12-15-2018

Development of the Emotional Verbal Learning Test - Spanish (EVLT-S)

Davor Nicolas Zink
davor13nzp@gmail.com

DEVELOPMENT OF THE EMOTIONAL VERBAL LEARNING TEST - SPANISH (EVLT-S)

By

Davor Nicolas Zink

Bachelor of Science – Psychology
Armstrong Atlantic State University
2008

Master of Arts – Psychology
University of North Carolina Wilmington
2012

A dissertation submitted in partial fulfillment
of the requirements for the

Doctor of Philosophy - Psychology

Department of Psychology
College of Liberal Arts
The Graduate College

University of Nevada, Las Vegas
December 2018

UNLV | GRADUATE COLLEGE

Dissertation Approval

The Graduate College
The University of Nevada, Las Vegas

August 30, 2018

This dissertation prepared by

Davor Nicolas Zink

entitled

Development of the Emotional Verbal Learning Test - Spanish (EVLT-S)

is approved in partial fulfillment of the requirements for the degree of

Doctor of Philosophy - Psychology
Department of Psychology

Daniel N. Allen, Ph.D.
Examination Committee Chair

Kathryn Hausbeck Korgan, Ph.D.
Graduate College Interim Dean

Michelle G. Paul, Ph.D.
Examination Committee Member

Kimberly A. Barchard, Ph.D.
Examination Committee Member

Merrill R. Landers, Ph.D.
Graduate College Faculty Representative

ABSTRACT

Development of the Emotional Verbal Learning Test - Spanish (EVLT-S)

by

Davor N. Zink, M.A.

Dr. Daniel N. Allen, Examination Committee Chair
Professor of Psychology
University of Nevada, Las Vegas

Emotional disturbances are common features of clinical disorders and are often present in individuals who have neurodevelopmental or acquired brain disorders. The Hispanic population is the largest and fastest growing ethnic minority group in the United States (U.S.) and by 2050 is projected to be the largest. However, few instruments are available to evaluate emotional functioning in individuals who speak Spanish. Fewer still are available to assess cognitive disturbances resulting from brain dysfunction that impact emotion processing. Normal processing of emotion is critical for social functioning. In recent years it has become apparent that cognitive abilities specialized to process social information are crucial for adaptive functioning and differ from cognitive abilities that process non-social information in a number of important ways. Measures to assess social cognitive abilities in individuals whose primary language is Spanish are scarce and there are currently no measures available to assess emotional learning and memory. The current study addresses this matter by adapting one test of emotional verbal learning and memory for use with Spanish speaking individuals.

Keywords: emotional memory, neuropsychological assessment, social cognition, Hispanics

ACKNOWLEDGEMENTS

This project would not have been possible without the unconditional support and guidance of many amazing individuals. I would like to extend my sincere gratitude to all of you. To my research mentor, Dr. Allen, for his wise guidance and advisement throughout my graduate career in both research and personal levels and for his unwavering believe in my ability to complete this project successfully. Dr. Allen I will always appreciate those late meetings and extra hours you put in to complete this project, I learned more in those meetings than in all of my classes. You are an exemplar researcher and I am really lucky to have the opportunity to work with you. I admire your kindness and generosity and thank you for pushing me to be better person. To my committee members for their careful feedback and dedication to improve this project. To Michelle Paul, for providing structure and calm throughout my graduate career and for always being there to consult with. To Kimberly Barchard, for her unwavering dedication to teaching, contagious enthusiasm, and for her careful feedback that improved my writing and analyses. To Merryl Landers, for being awesome and teaching by being an example to follow. To my undergraduate research assistants, without you and your hard work this project would not have been possible. To my fellow lab members in the neuropsychology graduate program for their support, particularly Hana Kuwabara and Eliany Reyes, who's dedication and effort went beyond any expectations. I could not have asked for a better group of people to work with. To Dr. Puente, for always taking the time to provide guidance, support, and consult during this project and throughout my career. Thank you for encouraging me to pursue a doctoral degree, believing in me, and being a model bilingual clinician/academic to aspire to be. To Dr. Lisa San Miguel and Alicia Nuñez for their kindness and help with complicated translations. Thank you to my family, for believing in me and always being there for me even though we are so far away.

Thank you to my Father, for reminding me of my goals and guiding me to not stray from the right path. And finally, thank you to my wife, who's unconditional love and support allowed me to finish this project and weather several storms in the process.

DEDICATION

Le dedico este trabajo a mi mama que siempre ha valorado mucho la educación. Si no fuera por ti y tu incansable esfuerzo para que yo me superara durante mi niñez, yo no estaría aquí. Aunque ahora no te pueda mostrar o explicar este logro, te lo dedico y te doy gracias por tu apoyo y amor incondicionales.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Hispanics are the largest and fastest growing minority group in the United States (50.5 million; U.S. Census Bureau, 2011). The rapid demographic shift of the Hispanic population in the U.S. represents a challenge for the field of clinical neuropsychology. As the Hispanic population increases, the need for appropriate neuropsychological assessment instruments in Spanish also increases. Neuropsychological testing of Spanish speakers is a difficult task because of the linguistic and cultural diversity of this population (e.g., Ardila et al., 2002, Puente & Puente, 2009). Additionally, in neuropsychology there is scarce Spanish speaking personnel as well as available tests in Spanish to properly assess individuals whose primary language is Spanish, including those who live in the U.S. (e.g., Echemendia & Harris, 2004).

The current set of studies aims to address the current challenge of assessing Spanish speakers in the U.S. by adapting the Emotional Verbal Learning Test (EVLT) to Spanish. The EVLT is a novel tool, with consistent psychometric properties, that permits the assessment of several learning and memory processes in relation to emotional stimuli (learning curve, primacy, recency, preferential processing, state/trait emotional experience; Strauss & Allen, 2013). Few available tests in English assess the recall and recognition of emotional information, even though there is evidence suggesting that brain regions are differentially involved in memory for emotional and neutral stimuli (e.g., Wittmann et al., 2008). Moreover, affective disturbances are common in psychiatric and neurological disorders. For example, patients with schizophrenia commonly show affective abnormalities, such as anhedonia, and impairments in emotional learning and memory (American Psychiatric Association, 2013; Herbener, 2008). Notably, the Hispanic population in the U.S. has a high rate of neuropsychiatric disorders (Alegria et al.,

2008) and health concerns. For example, compared to non-Hispanic Caucasians, Latinos are at greater risk for neurocysticercosis (Bartolini et al., 2011) and Alzheimer's disease (Alzheimer's Association, 2012). Given these considerations, the Spanish version of the EVLT will be developed and its psychometric properties will be evaluated. Because emotional verbal learning has not been evaluated in a Spanish speaking population in the U.S., the current study may also provide insights into similarities and differences in emotional learning and memory among individuals whose primary language is Spanish, those whose primary language is English, or are bilingual (English and Spanish). In the following sections important background information is provided, which serves to establish a basis for the proposed work, including the Hispanic population in the U.S., Hispanics and psychopathology, neuropsychological assessment of Spanish speakers, social cognition, emotion and memory, and the EVLT.

CHAPTER 2

LITERATURE REVIEW

Hispanic Population in the U.S.

Hispanics are the largest and fastest growing minority group in the country (U.S. Census Bureau, 2009). From 2000 to 2010 the Hispanic population grew 43% (15.2 million), which was four times more than the overall U.S. population growth of 10% and accounted for most of the nation's growth (56%; Passel, Cohn, & Lopez, 2011; U.S. Census Bureau, 2011). The United States has a population of approximately 308 million, with approximately 50.5 million Hispanics (Census Bureau, 2011). Consequently, at least 16% of the U.S. population is Hispanic, but this amount is underestimated because it does not include undocumented Hispanic immigrants or Puerto Ricans who live in Puerto Rico (3.7 million), a U.S. territory. Presently, the unauthorized immigrant population is estimated at 11.2 million, with 8 million unauthorized workers (Passel & Cohn, 2011). Considering that the Hispanic population in the U.S. is growing at a faster pace than the population as a whole, it is expected that by the year 2050, 30% (132.8 million people) of the U.S population will be Hispanic (U.S. Census Bureau, 2009). The U.S census definition of Hispanic or Latino origin is as follows: "Hispanic or Latino refers to a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race" (US Census, 2011). In terms of cultural background or country of origin, Mexicans account for approximately 65% of the U.S. Latino population, followed by Puerto Ricans (9%), and Cubans (4%). Further, Hispanics in the U.S. include individuals with ancestries from Central America (8%, excluding Mexico), South America (6%), the Dominican Republic (3%), and Spain (1.3%, Lopez & Dockterman, 2011; US Census, 2011). It is noteworthy that there are considerable cultural differences among these Hispanic countries. People with Latino or

Hispanic origin represent 21 Spanish-speaking countries, each with distinct sociopolitical and historical contexts, language dialects, religious and cultural traditions, indigenous origins, and culinary traditions (Santiago Rivera et al., 2015). Though for simplicity and consistency with most of the research literature, Hispanic and Latino will be used interchangeably throughout this document and will refer to Hispanics in the U.S. regardless of country of origin or race unless otherwise specified.

Compared to non-Hispanic whites in the U.S., Hispanics on average are less educated and poorer. According to recent data among Latinos 25 years old and older, 61.4% are high school graduates or less, 23.6% completed two years or some college, and only 15% graduated college or more (Florez, Lopez, & Radford, 2017). Further, approximately 21.9% of Hispanics live at poverty levels (Florez, Lopez, & Radford, 2017). Regarding the total annual earnings of Latinos in the U.S., it is estimated that about 44.3% earn less than $20,000, 41.2% earn between $20,000-$49,999, and 14.5% earn $50,000 or more (U.S. Census Bureau, 2011). Notably, these estimations do not include undocumented Hispanics. In contrast, 50% of non Hispanic whites have incomes from $40,000 to $120,000 and 34.5% earned a bachelor's degree (Kochhar & Cilluffo, 2018).

Hispanics and Psychopathology

According to Perez-Arce and Puente (1996) Hispanics and other ethnic minority groups in the U.S. share common characteristics, which include low socioeconomic status (SES), limited/poor education, poor health care, unskilled jobs, origin from developing or foreign countries, discrimination, English as a second language, distinctive cultural values, rural life background, and acculturation issues. However, Hispanics also have unique characteristics that cannot be generalized to either majority or other minority groups. For example, they have

particular vocabulary, communication styles, music, and religious traditions depending on the country of origin. In addition, there is a high number of undocumented Hispanics that usually live in poorer conditions and often suffer from immigration traumas and fear of deportation (Dingfelder, 2005). Consequently, immigrant Latinos tend to experience greater psychological distress compared to U.S. born Latinos (Williams et al., 2010).

Low SES has a unique impact on health disparities between Latinos and non-Latinos. For example, compared to non-Hispanic Caucasians, Latinos are at a greater risk for prematurity and low birth weight, malnourishment (Strutt et al., 2015), cardiovascular disease (Williams et al., 2010), HIV/AIDS (Center for Disease Control and Prevention, 2011), neurocysticercosis (Bartolini et al., 2011) and Alzheimer's disease (AD; Alzheimer's Association, 2012). In the case of AD, Hispanics tend to develop the disease at a higher rate compared to non-Hispanic whites. Additionally, compared to non-Hispanic whites, average AD onset for Latinos is at an earlier age, with more severe depression, and slower disease progression (Chin et al., 2011). The types of work that many Hispanics in the U.S. tend to perform can also lead to increased risk factors for neurological conditions, including lead-based paint exposure (car body shops), pesticide poisoning (agricultural work), and traumatic brain injury due to falls (construction; Strutt et al., 2016; Reidy et al., 1992).

Most of the aforementioned variables (e.g., low SES, low education, immigration trauma, acculturation problems, and health problems) have been associated with increased psychopathology and emotional distress (e.g., Sue & Sue, 2013). Latinos have been identified as a high-risk group for depression, anxiety, and substance abuse. The prevalence for major depressive disorder is 15% among Hispanics (Alegria et al., 2008). Even though the lifetime prevalence rate of mood disorders among of Hispanics is lower than non-Latino Caucasians

(22.3%; Alegria et al., 2008), when mood disorders are present, Hispanics tend to exhibit more severe symptoms of depression or anxiety (Kessler et al., 2005; Skilback et al., 1984). Further, Hispanics with a history of mood disorder have twice as much the risk of developing a persistent course of illness compared to non-Hispanic whites (Breslau et al., 2005). Similarly, according to Mash and Barkley (2007), 1) depressed mood is higher in Hispanic adolescents, compared to African American, Asian American and European American adolescents, independent of SES, 2) Hispanic adolescents report significantly more symptoms of depression compared to European Americans, and 3) Mexican American adolescents show higher rates of major depressive disorder compared to eight other ethnic minority groups, after controlling for age, gender, and SES. As the Latino population in the U.S. rapidly increases, it is expected that the number of Hispanics with health or emotional disorders will also increase (Cardenas et al., 2008).

It is also important to consider cultural factors that can play a role in the diagnoses and treatment of mental disorders. For example, compared to European Americans, Hispanics tend to manifest more somatic than cognitive symptoms of depression (Blaney & Millon, 2009; Myers et al., 2002). Further, the content of delusions or hallucinations in psychotic disorders tends to vary across cultural contexts (American Psychiatric Association, 2013).

Levels of acculturation and immigration stress can also influence psychiatric symptomatology among Latinos in the U.S. Many immigrants leave their countries due to economic or political pressures and have to quickly navigate and adapt to the mainstream culture, where they usually have limited financial resources or psychosocial support (Neblina, 2012). Even highly educated professionals can experience downward movement in terms of job status and employment opportunities. This can potentially lead to unemployment coupled with problems associated with ethnic or racial minority status (e.g., discrimination; APA, 2012). In

the case of low SES immigrants, the migratory experience can become a major life crisis because the unfamiliar culture, language barrier, climate changes, and loss of routine and social support can lead to significantly increased stress and/or exacerbate presenting psychopathology (Hancock, 2005). Consequently, the assessment of psychopathology in Latino immigrants should consider whether the manifestation of symptoms (e.g., depression, anxiety, post-traumatic stress, substance abuse, and conduct problems) could be related to migratory variables, including loss or disruption of family relations, social support, friendships, and self-identity; or related to sociocultural factors such as discrimination and marginalization (Neblina, 2012). Experiences that could become traumatic should be investigated and assessed within a culture-specific context, by considering economic, legal, and social factors related to ethnicity (Suzuki & Ponterotto, 2008). Moreover, psychological interventions, including neuropsychological assessment, should fully acknowledge the possible influence of language and cultural variables (AERA, APA, & NCME, 2014; APA, 2003; Judd et al., 2009). At the same time, many ethnic minorities show significant resilience and optimism that allows them to effectively cope with their difficulties; therefore, psychologists should be mindful of how these strengths could help Hispanics in clinical, employment, or educational settings (APA, 2012; Gallo et al., 2009).

