- Test Of Variables of Attention (1)
- Trail Making Test (A & B) (36)
- VSAT (1)
- Warrington Recognition Memory Test (1)
- Wisconsin Card Sorting Test (26)

Tests Administered (Children)

- Wechsler Intelligence Scale for Children-III (10)
- Wide Range Assessment of Memory and Learning (1)
- Wide Range Achievement Test-Ill (1)
- Wisconsin Card Sorting Test (2)
- Trail Making Test (A & B) (1)
- Boston Naming Test (1)
- California Verbal Learning Test (1)
- Hooper Visual Organization Test (1)
- Rey Osterrieth Complex Figure Test (1)
- House Tree Person Test (1)
- Rorschach (Exner) (1)