Neuropsychological Assessment of Spanish Speakers

The absence of adequate cognitive assessment tools has been made readily apparent by the significant growth of the Spanish population in the United States. In this regard, clinical neuropsychology is faced with the substantial challenge of developing appropriate tools to properly assess this population in Spanish. Assessment of Spanish speakers is a complicated endeavor due to the linguistic and cultural diversity of this minority group (e.g., Hernández-Cardenache et al., 2016; Ardila, Rosselli, & Puente, 1994; Ponton & Ardila, 1999). Presently,

neuropsychology as a field has become more aware of the influence that culture can have on the assessment of cognition and more work has focused on discerning how language and cultural variables can affect neuropsychological assessment (Pedraza & Mungas, 2008; Strutt et al., 2016). Moreover, authors have investigated the influence that cultural factors can have on brain processes (e.g., Ardila, 1995; Mindt et al., 2008). According to the cross-cultural neuropsychology scientific literature, some of the main factors that have been reported to affect the performance of Hispanics in neuropsychological evaluations are: 1) language, 2) education, 3) socio-economic status, and 4) acculturation (Ardila, Rodrigues-Menendez, & Roselli, 2002; Benuto, 2013; Gasquoine, 1999; Geisinger, 2015; Hernández-Cardenache et al., 2016; Mindt et al., 2008; Puente, A. E. & Perez-Garcia, 2000; Ponton & Ardila, 1999; Strutt et al., 2016). Additionally, Puente and Puente (2009) suggested the following as some of the main challenges when assessing Spanish speakers: 1) personnel problems, 2) limited tests, 3) appropriate translations, 4) copyright issues, 5) inadequate normative samples, and 6) development of new instruments. The main aspects of these factors are discussed below.

Language

Among all of these variables, language becomes essential when focusing on multicultural assessment. Most countries in South America and Central America speak Spanish. However, there are important differences in words, phrases, and expressions depending on the country of origin (Ponton & Ardila, 1999). The same word could have different meanings in different Spanish-speaking countries (e.g., Chile, Mexico, Spain), which in turn could potentially change the meaning of a test item. For example, the English word *t-shirt* is translated as *remera* in Argentina, but in Chile it is translated *polera*. If *t-shirt* were used in a test item on a test developed for English speakers that was later translated to Spanish, a Chilean would not be

familiar with the word *remera* and an Argentinean would not be familiar with the word *polera*. When administering neuropsychological tests in Spanish, it is important to consider the country of origin of the test taker because there are considerable linguistic differences among dialects of the same language and the test items might not be sensitive to them, resulting in testing error. Bure-Reyes et al. (2013) compared the performance of Spanish speaking individuals of four different countries (Puerto Rico, Chile, Dominican Republic, and Spain) on a series of commonly used neuropsychological tests. Participants were approximately 30 from each country and they were matched in terms of age, sex, and years of education. Results showed significant differences in the Serial Learning Test and The Verbal Fluency Test depending on the country of origin, whereas no significant differences were found on visuospatial and executive tasks performances. Results suggested that differences in language or culture in each country might have contributed to testing performance, though the influence of SES, quality of education, and other confounding variables could not be ruled out.

Proficiency in the language in which the test was developed is also important to consider. Standardized tests that were not originally designed to test individuals with limited English proficiency could negatively affect the performance of Spanish speakers, by serving as a measure of language proficiency instead of the original construct (e.g., memory; AERA, APA, & NCME, 2014; Puente & Ardila, 2000; Reynolds, 2000; Suzuki & Ponterotto, 2008). Considering that 58% of Latino students score below the National Assessment of Education Progress basic level of proficiency in English (Mash & Barkley, 2006) and language proficiency exams include measures of reading ability, Hispanic children tend to be at greater risk for learning disability misdiagnoses when they are evaluated with tests in English. To overcome this issue, researchers have suggested the use of nonverbal, performance, or culture-reduced tests developed for

assessment of English-speaking populations. These types of tests include objects, symbols, or information that require minimal or no verbal processing and should be familiar to members of various cultures. However, this approach has not been effective in reducing systematic differences in test scores between minority members and European Americans (Murphy & Davidshofer, 2005), possibly because cultural factors continue to influence test performance (e.g., familiarity with item type, formalized testing environments, educational differences). For example, compared to non-Hispanic whites, Latinos underperform in nonverbal tasks as well (Ardila et al., 2010; Jacobs et al., 1997). Additionally, performance on traditional nonverbal neuropsychological tasks (e.g., processing speed, working memory, and visuoconstructional) has been shown to be affected by culture and educational attainment (Arentoft et al., 2012).

Bilingualism is another aspect of language that is important to consider when testing Latinos. It is common for the degree of Spanish or English language fluency to vary depending on the context. For example, Hispanics often use English at school or work and then use Spanish to communicate with the family or at home, making each language dominant in a particular setting and also gaining new vocabulary related to the setting. Similarly, a bilingual doctoral student in clinical psychology studying in a U.S. university may have an expert English vocabulary for psychological terms and concepts because the psychology curriculum was taught in English, but have an expert Spanish vocabulary for other areas. Based on self-report, Census data indicated that among Hispanics who are younger than 18, 36% speak only English at home, 50.9% speak English very well, and 17% speak English less than very well. In contrast, of those who are older than 18, 22.1% speak only English at home, 38.6% speak English very well, and 39.3 speak English less than very well (Brown & Patten, 2014). It follows that older groups of Hispanics tend to keep Spanish as their main language because they tend to have more

difficulties learning English or becoming fully fluent (Manuel-Dupont et al., 1992). In addition, bilingual Hispanics in the U.S. adapt words and phrases in English into their Spanish vocabulary (Spanglish). For example, the word *troca* is used for the English word *truck*, but it does not exist in Spanish. However, monolingual Spanish speakers might not understand such phrases because they are not familiar with the English language or the American culture. Additionally, such words would normally not be included in a standardized test.

To ensure testing validity with bilinguals, it is important to accurately determine the dominant language as well as the purpose of the evaluation (Ardila et al., 2000). For example, if the purpose of the evaluation is to assess for a language disorder, bilingual patients should ideally be evaluated in both languages. If the aim of the evaluation is to determine performance in a mainstream classroom, then the patients should be evaluated in English. In contrast, if the purpose of the evaluation is to determine the impact of the patients' neurological condition on their cognitive functioning, the patients should be evaluated in their preferred language (the most proficient language; Salinas et al., 2016). In a study on the effects of bilingualism on verbal learning and memory in Hispanic adults, participants were divided into groups based on their English proficiency. Nonbalanced bilinguals were more proficient in Spanish than English, while balanced bilinguals were equally proficient in both languages. Results indicated that nonbalanced bilinguals assessed in English learned fewer words overall and obtained lower retention scores compared to English speaking monolinguals (Harris et al., 1995). In a similar study that used the Stroop Test, which is a commonly used neuropsychological test of response inhibition, Roselli et al. (2002) found that there were no differences in performance when balanced bilinguals were tested in either language. However, unbalanced bilinguals performed better when the test was administered in their best-spoken language. Expanding on these results, Gasquoine et al. (2007)

assessed the performance of adult bilingual Hispanics on a neuropsychological test battery administered in English and in Spanish. Participants were divided into Spanish-dominant, balanced, and English-dominant bilingual groups. Spanish and English dominant bilinguals were significantly affected by language of administration in tests that involved more language abilities than visuospatial abilities. In contrast, language of administration did not affect the performance of balanced bilinguals. The results of these studies suggest that a bilingual individual who is dominant in a specific language will perform better if the test is administered in the language of dominance. However, balanced bilinguals seem to be able to perform similarly in both languages. Additionally, it is well documented in the literature that over the lifespan, compared to monolinguals, bilingual individuals have cognitive disadavntages in lexical access, vocabulary, and verbal fluency, whereas they have cognitive advantages in executive function, inhibitory control of attention, and cognitive reserve (Bialystok 2001; Bialystok & Craik, 2010; Craik et al., 2010).

Findings such as these underscore the importance of determining language proficiency and degree of bilingualism when assessing bilingual individuals. In this regard, the general recommendation is to utilize subjective as well objective measures to determine language proficiency (Mindt et al., 2008). Subjective measures include the clinical interview and self-reported fluency levels (Strutt et al., 2016). Useful questions to ask bilingual patients include: 1) country of origin, 2) initial language exposure and years of exposure for both languages, 3) language spoken at home, work/school, and social situations, 4) asking what language they prefer; 5) asking questions in both languages and assessing the speed, length and quality of the response; 6) determining if there is a preference for a specific language in certain situation or topic; and 6) in what language they prefer to listen to music, read books, or watch movies

(Salinas et al., 2016). Objective measures of language proficiency include vocabulary, word reading, reading comprehension, academic achievement, verbal fluency, and acculturation (Renteria, 2010). It is noteworthy, that sometimes the language that patients' report as preferred does not imply that it will also be the language that they are most proficient at. For example, a bilingual individual might report English as they preferred language because she/he is using it more often at work and with friends, but he/she might only be using Spanish at home and might have moved to the U.S a couple of years ago. In such a case objective measures of language proficiency might favor Spanish as the dominant language. For balanced bilingual individuals (fluent in both languages), a combination of English and Spanish objective and subjective measures would be the best method to determine proficiency in each language (Strutt et al., 2016). Nevertheless, there are practical limitations to thoroughly evaluating language proficiency in clinical settings, including the fact that objective measures can be very time consuming, insurance companies allow a limited number of hours for an evaluation, and professionals who are fluent in English and Spanish are scarce.

Socio Economic Status (SES) and Level of Education

A large portion of the Hispanic population in the U.S. is of low SES, which often limits access to resources, educational opportunities, and other variables that can affect performance in neuropsychological assessments. Studies on test bias and fairness in cognitive testing suggests that European Americans tend to score up to one standard deviation higher on average than minority groups and that middle and upper-class children and adults perform better on tests of cognitive ability compared to those from lower SES (Murphy & Davidshofer, 2005). Pineda et al. (2000) reported SES by itself had a significant impact on performance on the Boston Diagnostic Aphasia Examination Battery, but, not surprisingly, SES was also strongly correlated

with educational level. Multiple studies have suggested that educational level significantly influences performance in neuropsychological tests (Ardila, 1996; Ardila et al., 1994; Pineda et al., 2000; Roselli et al., 2006). Generally, fewer years of education is related to lower scores on neuropsychological tests. In line with this notion, Roselli et al. (2006) showed that Spanish speaking participants with 1 to 4 years of education and participants with mild dementia had similar Mini Mental Status Examination scores. Other studies have found similar education effects (Ostrosky-Solis & Lozano, 2006; Ostrosky-Solis et al., 2007). A possible factor that exacerbates this effect is that Spanish speakers with lower education might have less familiarity and exposure to testing procedures and conditions (Agranovich & Puente, 2007; Ardila, 1996; Puente & Agranovich, 2004; Puente & Salazar, 1998). Similar education effects have been reported in the literature regarding intelligence testing (Reynolds, 2000).

Another consideration that is relevant to educational and neuropsychological testing is that the education curriculum in Spanish speaking countries is often different from the U.S. curriculum, leading to potential differences between English and Spanish speaking students in the knowledge they have at a particular point in their education (e.g., Benuto, 2013; Geisinger, 2015). This may in turn cause disparities in test performances between Spanish and English speakers who are at a similar point in their educations. For example, tests of vocabulary often order words based on difficulty level with easier words presented earlier in the test. Test scores are typically determined based on how many items were answered correctly and administration stops after a certain number of items are administered incorrectly in a row (e.g., three or six). A main consideration in determining item difficulty is curricular (i.e., what vocabulary words are commonly known by children in the first grade). In this case, cultural differences in the language curriculum could causes significant discrepancies between the vocabulary scores of

English and Spanish speaking children on an English vocabulary test, even if that test had been expertly translated into Spanish. Another example might include curriculum differences in the information taught for courses that have stronger cultural components. In high school history, the historical figures (military, political, celebrities, etc.) discussed may vary substantially from one culture to another, so tests that include questions about important historical figures may have substantial bias. Interpretation of important historical events may also vary substantially between cultures, such that the answer to the seemingly straightforward question "Who won World War II?" could be quite different if asked of a U.S., British or Russian citizen based on what has been taught in the different educational settings of each country.

This also raises the question of educational equivalence and records. Years of education is an important variable reported in neuropsychological research and assessment. For example, it is often considered an indicator of premorbid ability level. However, real differences do exist across cultures with regard to educational attainment and curricula (Puente & Puente, 2009). In some Latin American countries, high school is sometimes more comprehensive than in the U.S. and college usually lasts five to six years instead of the standard four in the U.S. Alternatively, in Chile, for example, people go straight from high school to medical school, law school, or to study engineering or psychology to become a professional. The four years of college in between are not the norm. In sum, the diverse social, political, educational, and economic differences affecting Hispanics have to be considered for neuropsychological assessment of this minority group to be accurate (Olmedo, 1981).

Acculturation

In general terms, acculturation can be defined as the push/pull phenomena of assimilation, separation, marginalization, and integration that occur while adapting to a host or

mainstream culture (e.g., U.S.; Suzuki & Ponterotto, 2008). Notably, while Hispanic individuals' external behavior may reflect a high degree of cultural adaptation, that does not mean that they have internalized the values of the host culture (Suzuki & Ponterotto, 2008). For example, Mexican American youth whose migration history in the U.S. is generations old may seem to identify completely with American culture. Nevertheless, Mexican Americans who have lived in the U.S. for several generations usually still have values, language usage, and behaviors that are distinct from the dominant culture (Sharma & Kerl, 2002). Intergenerational differences in degrees of acculturation may also impact child-parent relationships. As time goes by children tend to rely less on the assistance of their parents to navigate the mainstream culture and parents usually understand less of their children's experiences outside of the home (APA, 2012). Further, Latino parents often rely on their children for assistance with language difficulties in different settings because the parents tend to have more difficulties learning the host culture language (Benuto, 2013; Sue & Sue, 2013). A higher degree of acculturation would suggest a better understanding of culturally loaded assessments or test items (e.g., verbal test, such as naming or vocabulary) and vice versa.

The criteria that are considered important in a particular society are reflected in the tests that are developed, but these criteria can be different depending on the culture (Puente & Puente, 2009). For example, in western societies time efficiency is considered a valuable and important quality (the faster you do a task, the better), whereas in nonwestern societies time is not considered as such an important variable. It is considered something secondary to the task, with quality of performance and results being more important (do it right, no matter how long it takes). It follows that Hispanics might have less time efficiency in certain tasks compared to westerners, resulting in lower scores in neuropsychological tests that are time limited (Puente &

Salazar, 1998). Agranovich et al. (2011) examined cultural differences in time attitudes that might affect time limiting testing. They compared the performances of Russian (n = 100) and American (n = 100) individuals on neuropsychological tests that were previously reported to be free of cultural bias and used the Culture of Time Inventory to assess time attitudes. Results showed that attitudes toward time may influence performance on time limited tests and suggested that individuals who lack familiarity with timed testing procedures tend to obtain lower scores on timed tests. Boone et al. (2007) examined the association between ethnicity, language, acculturation, and test performance in a sample of 161 patients with diverse diagnoses referred for neuropsychological evaluations. Results from a battery of common neuropsychological tests showed that, compared to non-Hispanic Caucasians, African Americans scored significantly lower on Digit Span, Trails A, Boston Naming Test, Rey-Osterrieth Complex Figure Copy, and Wisconsin Card Sorting Test categories; Asians scored significantly lower on Boston Naming Test; and Hispanics scored significantly lower on Digit Span and Boston Naming Test. Further, participants who spoke English as their first language scored significantly higher on the Digit Span, Boston Naming, and Verbal Fluency tests compared to participants who spoke English as their second language (ESL). The ESL group performed significantly better on Rey Osterrieth Complex Figure Copy trial. Boston Naming Test scores were significantly correlated with years of education, age at which conversational English was learned, and number of years in the U. S. Digit Span scores were significantly correlated with age at which conversational English was learned and FAS scores were significantly related to number of years in the U.S. The results of these studies highlight the importance of considering level of acculturation in test performance. Moreover, these findings suggest caution when using

normative data derived from Caucasian samples to measure and interpret test scores of individuals from other cultural backgrounds (Boone et al., 2007).

Testing Norms

Normative samples are crucial when interpreting the results of a neuropsychological assessment and they are particularly relevant when evaluating Hispanics or other minority groups. Sometimes it is difficult to decide which normative sample is most appropriate to use. If the purpose of the test is to determine ability or competency (e.g., cognitive problems, learning disabilities), then a normative sample reflecting country of origin or the country where the most acculturation has occurred should be used. If the purpose is to assess achievement, then a normative sample that represents the problem in question would be the most appropriate (Puente & Puente, 2009). Another issue is whether more than one normative sample should be used. If the question is to determine how patients' conditions are relative to the population where they reside, then a reference sample from the majority population should be used. However, if the purpose is to determine what capacity or what change has occurred as a consequence of disease or trauma, then a demographically corrected normative sample would be more relevant (Puente & Puente, 2009). Depending on the referral question, both samples could be used as well to make appropriate comparisons. Additionally, an important consideration for neuropsychological evaluations is that even tests with otherwise good psychometric properties may be insensitive to brain dysfunction; therefore, measures of neurocognitive functioning should be validated for use with specific clinical populations (Bello, Allen, & Mayfield, 2008). Notably, testing manuals rarely include clinical samples that are representative of minority groups. Depending on the overarching goal of the assessment, a careful decision of which norms to use should be made.

Moreover, it is important that the norms selected match the population being assessed. Considering the previously mentioned cultural variables, when the test-taker nationality does not match the country where the norms where developed, the validity of the assessment can be compromised. For example, using U.S. norms to score the results of a neuropsychological test taken by a Spanish speaker of Latin American background could yield spurious interpretations. The widespread use of Western-culture oriented tests and norms for individuals of diverse cultural backgrounds, neglecting an array of possibly interfering cultural variables, can render the results psychometrically problematic (Puente & Agranovich, 2004).

Test Development and Translations

The majority of neuropsychological assessment tools in the U.S. were developed for the dominant Western culture; therefore, minorities such as Spanish speakers might perform worse because they do not have a Western background (Puente & Agranovich, 2004). Considering the cultural specificity of behavior, most tests tend to favor individuals from the culture in which they were developed (Anastasi & Urbina, 1997). For example, an intelligence test developed for the assessment of monolingual English speakers in the U.S. will likely be more congruent with the U.S. mainstream culture and more suitable for use with that particular population. This can compromise the validity of the scores or lead to misdiagnosis of Hispanic patients. In the absence of appropriate cognitive tests, many tests developed for English speaking individuals have been used to evaluate individuals who speak Spanish. However, concerns about the validity of this process are abundant. For example, unless the examiner speaks Spanish, a translator must be used. In these cases, it may not be clear whether the translator is familiar with standardized assessment procedures; therefore, some test items, instructions, and other standardized aspects of the tests may not be maintained in the translation process (e.g., Judd et

al., 2009). Currently available neuropsychological measures were not originally developed to be used with translators, though it is common practice to use translators when other options are not available (e.g., referring to a Spanish speaking neuropsychologist).

Considering the variables previously described, even when the test administrator is fluent in Spanish concerns may arise regarding the influence that cultural factors might have on the validity of the test items. For example, a simple literal translation does not account for potential differences in the culturally based understanding of the stimuli or constructs being evaluated (AERA, APA, & NCME, 2014; Cherner, 2010). Some work in the area has focused on cultural idioms of distress, where the meaning of particular expressions of mental illnesses (e.g., anxiety) varies among cultures (Imada, 1989). Another more specific concern is whether the semantic meanings of words present in more than one culture (e.g., *depression*) are associated with the same semantic concepts. One study reported that while the word for depression is present in both English and Japanese cultures, in English culture *depression* is associated with words such as sad and lonely, but in Japanese culture *depression* is associated with words such as rain, cloud, headache, and fatigue (Tanaka-Matsumi & Marsella, 1976). These concerns suggest that cognitive tests that were developed for assessment of English speaking populations may not perform in a similar manner when translated for use in cross-cultural settings.

Regarding translations, the commonly used method of translating and back-translating tests is not sufficient for creating a completely equivalent version of the test in cross-cultural settings. Internal analysis of the validity of each item, external analysis of subtests and global scores, and comparisons of alternative forms are also necessary steps. Cultural factors need to be taken into account and conceptual equivalence should also be assessed (Cherner, 2010). Furthermore, evaluation of test items that might be biased towards minority groups is required

(Puente & Puente, 2009). Additionally, standard mainstream culture norms might be insufficient to assess minority group members unless items that represent a diverse cultural experience and normative data that matches the examinees cultural background are developed at the same time (Boone et al., 2007).

Copyright laws can become another barrier to test translations. Copyright prevents the unauthorized translation of a test, so test publishers who are not interested in translating commonly used educational and cognitive tests due to financial or other concerns cannot be compelled to do so. Thus, some tests are unavailable for cross cultural assessment purposes. Sometimes copyright permissions are granted to individuals who are interested in adapting tests for cross cultural assessment purposes. However, even in these cases obtaining copyright permission can be difficult and time consuming (Puente & Puente, 2009). Additionally, most translated tests sold in the U.S. only include English language manuals (Fernandez, Boccaccini, & Noland, 2007).

These concerns have prompted the development of a number of published guidelines designed to help when adapting tests for use in cross cultural settings. These guidelines should be considered when assessing Hispanics or developing measures in Spanish. Some of the most relevant guidelines are highlighted in the following paragraphs. In this section, only the concepts most relevant to the current project will be explained. For further details regarding these guidelines and the concepts within them please refer to the appropriate references.

Helms (1997) suggested several steps to reduce cultural bias and increase fidelity to the concept being measured in the development of new tests: 1) functional equivalence, 2) conceptual equivalence, 3) linguistic equivalence, 4) psychometric equivalence, 5) condition equivalence, 6) context equivalence, and 7) sampling equivalence. Puente and Agranovich

(2004) elaborated on these steps focusing on how they apply to neuropsychology. They suggested the following variables: 1) time, 2) attitude toward testing, 3) values and meanings, 4) modes of knowing, and 5) patterns of abilities. Regarding test publishers, some of the common problems are: 1) the economic viability of the translated product, 2) the cost and complications associated with multicultural or multinational group studies, 3) representation of subjects used in normative studies, 4) selection, training, and participation of qualified standardization personnel, and 5) marketing and eventual acceptability/use of the developed product.

The National Academy of Neuropsychology (NAN) guidelines for evaluating Hispanics encourage tests developers and publishers to use the International Test Commission's (ITC) Test Adaptation Guidelines and to specify in their manuals if their tests conform to them (Judd et al., 2009). The NAN guidelines cover the following topics: a) professional, cultural, and linguistic competence of neuropsychologists, b) psychometrics, c) interpreters, d) translators, e) language of evaluation, f) use of interpreters, g) evaluation of acculturation, h) test translation, adaptation, i) application of test norms, j) intervention issues, k) reimbursement and l) organizational issues. They also suggested goals and objectives for enhancing neuropsychological assessment services with Spanish speaking patients.

The ITC's Test Adaptation Guidelines (ITC, 2017) include: a) test development and adaptation, b) administration, and c) documentation/score interpretations. Among the test development and adaptation guidelines, the following are the most relevant: "Ensure that the translation and adaptation processes consider linguistic, psychological, and cultural differences in the intended populations through the choice of experts with relevant expertise" (ITC, 2017, P. 11); "Use appropriate translation designs and procedures to maximize the suitability of the test adaptation in the intended populations" (ITC, 2017, P. 11); "Provide evidence that the test

instructions and item content have similar meaning for all intended populations" (ITC, 2017, P. 11); "Collect pilot data on the adapted test to enable item analysis, reliability assessment and small-scale validity studies so that any necessary revisions to the adapted test can be made" (ITC, 2017, P. 11).

The Joint Committee on the Standards for Educational and Psychological Testing is a joint collaboration group that reviews and regulates the accuracy, effectiveness, and ethical concerns in testing practices. The Joint Committee was formed by the American Educational Research Association, the American Psychological Association (APA), and the National Council on Measurement in Education (AERA, APA, & NCME, 2014). The Standards outline testing practices to reduce threats to the reliability and validity of test score inferences that may arise due to language or cultural factors. They include standards for test modifications and adaptations, translations, and multiple versions of a test among others and highlight the importance of considering diversity and cultural issues in the process (AERA, APA, & NCME, 2014).

Cherner (2010) introduced the following considerations to ensure construct validity of an adapted instrument: 1) linguistic appropriateness; the words in the instructions and items of the test should be understandable by the people being evaluated, with special emphasis to achieve a translation/adaptation that is linguistically neutral and generalizable to as many variants of the language of the target population as possible, 1a) semantic/content equivalence; the meaning of stimulus items is the same in both languages (semantic), and the items relevance to each culture is preserved (content); 1b) conceptual equivalence; the items in both versions of the test are assessing the same theoretical constructs, 2) ecological validity; to be meaningful, the items being measured should be representative of the individuals experience in their culture, 2a)

cultural relevance of assessment method; familiarity with the method in which responses are to be obtained, and 2b) cultural relevance of assessment items; familiarity with the tasks or items an individual is asked to respond (the items should have practical relevance in the culture).

Cherner (2010) also suggested the following steps for test adaptation: 1) translation by expert, 2) back translation or reconciliation by another expert, 3) review for linguistic neutrality by additional native speakers, 4) implement suggested adjustments, 5) pilot-test on target group, 6) establish psychometric properties, and 7) determine population normative performance. In this process, she emphasized that translations should be conducted and reviewed by truly bilingual individuals with relevant expertise, who would be able to ascertain and discuss linguistic and conceptual equivalence and make appropiate modifications to the original translation. These guidelines or variations of them have been used before in the translation of several instruments (e.g., Functional Assessment of Cancer Therapy; SF-36 International Quality of Life Assessment). For a detailed discussion of each of these steps and concepts see Cherner (2010).

Matsumoto and Yoo (2007) also reported considerations for cross cultural assessment with a particular emphasis on emotion measurement, which are relevant to this study because of the emotional nature of the words that compose the EVLT. Consistent with recommendations outlined above, they emphasized the importance of conceptual equivalence, linguistic equivalence, and item/stimulus equivalence of measurement instruments across cultures. They also recommend the use of multicultural experts in the relevant field of study.

Additional relevant recommendations included: 1) Sampling equivalence; participants in the study should be appropriate representatives of the cultures that they are supposed to represent. 2) Empirical equivalence; requires that investigators use instruments that have research support showing that they measure the construct of interest in the culture being studied.

3) Balanced design: researchers should aim to have all judges of all cultures view emotional stimuli portrayed by members of all other cultures in the study. 4) Data Equivalence: refers to the data obtained being equivalent across the cultures being studied. Cultural response sets are important to consider in this regard. Cultural response sets are tendencies that members of a particular culture can have to use certain parts of a scale (e.g., choosing responses in the middle of the scale vs. the end points). For example, there is evidence showing that collectivistic cultures tend to be more reluctant to use the end points of a scale due to a cultural hesitation to stand out in their answers. If they are present, cultural response sets can confound comparisons between the cultures being studied. Matsumoto and Yoo (2007) also underscore the use of effect size statistics when interpreting differences in scores between two distinct cultural groups because statistical significance does not equate practical significance. 4) Dealing with nonequivalent data; it is not possible to achieve a perfectly equivalent cross-cultural study because there will always be some aspects of the comparisons that are not perfectly equivalent to each other. For cross cultural comparisons to be valid and meaningful, the measurement instruments have to be *equivalent enough*, though there is no agreed upon method to achieve *equivalent enough* level. Nevertheless, methods used should strive to reduce nonequivalence in measurements to obtain the highest degree of cross-cultural equivalence possible.

Portinga (1989) suggested the following as possible ways to deal with nonequivalent data: 1) Precluding comparisons; not to make comparisons between nonequivalent data because they would be meaningless. 2) Reducing nonequivalence in the data; identify equivalent and nonequivalent parts in the data and make comparisons only with the equivalent parts. 3) Interpret the nonequivalence; interpret nonequivalent data as an important aspect related to relevant cultural differences. 4) Ignore the nonequivalence; the authors caution against this method,

though suggest it can happen when researchers hold beliefs regarding an instrument's invariance across cultures, without the appropriate empirical support for such beliefs.

In light of these multiple guidelines and recommendations, it is apparent that the development of culturally specific or culturally unbiased assessment tools is a complicated process. In our society important decisions regarding legal, occupational, educational, and medical or psychological treatment are made based on the results of psychological assessments. Scores and interpretations can be used to determine access to services, employment, or competence to stand trial, among other uses; therefore, utilizing valid and reliable measures when assessing minorities is of paramount importance. Taking all of the above-mentioned variables into account when developing assessment instruments in Spanish makes the process a slow and difficult one. Regardless, considering the rapid growth of the Hispanic population in the U.S., translating and developing tests Spanish is needed. These guidelines and recommendations were used in the translation and adaptation process for the EVLT in the current study.

Limited Professionals and Test Availability

Currently in the U.S., there is a lack of Hispanic professionals in psychology. The American Psychological Association (APA) Survey of Psychology Health Service Providers (2008) indicated that 4% of psychologists in the U.S. are of Hispanic descent and the Doctorate Employment Survey (2007) reported that 14% of doctorate recipients in psychology are new Hispanic health service providers. Regardless of the growth of the Hispanic population, only about 1% of all U.S. psychology practitioners considered themselves Latino and approximately 83% of neuropsychologists felt unprepared to work with Hispanic individuals (Dingfelder, 2005). Echemendia et al. (1997) did the first comprehensive study that examined training and

practices in neuropsychology with Latinos in the U.S. Results indicated that 42% of neuropsychologists had assessed over 250 Hispanics in their careers. Nevertheless, most of them were not proficient in Spanish (could not read, write, or speak). Moreover, 53% of neuropsychologist used a translator with monolingual Spanish speakers, and 5% used a translator with bilingual Spanish speakers. In addition, 90% of the participants reported not having any kind of graduate training in giving neuropsychological services to culturally diverse individuals (Echemendia & Harris, 2004). These findings suggest that there is a gap between the rapid growth of the Hispanic population in the U.S. and the development of proper neuropsychological training and practices with Spanish speakers.

There is also a limited number of neuropsychological tests officially sold by publishers in Spanish in the U.S. Camara, Nathan, and Puente (2000) surveyed neuropsychologists and psychologists in order to determine test usage and multicultural practices at the time. According to their findings, of the top 100 most used tests, none were originally in Spanish and only a few were available in Spanish (e.g., Wechsler Adult Intelligence Scale, Beck Depression Inventory). Results also showed that direct verbatim translations were used more often than culturally adapted translations and the norms used to interpret the tests did not typically match the population being assessed (Camara, Nathan, & Puente, 2000). Another survey conducted in 2012 with members of the Hispanic Neuropsychological Society (HNS) showed that there are significantly fewer tests available in Spanish (555 out of 3500) compared to English. Of the ones available only 25 to 50 are used frequently and most of the frequently used neuropsychological tests do not have norms that were developed for Spanish speakers (Puente et al., 2015).

Since Camara et al. (2000), a number of test usage studies in cross cultural settings have been published (e.g., Lazarus & Puente, 2009; Muniz et al., 2011; Rabin et al., 2005; Renteria,

2010; Salazar et al., 2007), and most of them have yielded similar results. However, they also have shown an emerging trend of new measures for Spanish speakers that have been developed or adapted from the original English versions. In the past two decades considerable effort has been made to develop more valid assessment tools for Spanish speakers (Benuto, 2013), including neuropsychological batteries to assess Spanish speakers, such as NEUROPSI – Attention and Memory (Ostrosky-Solis et al., 2007) or the Neuropsychological Screening Battery for Hispanics (Ponton et al., 2000) and some large scale projects such as the Spanish and English Neuropsychological Assessment Scales (Mungas et al., 2004) or NEURONORMA (Pena Casanova et al., 2009). For useful resources that describe tests that are currently available for Hispanics in the U.S., see Leany, Benuto, and Thaler (2013), Curiel et al. (2016), or Schlueter et al. (2013).

Verbal Learning Tests in Spanish

Memory assessment is a core component of modern day neuropsychological assessments (Zillmer et al., 2008). Tests that assess learning and memory for verbal and visual information are now commonly used to assist in diagnosis and rehabilitation planning, to track the course of deterioration or recovery, and to monitor patient responses to behavioral and pharmacological interventions. Generally, verbal learning tests consist of presenting a list of words or a story that the patient must immediately remember (repeat). Most tests offer 3 to 5 learning trials, a distraction trial, a delayed recall trial (remembering the word list after 20 to 30 minutes), and a recognition trial (recognizing the original words among a set of distractor words). There are several different verbal learning tests that have been either translated or developed in Spanish. One of the first verbal learning tests developed in Spanish was the Spanish Verbal Learning Test (Ardila et al., 1994; Harris et al., 1995); however, its normative data are limited. This test was

designed with a similar format as the California Verbal Learning Test, 2nd Ed. (CVLT-II, Delis et al., 2000), which is one of the most commonly used verbal learning tests in English. Since the development of the Spanish Verbal Learning Test, a few other Spanish versions of the CVLT-II (Jacobs et al., 1997; Benedet & Alejandre, 1998) have been developed. However, most of them also offer limited or geographically restricted norming samples. More recently, the Hopkins Verbal Learning Test (HVLT) was translated to Spanish and norms were developed for the Texas/Mexico border area (Cherner et al., 2007). Similarly, the Spanish English Verbal Learning Test (SEVLT) is another test that was developed to assess Spanish speaking adults, predominantly of Mexican origin (Gonzales et al., 2001). The Spanish version of the HVLT and the SEVLT have relatively large norming samples and appropriate psychometric properties. Notably, the SEVLT has both English and Spanish versions that were developed concurrently to be equivalent and normative data for both English and Spanish speakers. The Selective Reminding Test (Buschke, 1973) has also been adapted to Spanish with a moderately large norming sample (Campo & Morales, 2004). Additional verbal learning tests can be found as subtests of neuropsychological batteries that have been developed to assess Spanish speakers, such as Bateria Neuropsycologica en Español (Artiola i Fortuny et al., 1999), the Bateria - III Woodcock-Muñoz (Muñoz-Sandoval et al., 2005) and NEUROPSI-Attention and Memory (Ostrosky-Solis et al., 2007).

It is important to consider that available tests do not always accommodate the needs of clinicians and researchers (Lezak, 2012). The evaluation of emotional memory is an example of this issue, specifically with Spanish speakers. An emotional verbal learning component is absent in all of the currently available verbal learning tests in Spanish. Further, there are no studies in the literature using an emotional verbal learning test with Spanish speaking participants.

Moreover, a vast amount of research in the affective neurosciences suggests that emotional memory should be included in neuropsychological tests because there are different neural substrates associated with processing emotional information and there are performance differences when comparing neutral stimulus and emotionally laden stimuli in learning tasks (Straus & Allen, 2013b).

Given the scarce availability of adequate neurocognitive tests for Spanish speaking individuals, the current study is designed to partially address this matter by adapting a verbal list learning test, the EVLT, for use with Spanish speakers. The EVLT is an excellent candidate for adaptation because it provides a reliable and valid means to assess learning and memory, includes content that taps into emotion processing abnormalities often present in individuals who are referred for memory assessment, provides a means to examine how state and trait emotion ratings may influence memory processing, and appears to be the only test that would be available for the evaluation of emotional verbal learning and memory (including repeated and delayed trials) in individuals who speak Spanish. In the following sections, more information is provided regarding memory and social cognitive abilities, as well as the development, format, and psychometric properties of the EVLT. Emotional memory/processing is an aspect of social cognition; therefore, a description of social cognition follows in the next section.

Social Cognition and Emotion Memory: A Brief Overview

Memory for emotional words is encompassed by the broader term *social cognition*. A National Institute of Mental Health workshop defined social cognition as "the mental operations that underlie social interactions, including perceiving, interpreting, and generating responses to the intentions, dispositions, and behavior of others." (p. 1211; Green et al., 2008). In social psychology and affective neuroscience, there is a growing research literature on social cognition,

including studies with normal individuals as well as multiple clinical populations (e.g., Cusi et al., 2012; Henry et al., 2014; Pelphrey et al., 2011). Development of tests such as the EVLT help meet the growing need for instruments that can be used to assess various aspects of social cognitive processes in both research and clinical settings.

As suggested by Green et al. (2008) definition, social cognition is a multicomponent construct that is composed of various social cognitive processes or domains. Subsequently, a group of experts in the Social Cognition Psychometric Evaluation study (Pinkham et al., 2014) tasked with identifying the major social cognition domains identified the following four main domains: theory of mind, attributional style, social knowledge and perception, and emotion recognition and processing. Of these four domains, the EVLT is considered to assess aspects of emotion processing related to learning and memory (Strauss & Allen, 2013b). Emotion processing refers to the perception and use of emotional information; it involves recognizing emotions, understanding emotions, and managing emotions (Green et al., 2008; Pinkham et al., 2014). Some view emotion recognition and processing as a more basic social cognitive ability that is required for higher order abilities, such as theory of mind (ToM), social perception, and attributional style. ToM refers to the ability to infer intentions, beliefs, knowledge, and desires of other people and it is crucial in explaining and predicting others behaviors (Green et al., 2008; Pinkham et al., 2014). A further distinction are the terms *cognitive ToM*, which refers to the ability to understand the thoughts of another individual, and *affective ToM*, which refers to the ability to understand the emotions of another individual. Emotion perception and processing are crucial for understanding the emotions of others.

Attributional style can be broadly defined as the manner in which people infer the causes of interactions with others or social events (Pinkham, 2014). Internal attributions occur when

people believe that they are the cause of an event, whereas external attributions occur when people believe that the cause of an event is other than themselves (situational; McCleery et al., 2014). Impaired emotion perception and processing can negatively impact attribution in a number of ways. For example, incorrect identification of another's affect (angry instead of sad) will significantly influence the attribution one makes and the subsequent interaction. Social knowledge and perception encompasses the interpretation of rules, roles, and context in social situations (Green et al., 2008). It also refers to the ability to make judgements about individual traits based on verbal and nonverbal cues, and inferences about social situations (Savla et al., 2013). Emotion perception and processing also plays a key role here because much of the information that guides social interactions is affective in nature. Thus, the EVLT provides a means for examining the aspects of emotion perception and processing that rely on learning and memory systems. Social cognition as defined by the four domains mentioned above has mostly been studied in individuals with schizophrenia (e.g., Ochsner, 2008) and autism (e.g., Sinzig et al., 2008).

Another consideration when the EVLT was developed, was that research has suggested that neurocognition and social cognition represent related but separable domains. For example, studies have shown correlations between theory of mind and various neurocognitive domains including verbal learning and reasoning, memory, executive functioning, and intellectual functioning (e.g., Bertrand et al., 2007; Brune, 2003; Koelkebeck et al., 2010; Greig et al., 2004). Similarly, the ability to perceive emotions has been associated with attention, memory, and aspects of early visual processing (e.g., Bryson et al., 1997; Kee et al., 1998; Sergi & Green, 2003). These findings suggest that neurocognitive abilities can affect or influence aspects of

social cognition and some authors have suggested that healthy neurocognition is a necessary precursor for healthy social cognition (e.g., Ostrum, 1984; Penn et al., 1997).

However, there is also a considerable amount of research suggesting that social cognition and neurocognition should be considered as separate constructs. Results of several studies using factor analysis (e.g. Allen et al., 2007), principle component analysis (Williams et al., 2008), and structural equation modeling (Vauth et al., 2004) showed that social cognition and neurocognition are distinct constructs that load on different factors/components. A review of nine studies on this subject found that 8 of them identified social cognition and neurocognition as statistically separable constructs (Mehta et al., 2013). In addition, social cognition seems to be uniquely and strongly related to functional capacity in studies with clinical populations (e.g., Mancuso et al., 2011; Meyer & Kurtz, 2009). Thus, neurocognition and social cognition seem to account for unique variance in functional ability, suggesting that they are separate constructs (Pijnenborg et al., 2009; Fett et al., 2011).

A primary motivation for developing the EVLT was this literature that suggests social cognition and neurocognitive are associated but separable domains. The EVLT was designed to allow for concurrent evaluation of both neurocognition and social cognition (as related to emotion recognition and processing). As such, scores can be obtained for standard non-emotional memory processes (e.g., learning curve, primacy/recency, interference) as well as emotional memory processes (e.g., emotion category words recalled, mood congruent memory effects, emotion recall bias, state/trait emotional experience). This feature of the EVLT was thought to support its application in clinical and research settings.

Emotion, Memory, and the EVLT

More specific rationales for the development of the EVLT were based on the several lines of research from the field of affective neuroscience. This research speaks to why neuropsychological tests of emotional memory are needed in addition to traditional non-emotional list learning tasks including unique effects of emotional information on encoding and retrieval, emotion related proactive and retroactive interference, facilitation of learning, mood congruency effects, and preferential processing. The EVLT was designed to satisfy this need. The EVLT allows for an assessment of various learning and memory processes in relation to emotional stimuli from four specific emotion categories (happiness, sadness, anger, and anxiety). These emotional categories were selected because they are commonly disrupted in neuropsychiatric disorders, and when coupled with the EVLT's measures of state and trait emotional experience, the various test scores may be useful predictors of deficits seen in neuropsychiatric conditions. A test with these characteristics currently does not exist in Spanish and the emotional verbal learning literature with Hispanics is scarce. The following section elaborates on the differences in learning and memory for emotional and non-emotional information and provides relevant background information for the rationale in the development of the EVLT (for detailed review see Strauss & Allen, 2013b supplemental material).

Emotions can modulate memory formation and retrieval, with both enhancements and impairments possible (e.g., Allen et al., 2005; Dolan, 2002; McGaugh et al., 2013; Nielsen, et al., 2005). Additionally, different neural circuits are thought to underlie memory for neutral stimuli and memory for high emotional arousal stimuli (Lisman & Grace, 2005; Packard & Cahill, 2001). The midbrain-striatal reward system (ventral stratium, substantia nigra/ventral tegmental area and hippocampus activation) has been associated with reward learning anticipation, while

amygdala-hippocampal coactivation during the encoding of emotional stimuli has been associated with enhanced memory related to emotional arousal (Hamann et al., 1999; Wittmann et al., 2008; McGaugh, 2004). Furthermore, impairments in emotional memory may predict pathology and symptoms not associated with impairments in non-emotional memory (Dere et al., 2010).

Similar to how semantic content facilitates encoding of semantically similar neutral stimuli, there are data that suggest that the emotional content of words may also facilitate learning (Doerksen & Shimamura, 2001; Siddiqui & Unsworth, 2011). Bower (1981, 1991), in his seminal work, introduced the idea that emotions impose an organizational structure on information that has been encoded and organized in memory (the associative semantic network theory of emotion). Single emotions like happiness, sadness, and anger are thought to be depicted by unique nodes within a cognitive network of related memories. When people are feeling a particular emotional state, a mood congruent node becomes activated. This activation propagates the associative semantic network and facilitates encoding and retrieval of emotional information that is congruent with that emotional state (Strauss & Allen, 2013b). This suggests that affective content can facilitate the encoding of words representing related emotional categories (Doerksen & Shimamura, 2001; Siddiqui & Unsworth, 2011), similar to how semantic clustering strategies facilitate recall of neutral words (semantic relatedness).

Moreover, studies have reported that people are better at remembering positive information when they are in a positive mood. Likewise, their memory for negative information improves when they are in a negative mood, supporting the prevalence of mood-congruent memory effects (for reviews, see Blaney, 1986; Rusting, 1998). Neuroimaging studies have provided further support for the semantic network and mood-congruent memory models, with

brain activity associated with positive valence observed in areas such as the subgenual cingulate and activity related to negative valence in the posteriolateral orbitofrontal cortex (Lewis & Critchley, 2003; Lewis et al., 2005). Nevertheless, there is also evidence that people in high negative mood states preferentially encode and retrieve positive, rather than negative, information (Erber & Erber, 1994; Parrott & Sabini, 1990; Rinck et al., 1992). This is referred to as mood-incongruent memory and is thought to happen when individuals encode and retrieve positive information as a method of down-regulating their negative emotions (as an emotion regulation process; Rusting & DeHeart, 2000; Parrott & Sabini, 1990; Singer & Salovey, 1988). Additionally, mood congruent and incongruent memory are thought to a play a role in the etiology and maintenance of neuropsychiatric disorders. For example, depressed patients show a tendency to recall negative experiences with more ease and to show preferential encoding for negative stimuli compared to positive (e.g., Abramson et al., 1978; Bazin et al., 1996; Bradley et al., 1995; Tarsia et al., 2003).

Emotional stimuli can also have particular effects on proactive and retroactive interference when remembering material. Research on emotion and interference highlights the relevance of investigating how the activation of emotion-specific associative semantic networks affects the encoding and retrieval of subsequent emotional information (Straus & Allen, 2013b). These effects may be predictive of psychopathology such as depression and anxiety (Ferraro & King, 2004). For example, depressed patients show preferential access to mood congruent negative cognitions (e.g., Bradley et al., 1995; Seligman, 1984). When testing depressed patients, if a semantic network related to sadness is activated early in the test (trial one), this might in interfere with the encoding of items related to happiness later in the test (trial five).

In addition, research suggests that there are individual differences in the preferential processing of emotional information, and that such differences predict demographic factors and clinical symptoms (Straus & Allen, 2013b). For example, several studies have demonstrated that when verbal learning is tested using a heterogeneous word list consisting of positive, negative, and neutral stimuli, or separate homogeneous word lists, normal controls usually recall and recognize positive stimuli as opposed to negative or neutral stimuli (e.g., Amster, 1964; Colombel, 2000; Hayward & Strongman, 1987; Libkuman et al.,, 2004; Lishman, 1972; Phelps et al., 1997; Rychlak & Saluri, 1973), and this effect tends to increase with age (Mather & Carstensen, 2005). Preferential processing of specific types of emotional stimuli also occurs in psychiatric disorders when the stimuli are related to symptoms, current mood state, or unique preoccupations (Strauss & Allen, 2013). For example, anxiety disorder patients preferentially process threat over other types of stimuli (Coles & Heimberg, 2002; Mathews et al., 1996 Williams et al., 1996). Studies with individuals with neuropsychiatric disorders have reported preferential recall or recognition for specific types of emotional stimuli, or a higher percentage of memory errors for emotional stimuli (Howe & Malone, 2011; Jermann et al., 2009). For example, patients with major depressive disorder have been found to have significantly better recall for negative words (Bradley et al., 1995; Denny & Hunt, 1992; Watkins, 2002). In addition, these patients are unable to exclude irrelevant negative information from working memory (Levens & Gotlib, 2009). It is noteworthy that most studies on psychopathology and preferential processing have focused on emotion-attention interactions, instead of emotion-memory interactions (Strauss & Allen, 2013b). This is not surprising considering the scarcity of memory tests that measure the preferential processing of emotional stimuli compared to the

greater availability of tasks designed to examine the effects of emotion on attention (e.g., Emotional Stroop, Strauss et al., 2005; Attentional Blink task; Anderson, 2005).

A number of studies have also shown that the emotional intensity of a stimulus can exert unique effects on encoding and retrieval, with more intense stimuli resulting in higher rates of recall and recognition compared to less intense stimuli (e.g., Blake et al., 2001; Labar & Phelps, 1998; Maddock & Frein, 2009). A possible explanation for this effect is that emotional stimuli enhance attention to item-level details during encoding, which facilitates recall later (for reviews see Levine & Edelstein, 2009; Yiend, 2010). Higher emotional intensity in the stimuli have been reported to enhance short and long-term memory (Anderson et al., 2006; Talmi et al., 2007). Considering that pleasant stimuli tend be less intense than unpleasant stimuli (Bradley et al., 2001; Bradley & Lang, 2000), the effects of emotional intensity on memory performance are relevant to the development of assessment tools that aim to measure emotional memory.

In sum, the EVLT was developed to incorporate the abovementioned emotional memory process as they relate to verbal learning and memory. The social cognitive domain assessed by the EVLT is primarily emotion processing as it relates to the acquisition, storage and retrieval of emotionally valenced information including the examination of preferential processing, mood congruent effects, semantic emotional networks, and proactive and retroactive interference (Strauss & Allen, 2013b). Additional information regarding the rationale, structure, and development of the EVLT is provided in the following section.

The Emotional Verbal Learning Test (EVLT)

Rationale and test format. The EVLT (Strauss & Allen, 2013) was developed to evaluate emotional aspects of learning and memory in clinical and research settings. The general aim was to incorporate more recent findings from cognitive and affective neuroscience research

on memory and evaluate a clinical population where differences in memory for specific emotional words might be expected (e.g., individuals with schizophrenia; Strauss & Allen, 2013).

During the test development process, previously mentioned, recent developments in the field of emotion research were considered in order to guide test development. The resulting measure included emotional words selected to represent four specific emotions that are commonly dysregulated in neuropsychiatric disorders. The EVLT's format is similar to the previously mentioned verbal learning tests (e.g., Rey Auditory Verbal Learning Test, RAVLT; Rey, 1964; CVLT-II) in that it assesses learning and emotional memory through multiple presentations and recall of a single word list. It also includes interference, delayed, and recognition trials. What makes the EVLT unique is that the target list is composed of emotional words selected from specific emotional categories (happiness, sadness, anger, and anxiety). The test was designed to allow for assessment of various learning and memory processes in relation to these four emotion conditions, including processes such as encoding, retrieval, and retroactive and proactive interference. In addition, Likert ratings assessing state and trait emotional experience (including the emotion category disgust) were incorporated, which, when combined with the ability to examine various memory processes, may provide useful information on emotion processing for individuals with neurologic and psychiatric disorders (Strauss & Allen, 2013).

Unlike traditional verbal learning measures, the EVLT provides information regarding preferential processing of emotional content. For example, EVLT scores can be calculated for recall of an individual emotion type in any of the trials of the test. Additionally, emotion clustering scores provide information regarding whether the similarity of emotional words

enhances the consecutive recall of words of a specific emotion category. Furthermore, analysis of error scores could provide meaningful information related to individual differences in emotion processing. For example, repetitions or intrusions could lead to inferences regarding an individual's emotional preoccupations or false memories. Lastly, state and trait ratings provide information regarding self-reported emotional experience, which allows researchers or clinicians to characterize individuals and to analyze mood-congruent and incongruent memory effects in conjunction with recall and recognition scores (Strauss & Allen, 2013, 2013b). For example, if the EVLT is administered to patients suffering from generalized anxiety disorder, it would be expected that they report higher state and trait rating for the anxiety emotion category. These ratings then could be examined in relation to the number of anxiety words vs. other emotion categories recalled during learning trails, recall, and recognition sections of the test.

The emotional words that comprise the word lists of the EVLT were selected from the Strauss and Allen (2008) emotional word norms study, which included 484 words that were normed for emotional intensity and categorization on 200 college students and community members. Words included in the EVLT were identified as being highly representative of their designated emotional category (categorization rate of 70% or greater; Strauss & Allen, 2008; Strauss & Allen, 2013). Further, words composing each emotion category on the target list were equated for emotion intensity, word frequency, and word length (Strauss & Allen, 2013b). Moderately high intensity emotional words were selected over less intense words or extremely intense words because very high arousal stimuli can have detrimental or enhancing effects on memory and low arousal stimuli are typically not superior to neutral stimuli (Mather, 2009).

Psychometric support. There is good evidence supporting the reliability and validity of the EVLT when used to assess emotional verbal learning and memory in normal and clinical

populations. Regarding reliability, the primary internal consistency estimate (split half reliability with Spearman Brown formula for immediate learning trials one to five) was excellent (r = .96), and comparable to that of long standing non-emotional list learning tasks (e.g., RAVLT, CVLT-II)**.** Additional internal consistency estimates related to consistency within emotion categories (r = .84) and test-retest reliability (r = .79) estimates were also high and comparable to non-emotional learning and memory tests (Strauss & Allen, 2013).

There are also a number of sources of validity evidence for EVLT test scores. The EVLT was administered to a sample of 329 healthy participants, along with a battery of neuropsychological tests. Participants were recruited from a southwestern university and from the community. Students were compensated with class credit and community participants received monetary compensation for their participation. Results indicated that they remembered more words from the happiness category than sadness, anger, or anxiety. This preference for happiness words was displayed on the majority of learning and memory trials and is consistent with much of the literature on emotional memory in healthy individuals (Strauss & Allen, 2013).

Principal components analysis elucidated a seven-factor solution, which suggested that there were individual long-term memory factors for each of the four target list emotion categories, as well as two short-term memory factors and a recognition factor. These findings support the factorial validity of the EVLT because they identify memory factors corresponding to the emotion categories, suggesting the EVLT words are grouped based on emotion. They also provide evidence for factors commonly identified in other memory tests, including short term memory and recognition factors. In terms of convergent validity, most EVLT scores were significantly correlated with the (CVLT-II; Delis et al., 2000) scores, supporting the notion that the EVLT is a valid measure of learning and memory. Nevertheless, these correlations were

weak to moderate (.27 to .50), suggesting that the EVLT is also measuring another construct (e.g., emotional learning and memory; Strauss & Allen, 2013). The EVLT's self-report emotional experience ratings also showed appropriate convergent validity with the Positive and Negative Affect Schedule (PANAS) trait scores. EVLT happiness ratings (state = .24 and trait =.25) were significantly correlated with PANAS positive affect trait scores, whereas EVLT sadness, anger, and disgust state and trait ratings were significantly correlated with PANAS negative affect trait scores (.26 to .45; Strauss & Allen, 2013).

Scores on the EVLT were generally lower than those of the CVLT-II, suggesting that the EVLT may be a more difficult test. However, previous research has shown that neutral stimuli are better recalled than emotional stimuli when the neutral list is comprised of words that are semantically related (e.g., Talmi & Moscovitch, 2004) like in the CVLT-II. Consequently, because the EVLT words were related according to emotional rather than semantic content, this may have affected memory encoding in a unique way, providing further evidence for the uniqueness of the EVLT (Strauss & Allen, 2013).

The EVLT was also administered to a sample of schizophrenia patients and demographically matched controls. Individuals with schizophrenia scored lower across trials on both the CVLT-II and EVLT compared to controls. This was consistent with previous studies, and not surprising considering that schizophrenia patients often present with episodic memory difficulties. Nevertheless, rates of learning new information were different in the control and patient groups. Comparing the learning curves of CVLT-II and EVLT in the schizophrenia patients indicated a diminished ability to learn emotional information. Moreover, greater severity of clinically rated negative symptoms was significantly correlated with poorer emotional recall (Strauss & Allen, 2013). These findings provided further evidence for the validity of the measure

in clinical settings and highlighted possible clinical uses. For example, EVLT scores predicted clinically rated negative symptoms (e.g., anhedonia, restricted affect), while the CVLT did not, suggesting that the EVLT is sensitive to detecting affective dysfunction.

Purpose of the Current Study

As mentioned earlier in this manuscript, Hispanics are affected by both neurological and psychiatric conditions that may impact emotional processing, though currently there are no tests available to assess emotional learning and memory. Considering the prevalence of low SES and mental illness in the Hispanic population in the U.S., a Spanish version of the EVLT could be relevant for both research and clinical applications. Like the EVLT, the Emotional Verbal Learning Test - Spanish (EVLT-S) allows for the examination of traditional verbal learning and memory scores, preferential processing of specific emotional content, and state and trait emotional ratings. These scores may be valuable predictors of common psychiatric disorders and impaired emotional memory processes among Hispanics. A Spanish version of the EVLT is a step forward to better serve this population and in particular address memory disturbances in patients suffering from emotional and affective disorders. Therefore, the current study focused on translating the EVLT to Spanish, evaluating the equivalence of the Spanish and English versions, and preliminarily evaluating its psychometric properties.

The EVLT was translated with careful consideration of validity issues and differential item functioning that might be influenced by culture. In this process the previously mentioned cultural factors (e.g., acculturation, language proficiency) and guidelines for translation were considered. Then, the translated version was administered to a Spanish speaking sample to examine its applicability, its equivalence with the English version, and its psychometric properties.

A Spanish translation of an emotional verbal learning test has not been previously accomplished and offers an avenue to study cultural differences affecting emotional memory processes. Findings provided insights into whether common trends of emotional verbal learning in monolingual English speaking individuals, such as better memory for positive words, are also evident in Spanish speaking individuals.

The current study required a number of procedures to translate the EVLT to Spanish and examine its equivalence, reliability, and validity. The method section is structured to reflect these procedures including: 1) Phase I: translating the EVLT to Spanish, 2) Phase II: administering the EVLT and the EVLT-S to a pilot sample of participants, and 3) Phase III: evaluation of the reliability and validity of the EVLT-S.

CHAPTER 3

METHODOLOGY, RESULTS, AND DISCUSSIONS

Phase I: Translation of the EVLT

Method

The EVLT was translated to Spanish following the above-mentioned translation steps according to the cross-cultural neuropsychology scientific literature (e.g., Cherner, 2010), the Standards for Educational and Psychological Testing (AERA, APA, & NCME, 2014), and the International Testing Guidelines (ITC, 2017). The aim was to create a Spanish version that could be understood by Spanish speakers of diverse cultural origins by selecting words that are understood across the major Spanish dialects. Individuals from a variety of Spanish speaking countries with different levels of psychology expertise were purposely selected to be involved in the translation process in order to assure that the final translation was broadly representative of Spanish speakers from different countries. In this section, bilingual refers to an individual that speaks Spanish and English unless otherwise specified.

We used a number of steps in the translation process to assure that the final translation was semantically and conceptually equivalent to the English version of the EVLT. First, the primary author and another clinical psychologist in training with considerable experience working with Hispanic clients translated the entire EVLT (instructions and word lists). The primary author is from Chile and the other translator is from Mexico with first degree relatives from Spain and Mexico. Both of them have master's degrees in clinical psychology and are currently working on obtaining their doctoral degrees. Another independent translator, with experience in clinical psychology and neuropsychology, back translated the test to English. The person that did the back translation is a clinical neuropsychologist from Puerto Rico that is

practicing in San Juan. All of them were fluent in Spanish, native Spanish speakers, and had experience providing clinical and assessment services with Spanish speakers. Two of them have specific expertise in clinical neuropsychology. Additionally, the EVLT original word lists (without the instructions) were sent via e-mail to the following individuals to acquire alternate versions of possible translations. A bilingual lawyer from Chile (native Spanish speaker), a bilingual journalist from Chile (native Spanish speaker), a medical doctor from Chile (native Spanish speaker), a licensed counselor from Honduras (balanced bilingual capable of providing clinical services in both languages), and five bilingual undergraduate students with Mexican and Cuban cultural background that were balanced bilinguals based on self-report. Moreover, Google Translate was used as an additional translator for the EVLT word lists.

After receiving all the translations, three translators served as an expert panel to evaluate the translations and resolve any discrepancies among the different translations. Two of these experts were described above and were from Chile (primary author) and Mexico/Spain. They were fluent in English and Spanish and had specific expertise in clinical psychology/neuropsychology. The international testing guidelines (ITC) were used to determine expertise. According to ITC: “Our definition of an "expert", then, is a person or a team with sufficient combined knowledge of (1) the languages involved, (2) the cultures, (3) the content of the test, and (4) general principles of testing, to produce a professional quality translation/adaptation of a test.” (International Testing Guidelines, 2011, p. 11). The various translations were initially examined separately by the two experts to identify discrepancies in translations. Once these reviews were completed the experts met together to resolve the discrepancies. During this process the first priority was conceptual equivalence of the words including cultural appropriateness, then semantic equivalence, and then frequency of usage.

When discrepancies in the translations could not be resolved by the two experts, a third expert was consulted: a bilingual professor and clinical neuropsychologist from Cuba, who provides clinical services in English and Spanish in North Carolina and has extensive background in cross-cultural neuropsychological research.

The experts discussed the different translations to identify which words were conceptually and semantically equivalent to the original English words and instructions and also to ensure to the best of their ability that the language used was simple and neutral so that it could be understood by Hispanics from diverse cultural backgrounds. For example, care was taken to avoid slang terms or idiosyncratic words. Further, the experts were aware that some of the original English words did not have a literal translation to Spanish (e.g., *uneasy, hopeless, gloom*) that corresponded to an emotional category, while others had more than one appropriate literal translation (e.g., angry, mad, joy). For example, possible direct literal translations for *gloom* and *uneasy* would be *penumbra* and *dificil* respectively. In Spanish penumbra refers more to darkness than sadness and *dificil* refers to difficult (not easy) rather than anxiety. Primary emphasis was given to identification of an appropriate word that was representative of the intended emotion category in Spanish, with secondary emphasis on identifying a Spanish word similar in meaning to the original English word.

When a word had more than one possible appropriate translation, the experts discussed which translation would be more appropriate and easily understood by Spanish speakers from diverse cultures. For example, *angry* can be translated to *enojado* or *enfadado*. In cases like this, the goal was to achieve the translation that would be the easiest to understand by Spanish speakers of different countries. Frequency of usage was determined by the subjective judgements

of the experts and referring to the Spanish oral word frequency list provided by Alonso et al. (2011).

Once the final translation for the EVLT word lists was completed, the words in the target list were sent via e-mail to eight different bilingual individuals, who provided similarity ratings for each pair of English and Spanish words. The raters were instructed to rate the word pairs in terms of similarity of word meaning across languages using the following 4-point scale: 1 = Highly Dissimilar, 2 = Dissimilar, 3 = Similar, and 4 = Highly similar. To be included in the EVLT-S the average similarity rating for the English and Spanish words had to be three to four using this scale. The raters selected were from diverse Spanish speaking countries (Chile, Mexico, Spain, Cuba) to reduce language bias towards Spanish speakers of a certain country or cultural background.

Results

Translations. Translation and back translation of the EVLT resulted in three possible Spanish versions of the complete test. Further, the translations of the word lists without the instructions resulted in 10 possible translations of the target list by itself. We compared these translations to each other and resolved discrepancies among the experts using the above-mentioned procedures. As expected there were differences in the translations of *gloom*, with most translators translating the word to a Spanish word related to sadness, but others to a Spanish word related to darkness or low light. Because in Spanish the words related to darkness (e.g., *oscuridad*) do not necessarily relate to a feeling of sadness, we decided to use the word *melancolia* instead, even though its direct translation to English is *melancholy*. We agreed that *melancolia* would be a word easily categorized as representing sadness across different Spanish speaking countries with a similar emotional meaning to *gloom* in English.

As previously mentioned, *uneasy* does not have a direct translation to Spanish that relates to anxiety. The most common translations that were provided by the translators were *intranquilo* and *inquieto*, which are synonyms in Spanish. We decided to include *intranquilo* on the target list and *inquieto* on the interference list because *intranquilo* was thought to be more clearly related to anxiety, whereas *inquieto* – even though it should be typically related to anxiety – could also be interpreted as related to hyperactivity more so than *intranquilo*.

Mad is another word that has more than one possible translation. For example, one translator translated the word as *loco*, which means *crazy* in English. This was not an unusual translation considering that depending on the context *mad* can refer to *crazy* in English as well. However, most translators provided words related to anger, such as *enojado* (*angry*), *furioso* (*infuriated*), or *rabioso* (*enraged*). We decided to use *furioso* as the Spanish translation, because *enojado* was already paired with angry. Additionally, the we agreed that *furioso* represents a level of anger in Spanish that is more similar to the level of anger represented by *mad* in English compared to other possible translations, even though a more direct translation of *furioso* to English would be *infuriated.*

Joy also has multiple possible translations to Spanish; however, the most common translation was *alegria*, which can also mean *happiness* in English. We decided that *alegria* would be appropriate because it is a commonly used Spanish word across different countries. The rest of the original EVLT words had clearer direct translations to Spanish that represented the intended emotional categories and there were no discrepancies among the panel of experts that would require an explanation here. For example, *honor* was translated to *honor* in Spanish, *love* was translated to *amor*, and *glory* to *gloria*.

Another issue that had to be resolved during the translation process was that in Spanish adjectives such as *nervous* (*nervioso*) have different word endings depending if they are referring to a male or a female individual. *Nervioso* refers to a male being *nervous*, while *nerviosa* refers to a female being *nervous*. An option to eliminate this linguistic difference was to use *nerves* or *nervousness* (*nervios* or *nerviosismo*) in Spanish. However, it was not possible to apply this solution to all the words because there is no appropriate gender-neutral translation for *enemy* that clearly relates to the emotion category *anger*. The other problem was that using gender neutral words in Spanish would result in translated words more dissimilar to the originals and would interfere with the instructions of the cued recall part of the test. For example, in English *angry* is used in the target list and later the examinee is asked to provide the words that she or he remembers related to *anger*. If *enojo* were to be used in the target list instead of *enojado/a* in the EVLT-S, then *enojo* could not be used in the instructions of the cued recall section and would have to be replaced by another anger word resulting in more differences between the Spanish and English versions. On the other hand, the problem with using feminine and masculine adjectives in Spanish is that the original stimuli would have to change depending on the gender of the examinee. Considering these problems, we consulted with the additional expert and the original author of the EVLT and together decided to use the feminine and masculine versions in Spanish according to the examinee's gender. For example, if the examinee is female then the examiner has to say *nerviosa*, but if the examinee is male, then the examiner has to say *nervioso*. If the examinee is of another sexual orientation, then the examiner should ask politely how the examinee would prefer to be addressed. Regardless of the gender of the examinee, answers in the feminine or masculine form in Spanish are considered correct as long as the appropriate word is stated. The reasoning for this decision was to increase the semantic and conceptual equivalence

of the Spanish translation because using gender neutral words or only nouns would introduce additional changes to the instructions and words of the Spanish version. Appendix A contains a complete version of the translated test (EVLT-S). The final Spanish words selected for the target list of the EVLT-S are presented in Table 1 along with the EVLT words to which they correspond.

Table 1.

Rater's Similarity Ratings Between EVLT and EVLT-S Target List Words

Order	English	Spanish	Similarity Rating (n = 8)	
			Mean	*SD*
1	angry	enojado/a	3.6	0.5
2	love	amor	4.0	0.0
3	uneasy	intraquilo/a	3.9	0.4
4	hopeless	desesperanzado/a	4.0	0.0
5	nervous	nervioso/a	4.0	0.0
6	glory	gloria	4.0	0.0
7	sad	triste	4.0	0.0
8	enemy	enemigo/a	4.0	0.0
9	anxious	ansioso/a	4.0	0.0
10	rage	rabia	4.0	0.0
11	honor	honor	4.0	0.0
12	cry	llorar	4.0	0.0
13	mad	furioso/a	3.3	0.5
14	tense	tenso/a	4.0	0.0
15	gloom	melancolia	3.1	1.1
16	joy	alegria	3.8	0.5

Note. Ratings are based on the following scale: 1 = highly dissimilar, 2 = dissimilar, 3 = similar, 4 = highly similar. SD = standard deviation.

Similarity ratings. Contained in Table 1 also are the similarity ratings provided by the eight bilingual raters. These raters were selected because they were from diverse countries, fluent

in both English and Spanish, and willing to provide ratings. They were on average 27.9 years old (*SD* = 6.8), with 16.6 years of education (*SD* = 2.1), and 75 % were female. Raters' countries of origin are presented in Table 2. Ratings were made for each Spanish-English word pair by each rater. Examination of rater means indicated that overall, the word pairs were judged as Similar (rating = 3) or Highly Similar (rating = 4), while none of the words were judged as Dissimilar (rating = 2) or Highly Dissimilar (rating = 1). Lowest similarity ratings were for the words *melancolia* (*gloom/melancholy*; rating = 3.1) and *furioso/a* (*infuriated, experiencing fury;* rating = 3.3). Examination of the individual rater responses indicated that *furioso/a* was judged as either Similar or Highly Similar to *mad* by six and two raters, respectively. These lower ratings were likely due to *mad* having multiple possible translations to Spanish including *enojado*, *enfadado*, and *loco* among others. For *melancolia* and *gloom*, one rater indicated the words were Highly Dissimilar and another as Dissimilar. Two rated the words as Similar, and four rated the words as Highly Similar. A possible explanation for these different ratings is that *gloom* generally has two meanings, one related to *darkness* and the other to *sadness*. In contrast, *melancolia's* meaning in Spanish is mostly related to sadness and depression.

Absolute agreement between the raters' similarity ratings was then examined for the Spanish and English EVLT words presented in Table 1. Descriptive statistics for the overall ratings as well as the inter-rater correlations are presented in Table 2. Across all raters and word pairs, the intraclass correlation coefficient for absolute agreement was ICC(A,1) = .80, 95% CI = .60 - .92, F (15,105) = 5.00, $p < .001$, indicating good agreement between the raters. Overall, rater means were also indicative of Similar or Highly Similar ratings for the word pairs. Given that the words selected exceeded the similarity threshold established a priori (three or above), we retained all words for use in pilot testing.

Table 2.

Inter-rater Correlations

Rater (country)	Similarity Rating		Inter-Rater Correlations							
	Mean	*SD*	1	2	3	4	5	6	7	8
1 (Chile)	3.8	0.8	1.00							
2 (Chile)	3.7	0.5	0.49	1.00						
3 (Mex.)	3.8	0.6	0.75	0.66	1.00					
4 (Mex./Spain)	3.9	0.3	-0.09	0.38	0.35	1.00				
5 (Cuba)	3.9	0.3	-0.09	0.38	0.35	1.00	1.00			
6 (Cuba)	3.9	0.3	-0.09	0.38	0.35	1.00	1.00	1.00		
7 (Mex.)	3.9	0.3	0.13	0.56	0.17	0.68	0.68	0.68	1.00	
8 (Chile)	3.9	0.3	0.95	0.38	0.81	-0.07	-0.07	-0.07	-0.10	1.00

Note. Ratings are based on the following scale: 1 = Highly Dissimilar; 2 = Dissimilar; 3 = Similar; 4 = Highly Similar.

SD = standard deviation.

Word frequency and length. Word frequency of the translated words was examined because many studies in language and memory suggest that it is a reliable indicator of the accessibility of lexical representations stored in memory (e.g., Nelson & McEvoy, 2000). Nevertheless, considering that the EVLT-S is a translation and we did not originally select the words based on frequency of usage, we expected to find varied word frequencies in the final word lists in Spanish. The limitations of this approach are discussed below. Table 3 shows the absolute frequency (frequency of the words in the sources used) and frequency per million based on oral frequency norms for 67,979 Spanish words provided by Alonso et al. (2011). These words were extracted from transcriptions of oral documents included in the reference corpus for present-day Spanish, a large database developed by the Royal Spanish Academy (Real Academia Española; Alonso et al., 2011). As can be seen from the table, frequencies vary across the words, with some of the words related to happiness and sadness being considerably more frequent in their usage. However, analysis of variance comparing the emotion categories on word frequency indicated that differences between the groups were not statistically significant, F (3,12) = 1.95, p = .18, η^2 = .328.

Word length was also examined because previous research suggests that generally the proportion of words recalled is in an inverse relation to their syllabic length (Calhoon, 1935). This is known in the cognitive memory literature as the word length effect. A model to explain this effect is based on the assumption that items in working memory decay unless they are rehearsed. Longer words take more time to pronounce, which slows their rehearsal (Nairne, 2002). This allows shorter items to be rehearsed more, resulting in the word length effect (Nairne, 2002). Nevertheless, in a series of experiments Guitard et al. (2018) concluded that lexical factors rather word length are better predictors of when the word length effect may occur

and that there have been several studies that suggest that the word length effect may depend on the stimuli used. As presented in Table 3, word length varies across the words, with some of the words related to anxiety and sadness being considerably longer than the rest. However, analysis of variance comparing the emotion categories on word length indicated non-significant differences between the groups, F (3,12) = 1.65, p = .23, η^2 = .292.

Table 3.

Word Length and Oral Frequency of Spanish Words Chosen for Translation

Order	English	Spanish	Word length (letters)	Frequency	
				Absolute	Per Million
1	angry	enojado/a	7	1	0.32
2	love	amor	4	596	187.78
3	uneasy	intraquilo/a	10	1	0.32
4	hopeless	desesperanzado/a	14	1	0.32
5	nervous	nervioso/a	8	87.5	27.57
6	glory	gloria	6	114	35.92
7	sad	triste	6	137	43.16
8	enemy	enemigo/a	7	38	23.31
9	anxious	ansioso/a	7	2.5	1.58
10	rage	rabia	5	46	14.49
11	honor	honor	5	124	39.07
12	cry	llorar	6	59	18.59
13	mad	furioso/a	7	4	1.26
14	tense	tenso/a	5	8	2.53
15	gloom	melancolia	10	4	1.26
16	joy	alegria	7	36	11.34

Note. Frequencies based on norms provided by Alonso et al. (2011).

Discussion of Phase I

Based on the aforementioned guidelines, the panel of experts prioritized conceptual equivalence between the EVLT and the EVLT-S. It is important to consider that published

guidelines offer general standards for ideal practices that are sometimes difficult to apply to a specific test. There are no specific guidelines in the literature to translate emotional memory tests and the information available on the details of the translation process from previous tests that have been adapted to Spanish is scarce. Therefore, the expertise and experience of the translators involved in this process was important in decision making. It was also important that the translators were from a variety of Hispanic cultural backgrounds (Chile, Mexico, Spain, Puerto Rico, Cuba), given differences in regional dialects, culture, frequency of word use, and other factors relevant to developing a list learning task that could be used across various Hispanic cultures. Additionally, having similarity ratings that were mostly concordant with each other helped finalize the EVLT-S. After all discrepancies regarding possible translations for the word lists and the instructions were resolved, the panel of experts achieved the final pilot version of the EVLT-S.

Although no significant differences between the emotion categories were observed for word frequency or word length, it is notable that sample size was small in those analyses and visual inspection of the words themselves indicated considerable variability in length and frequency. Prior research suggests that higher frequency words tend to be recalled more effectively than lower frequency words (Deese, 1960), whereas recognition accuracy is usually superior for lower than for higher frequency words (Mandler et al., 1982). In attempting to create a test that could be understood by Spanish speakers of diverse cultural backgrounds, word frequency was difficult to assess. Alonso et al. (2011) was the most appropriate frequency norming sample because it provides a set of peer reviewed norms for oral frequency, which are more applicable to the EVLT-S that is administered orally. However, these oral frequency norms were developed in Spain based on their language use. Word frequency varies depending on the

Spanish speaking countries' particular use of Spanish. For example, the most frequently used words in Chile are not the same as in Mexico; however, it was not possible to find peer reviewed emotion words norming samples for every Spanish speaking country. Moreover, word frequency varies when it refers to written frequency as opposed to oral frequency. For example, the Royal Spanish Academy Dictionary (Real Academia Espanola, 2018) database of written word frequencies, includes data from various Spanish speaking countries and presents different values for the same words when compared to Alonso et al. (2011).

Regarding word length, previous studies have reported that longer words tend to be more difficult to retain because they increase the time of rehearsal in working memory (Nairne, 2002). Nevertheless, there is debate in the literature regarding the prevalence and significance of the word length effect on recall. For example, results of one study showed that mixed lists of both long and short words were recalled worse than pure short lists, but better than pure long lists (Cowan et al., 2003). Another study found that mixed lists were recalled equally as well as pure short lists (Hulme et al., 2004). Moreover, Bireta, Neath, and Surprenant (2006) suggested that these different results were likely related to the specific stimulus sets used rather than length of the words, per se. For example, most of the cognitive memory research showing effects for word length and frequency has been conducted with varied single or multiple trial stimuli or incidental memory paradigms. Even though relevant, it is not clear how applicable these findings are to verbal learning tasks involving a specific number and structure of multiple learning trials and long-term memory components.

In balancing considerations regarding word length and frequency with semantic and conceptual equivalence, we prioritized semantic and conceptual equivalence. We adopted this approach given the inconclusive results of research examining the effects of word frequency and

length on recall, and the importance of maintaining equivalence between the EVLT and EVLT-S. Also, from a practical perspective, the translation process inherently limits options to choose words of a certain length or frequency. This is because Spanish and English words that are highly similar from semantic and conceptual perspectives often have significant variability in length and frequency of usage (e.g., *gloom* and *melancolia*, *hopeless* and *desesperanzado*, *joy* and *alegria*, *sad* and *triste*).

Phase II: Pilot Testing

Method

As suggested by Cherner (2010) and ITC (2017), once the final translated version of the EVLT (ELT-S) was completed, it was administered to a pilot sample of Spanish speakers. The original EVLT was also administered to a sample of English-speaking individuals. The purpose of pilot testing with a smaller sample was to assure that the instructions were easily comprehensible and to conduct preliminary analyses to determine whether the EVLT-S was an appropriate translation. The English-dominant group was included to facilitate the investigation of linguistic, semantic, and conceptual equivalence between the EVLT and the EVLT-S. These analyses are described below and included emotional intensity and categorization of the words, and semantic and conceptual similarity between the English words and their Spanish translations.

Participants. The pilot sample included 30 predominantly Spanish-speaking individuals and 27 predominantly English-speaking individuals. They were recruited from the University of Nevada, Las Vegas psychology subject pool and the community. To be included in the English-dominant group, participants had to initially indicate that their primary language was English. To be included in the Spanish-dominant group, participants had to initially indicate their primary language was Spanish. Three participants in the English-dominant group were recruited from the

community. All other participants were recruited through the UNLV psychology subject pool. Community recruitment was done through online advertisement (posting on relevant listservs, Facebook, and Craigslist) and posting flyers around the Las Vegas community. Seven participants were subsequently excluded from this phase of the study because examination of their self-report data indicated that they identified their fluid language as different from the language of administration (e.g., identified English as their primary language and were tested in Spanish or vice versa). All other participants were included.

Measures. All of the measures described below were administered using paper and pencil and have English and Spanish versions. Participants in the English-dominant group were administered the English versions and participants in the Spanish-dominant group were administered the Spanish versions.

***Demographic questionnaire*.** A demographic and medical history questionnaire was administered. This questionnaire was created by the primary author in both Spanish and English. It included questions that allowed assessment of bilingualism, language proficiency, and cultural background based on recommendations by Salinas et al. (2016). These questions included a multiple choice item for ethnicity, including an open ended question that requested participants to describe their ethnic background; country and city in which they were born; when participants or their family moved to the U.S.; length of stay in the U.S.; preferred language, language they learned first; languages they speak fluently; language they speak at home, work/school, and social situations; languages they can speak, read, and write; years of education in Spanish and English; and their parents primary language.

The Symptom Checklist-90-Revised (SCL-90-R)/Listado de sintomas SCL-90-R. The SCL-90-R (Derogatis, 1983) and its Spanish version (Derogatis, 1983; Pearson, 2018) are

commonly used checklists that assesses the presence of symptoms that are characteristic of mental disorders based on the Diagnostic and Statistical Manual of Mental Disorders (APA, 2013). The English and Spanish versions of the SCL-90-R were used to screen participants for psychopathology. The checklist is comprised of three global scales (Global Severity Index, Positive Symptom Distress Index, and Positive Symptom Total), and nine subscales (Somatization, Obsessive Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism). Responses are provided on a scale that ranges from 0 = not at all to 4 = extremely. Many studies have been conducted on the SCL-90-R's psychometric properties. Reliability assessment of the subscales has yielded internal consistency estimates ranging from .77 to .90 and test-retest estimates ranging from .78 to .90 (Derogatis, 1983; Pearson, 2018). Validity estimates include high convergent validity with parallel Minnesota Multiphasic Personality Inventory Scales (Derogatis et al., 1976), and high concurrent validity with other instruments such as the Hamilton Rating Scale and the Center for Epidemiologic Studies Depression Scale (Derogatis & Cleary, 1977; Weissman et al., 1977). Martinez et al. (2005) reported similar reliability and validity estimates with a sample of Hispanic college students in the U.S. Henry et al. (1994) also reported similar concurrent validity for the Spanish version with a sample of college students from Spain.

The Bicultural Involvement Questionnaire (BIQ). The BIQ (Guo et al., 2009; Szapocznik et al., 1980) is a measure of acculturation that focuses on the degree of involvement with the mainstream culture and the culture of origin. It consists of 42 items to assess Hispanic acculturation, American acculturation, and cultural involvement with Hispanic or American culture. Items are scored on a 5-point scale with responses varying depending on item. The scale questions are divided into involvement in American culture, *Americanism*, with 21 questions,

and involvement in Hispanic culture, *Hispanicism*, with 21 questions. *Americanism* and *Hispanicism* scores are calculated by summing the appropriate item responses. The scale is self-administered. Alpha coefficients for the scales were .93 for *Hispaniscism* and .89 for *Americanism* (Guo et al., 2009).

The Revised Multigroup Ethnic Identity Measure (MEIM-R). The MEIM-R (Phinney & Ong, 2007) is a measure of acculturation that focuses on cultural identity. Lara and Martínez-Molina (2016) adapted the measure to Spanish (Escala de Identidad Étnica Multigrupo-Revisada). The MEIM-R evaluates participants' sense of ethnic identification and their feeling of belonging to a particular ethnicity. In consists of 6 items that assess two constructs: 1) Exploration (items 1, 4, and 5): looking for information and experiences related to one's ethnicity, 2) Commitment (items 2, 3, and 6): Strong attachment to and investment in one's ethnic group. Response options are on a 5-point scale, from *strongly disagree* = 1 to *strongly agree* = 5, with 3 as a neutral option. The score is calculated as the mean of items in each subscale or of the scale as a whole. Cronbach's alpha was .76 for Exploration, .78 for Commitment, and .81 for the combined 6-item scale (Phinney & Ong, 2007).

The Short Acculturation Scale for Hispanics* (*SASH)/Escala de Aculturacion Breve para Hispano Hablantes. The SASH (Marin et al., 1987) is a measure of acculturation that includes the following domains: 1) language use (five items); 2) media (three items); and 3) ethnic social relations (four items). The scale is self-administered, and responses are provided on a 5-point scale. For items assessing language and media preference, the scores range from only Spanish = 1 to only English = 5. For items assessing ethnic social relations, the scores range from all Latinos/Hispanics = 1 to all Americans = 5. Total average scores range from 1 to 5, with higher scores reflecting more acculturation to American culture. Both English and Spanish

versions were developed concurrently in the original study. The coefficient alpha for the total scale the was .92. The scale also has strong construct validity with the respondents' generation (r = .65), the length of residence in the United States (r = .70), ethnic self-identification (r = .76), and the age at arrival (r = –.69).

The Emotional Verbal Learning Test and the Emotional Verbal Learning Test-Spanish. The EVLT/EVLT-S assesses learning and memory through the presentation of word lists. The word lists are comprised of emotional words selected from specific emotional categories (happiness, sadness, anger, anxiety, and disgust) and they are presented orally. First, the target list is presented over 5 immediate-recall trials (trials 1-5). The target list consists of 4 words from each of four emotion categories (happiness, sadness, anger, and anxiety). After the administration of the 5 immediate free recall trials, an interference list is presented for a single trial. The interference list is comprised of 16 emotional words that are not included in the target list. Eight of these words are from a different emotional category (disgust) and the remaining eight words are from the four target list emotion categories (2 happiness, 2 sadness, 2 angry, 2 anxiety). Immediately following the administration of the interference list, a short delay free recall and a short delay emotion category cued recall of the target list are presented. Then after 20 minutes, long delay free and cued recall of the target list are conducted. Finally, immediately after the long delay cued recall, a yes/no recognition trial of the target list is administered. Correct responses, intrusions, and repetitions are recorded verbatim by the examiner on the test form for all of the trials. Following completion of these procedures, participants are asked to rate in a 1-7 scale (1 = not at all to 7 = extremely) their emotional experience at the moment (state) and in general (trait). The emotion categories rated in this section are happiness, sadness, anger, anxiety, and disgust and the responses are also recorded on the test form by the examiner.

The List Learning Task – English (LLT-E) and the List Learning Task – Spanish (LLT-S). The LLT-E/LLT-S is an adaptation of the Spanish English Verbal Learning Test (SEVLT; Gonzales et al., 2001; 2002) that was developed specifically for this study. The SEVLT was developed and standardized concurrently with Spanish and English-speaking individuals and both versions showed psychometric properties comparable to other verbal learning tests (e.g., CVLT-II, RAVLT) and good clinical utility (Gonzales et al., 2001; 2002). The SEVLT consists of a 16-item (neutral words) learning task in which five consecutive learning trials are given, followed by an interference, a short delayed, and a long delayed free recall trial. The words belong to five semantic categories, with five exemplars of vegetables, four drinks, three kitchen utensils, two reading materials, and one fruit. With permission from the authors, minor modifications were done to this test so that the administration procedures and trials of the test would match those of the EVLT/EVLT-S and allow for direct comparisons. Specifically, the target list and interference list words were grouped into four semantic categories (drinks, kitchen utensils, vegetables, and reading materials) by switching words from the interference list to the target list and replacing two words with new words of similar frequency and length. Additionally, cued and recognition trials were added that were identical in structure to the EVLT/EVLT-S cued and recognition trials, though used only neutral words. The final LLT-E/LLT-S had the same number of words, trials, and type of trials as the EVLT/EVLT-S.

The Positive and Negative Affect Schedule (PANAS). The PANAS (Watson et al., 1998) was adapted to Spanish by Robles and Paez (2003; Escalas de Afecto Positivo y Negativo). This is a self-report scale that asks participants to rate how they feel on a number of specific emotional terms that make up positive and negative affect dimensions. Participants provide ratings for trait emotion (how do you feel in general) and state emotion (how do you feel right

now). Ratings range from 1 = Very Slightly or Not at All to 5 = Extremely and they are assigned to each affective state or trait. The positive affect score is based on ten items and ranges from ten to 50, with higher scores representing higher levels of positive affect. The negative affect score is also based on ten items and ranges from ten to 50, with higher scores representing higher levels of negative affect. For the English version coefficient alphas for the positive and negative affect scales (state and trait) ranged from .84 to 90 (Watson et al., 1998). For the Spanish version coefficient alphas for positive and negative affect scales (state and trait) ranged from .81 to .90 (Robles & Paez, 2003). The PANAS was administered to evaluate state and trait emotional experience and to examine convergent and discriminant validity of the EVLT-S.

Select subtests of the Wechsler Adult Intelligence Scale, Third Edition (WAIS III)/ Escala de Inteligencia Wechsler para Adultos, Tercera Edicion (EIWA-III). The WAIS-III (Wechsler, 1997; Pearson, 2018) is one of the most commonly used intelligence test in the U.S. There is vast literature showing the strength of its reliability, validity, and factorial structure and other psychometric properties (e.g., Lezak et al., 2012). The EIWA-III (Wechsler, 2008; Pearson 2018) is the Spanish version of the WAIS-III, developed in Puerto Rico. It was developed to be an equivalent version of the original English test and the psychometric properties reported in the manual are comparable to the English version (Pearson, 2008). The following are the subtests selected for use from the WAIS-III and EIWA-III. Together these subtests were used to estimate the participants intellectual ability and to examine convergent and discriminant validity of the EVLT-S.

Vocabulary subtest (Vocabulario). The Vocabulary subtest (VC) is a measure of lexical knowledge (word knowledge) that requires participants to define a series of words of increasing difficulty. Item administration stops after six consecutive wrong answers. Scores of this subtest

for both groups were used as the primary measure of language proficiency in conjuction with their self-report.

Digit Span subtest (Retencion de Digitos). The Digit Span (DS) subtest is a measure of working memory that requires participants to repeat a sequence of numbers in the same order as presented by the examiner and also in the reverse order. This measure was used to examine the convergent and discriminant validity of the EVLT-S and to fill in one of the 20-minute delays during the administration of the memory tests.

Block Design subtest (Diseno con Bloques). The Block Design (BD) subtest is a measure of visuospatial/constructional abilities that requires participants to use blocks to recreate a series of modeled or pictured designs of increasing difficulty. This subtest was used to examine the convergent and discriminant validity of the EVLT-S and to fill in one of the 20-minute delays during the administration of the memory tests.

Coding (Digitos Simbolo-Clave). The Coding (CD) subtest is a measure of processing speed that requires participants to quickly copy and match symbols that are paired with numbers according to a key. This subtest was used to examine the convergent and discriminant validity of the EVLT-S and to fill in one of the 20-minute delays during the administration of the memory tests.

The Search Identification Task (SIT). The SIT is a measure of attention, visual scanning, and processing speed developed by Strauss and Allen that has not been officially published yet. Participants are asked to target a specific letter or symbol within an array of letters or symbols. They are first required to only target a specific letter or figure by marking it on the test protocol with a marker or pen. They are then required to target a specific letter or figure of a certain color, and finally target a specific letter or figure only if it precedes or follows another

letter or figure. Spanish instructions for this test were developed by the primary author and back translated and revised by the other translators involved in this project. This measure was used to examine the convergent and discriminant validity of the EVLT-S and to fill in one of the 20-minute delays during the administration of the memory tests.

Emotional Intensity (EI) and Emotional Category (EC). All participants provided emotional categorization and intensity ratings for the words in the target list and the interference list in their respective languages, following procedures previously established by Strauss and Allen (2008). For emotional intensity ratings, participants were asked to rate the words using a scale where 1 = not very emotional and 7 = very emotional. After completing intensity ratings, participants were asked to categorize each of the words into one of nine discrete emotional categories (happiness, sadness, anger, anxiety, fear, disgust, surprise, neutral, and other) that they felt most highly represented the word. If they chose *other* they were requested to write down to which emotional category they thought the word belonged. The EVLT was developed so that each of the words had categorization ratings of .70 or above for their intended emotion category and the same standard was applied with the EVLT-S. This task was developed concurrently in English and Spanish by the primary author and was revised by the other translators involved in this project.

Similar Words. To determine whether the EVLT-S word lists are semantically and conceptually equivalent the EVLT word lists, all participants provided three words associated with each word on the target and interference lists of the EVLT-S/EVLT words, following a procedure established by Tanaka-Matsumi and Marsella (1976). The instructions stated to provide the three words that were most closely associated with the presented word. Those in the Spanish-dominant group provided three words associated with each of the EVLT-S target and

interference list words. Those in the English-dominant group provided three words with each of the EVLT target and interference list words. This task was developed concurrently in English and Spanish by the primary author and was revised by the other translators involved in this project.

Word Concepts. For this task participants wrote the concepts that they thought best represented each of the words in the EVLT or EVLT-S respectively. The task consisted of presentation of each word on the EVLT/EVLT-S with an open space next to it to write the concepts down. The primary author developed this task concurrently in English and Spanish and the other translators involved in this project revised it.

Procedure.

All participants provided written informed consent prior to completing any study procedures and all procedures were approved by the UNLV Institutional Review Board (IRB). All measures were administered individually in a quiet setting; testing sessions were approximately 120 to 180 minutes long. Participants recruited through the psychology subject pool were compensated with research credits. Participants recruited from the community were compensated at a rate of 5 dollars per half hour for their participation.

Test administration was performed by the primary author and a team of bilingual (Spanish and English) undergraduate research assistants (RAs). The RAs were trained by the primary author, the senior investigator, and one of the translators to administer the measures according to the standardized administration procedures of each instrument. The training entailed four parts: 1) theoretical knowledge regarding neuropsychological testing, the importance of standardized administration, and confidentiality, 2) specific theory and administration procedures related to each test on the battery, 3) scoring procedures for each measure, and 4) supervised

administration of all the measures until proficiency was demonstrated. During the fourth part of training the RAs practiced the tests on each other and by themselves, then they administered the whole battery to the primary author posing as a participant, and after that they administered the whole battery to another volunteer mock participant. This process was repeated until the RAs showed proficiency in administration and adhering to the standardized procedures without making mistakes in English and in Spanish. Once this was achieved, they began testing participants under the supervision of the primary author, one of the translators, or another graduate student with experience in neuropsychological testing. They tested under supervision until the supervisors deemed that they were following the standardized procedures appropriately. There were typically one or two supervised testing sessions, although more were performed if needed.

All tests included in the battery have English and Spanish versions; therefore, language of administration depended on the participant's self-reported language of preference. Monolingual English speakers were tested in English. Monolingual Spanish speakers were tested in Spanish. Bilingual participants were administered the battery in their language of preference based on their self-report. All participants completed the whole battery in either English or Spanish.

All of the measures were completed using paper and pencil and administered in the following order: PANAS, demographic questionnaire, SASH, BIQ, MIEM, VC, EVLT-S or EVLT, BD, DS, and CD, LLT-E or LLT-S, SIT A or B, EI, EC, and WC. The order of administration of the memory measures (whether the LLT-E/LLT-S or the EVLT/EVLT-S was administered first) was counterbalanced, and participants were randomly assigned to the particular order of administration. These tests were counterbalanced because both memory tests have similar structures and similar instructions, which could result in practice effects (better

performance on the test that is administered second) due to previous exposure to the test format. During the long delays (20 minutes) of the memory tests, only tests with visuospatial or single number-letter visual stimuli were administered (e.g., BD, CD DS, SIT) to reduce the possibility of additional verbal information interfering with the encoding and consolidation of the word lists on the memory tests.

After test administration was over, the participant files (including all completed measures) were first scored by the individual who administered the battery. Then files were double scored by the primary author, one of the translators, or another graduate student with extensive experience in neuropsychological assessment and scoring. The files were never scored twice by the same person. Once discrepancies in scoring were resolved, the final scores were entered into the database. Scores were entered into the database by the primary author, the previously mentioned graduate student, and two RAs who were specifically trained for this task and did not participate in test administration. All data were double entered by two different individuals separately to avoid data entering errors.

The three most frequent synonyms that the participants provided in English and Spanish on the SW task were grouped into pairs based on similarity of meaning across languages. Each pair was composed of an English and a Spanish word. Then, the pairs were sent via email to the panel of eight bilingual individuals from Phase I. They provided independent ratings regarding the similarity in meaning between the synonyms provided by both groups. Ratings were made for each Spanish-English word pair by each rater on a 1 – 4 rating scale, where 1 = Highly dissimilar, 2 = Dissimilar, 3 = Similar, and 4 = Highly Similar.

The concepts that the participants provided for each EVLT and EVLT-S words were qualitatively evaluated by the primary author as related or non-related to the emotion category of

the EVLT or EVLT-S word. During this process a dichotomous scale was used, with 1 = related and 0 = non-related. Then the percentage of related and non-related concepts that the participants provided was calculated. For the words to be retained, the concepts provided had to be related to the intended emotion category .70 or above.

At the end of Phase II, a meeting with the examiners was held to discuss whether the administration procedures and the instructions of the EVLT-S were appropriate for its original purpose and easily understood by the participants.

Results

Participants. Demographic information for the participants included in Phase II of the study are presented in Table 4. Additional demographic information is presented in Appendices B (Table 19) and C (Table 20). Univariate ANOVA and Chi Square analyses were used to examine differences in the demographic characteristics of the Spanish-dominant and English-dominant groups. As Table 4 shows, the groups did not significantly differ in sex or years of formal education. There were no differences between levels of mothers' and fathers' education between the groups. The groups did significantly differ on years residing in the U.S., with the English-dominant group reporting living in the U.S. longer than the Spanish-dominant group, which was expected. There was a significant difference between groups on ethnicity, such that 59% of the English-dominant group identified as Hispanic, while all participants in the Spanish-dominant group identified as Hispanic. It is also noteworthy that the majority of participants in both groups identified as bilingual, with 96.7% of the participants in the Spanish-dominant group indicating that they were fluid in both English and Spanish. The English-dominant group was significantly older than the Spanish-dominant group. However, the mean age difference was 3.8

years, which in terms of cognitive performances or normative interpretations, is unlikely to substantially affect performances.

Table 4.

Demographic Characteristics of Phase II Participants

Variable	Group				*F (1,55)*	*p*
	English (*n* = 27)		Spanish (*n* = 30)			
	Mean	*SD*	Mean	*SD*		
Age (yrs.)	23.4	9.6	19.6	2.8	4.27	<0.05
Years in US	22.4	10.5	16.9	4.2	2.78	<0.05
Educ. (yrs.)	12.9	1.1	12.6	1.0	0.78	0.38
Fath. ed.	11.7	3.0	10.4	3.8	1.89	0.17
Moth. ed.	12.5	3.1	11.8	3.2	0.60	0.44
	% (*n*)		% (*n*)		χ^2	
Sex (% Male)	48.1 (13)		23.3 (7)		3.84	0.05
RHand.	96.3 (26)		77.8 (23)			
Ethnicity					15.15	<.05
Caucasian (not Hisp.)	14.8 (4)		0.0			
Hispanic	59.3 (16)		100.0 (30)			
Other	25.9 (7)		0.0			
Bilingual	51.9 (14)		96.7 (29)			

Note. yrs. = years; Fath. ed. = father's education; Moth. ed. = mother's education; RHand = right handed; *SD* = standard deviation.

Acculturation, language, performance on cognitive tests, and psychopathology screening information for the Phase II participants are presented in Table 5.

Table 5.

Description of Phase II Participants in Terms of Acculturation, Cognitive Performances, Estimated Intelligence, and Psychopathology

Variable	Group				*F*	*p*
	English (*n* = 27)		Spanish (*n* = 30)			
	Mean	*SD*	Mean	*SD*		
SASH	3.7	0.6	3.2	0.4	13.60	<0.01
BIQ-A	80.2	7.6	76.4	6.2	4.23	<0.05
BIQ-H	64.7	15.2	76.6	9.7	12.54	<0.05
MEIM-T	3.5	0.8	2.1	0.6	59.72	<0.001
MEIM-E	3.5	0.8	2.3	0.8	27.69	<0.001
MEIM-C	3.6	0.9	1.9	0.8	54.57	<0.001
VC (RS)	42.2	10.9	27.9	6.1	37.53	<0.001
VC (SS)	11.1	2.7	10.3	2.0	1.59	0.21
CD (RS)	69.0	18.4	74.8	14.2	1.77	0.18
CD (SS)	8.5	3.0	10.8	3.0	8.36	<0.05
BD (RS)	41.4	10.2	39.5	10.0	0.50	0.48
BD (SS)	10.3	2.4	11.1	2.5	1.65	0.20
DS (RS)	16.4	3.4	13.5	3.1	11.72	<0.05
DS (SS)	9.4	2.3	10.1	2.9	1.20	0.28
IQ est. (RS)	42.3	7.5	38.9	5.2	3.88	0.054
IQ est. (SS)	9.8	1.7	10.6	1.6	3.91	0.053
SCL90-GSI	53.9	15.1	62.1	9.3	5.94	<0.05
SCL90-PST	54.0	13.9	60.5	9.4	4.14	<0.05

Note. SASH = The Short Acculturation Scale for Hispanics; BIQ-A = The Bicultural Involvement Questionnaire Americanism; BIQ-H = Bicultural Involvement Questionnaire Hispanicism; MEIM-T = Multi Group Ethnic Identity Measure Total; MEIM-C = Multi Group Ethnic Identity Measure Commitment; MEIM-E = Multi Group Ethnic Identity Measure – Exploration; RS = Raw Score; SS = Scaled score; VC = Vocabulary; CD= Coding; BD = Block Design; IQ est. = Intellectual Quotient Estimate; SCL90-GSI = The Symptom Checklist-90-Revised Global Severity Index; SCL90-GSI = The Symptom Checklist-90-Revised Positive Symptom Total.

The SASH, the BIQ, and the MEIM-R were used to assess aspects of acculturation, and there were significant differences between the groups on all these scales. SASH scores showed that the English-dominant group was significantly more accultured than the Spanish-dominant group to the mainstream U.S. culture. The BIQ indicated that the English-dominant group preferred American culture, whereas the Spanish-dominant group was more bicultural. In terms of ethnic identity (MEIM-R), the English-dominant group scores were significantly higher than the Spanish-dominant group, suggesting that they identified more strongly with their ethnic identity. We anticipated these differences, given the selection criteria for inclusion in the study.

The Vocabulary subtest from the WAIS-III English and Spanish was used as a measure of language proficiency for both groups. As Table 5 shows, there were no significant differences between the groups in terms of their scaled scores. Both groups mean vocabulary scaled scores were within the average range suggesting that their basic lexical knowledge was sufficient to perform the EVLT and EVLT-S in the language that were administered. However, when comparing vocabulary raw scores, significant differences emerged, with the English-dominant group obtaining higher scores. Nevertheless, as pointed out in the general discussion, the equivalency of the Spanish and English versions of the WAIS-III is not well established.

CD, BD, and DS subtests from the WAIS-III English and Spanish were used to assess cognitive abilities. For each subtest, the total raw score was used as the primary outcome in order to avoid potential confounds associated with differences in the Spanish and English normative data among various age groups and between tests. Scaled scores (ss) were included on the table for descriptive purposes. In terms of cognitive performance, the English-dominant group performed significantly better than the Spanish-dominant group on DS. There were no significant differences on other cognitive performances, including the IQ estimate, which was the

average of the VC, CD, BD, and DS subtests. IQ was estimated using this procedure because the Spanish version of the WAIS-III does not include procedures to calculate IQ based on a short form or select subtests. This is not a standardized procedure to obtain IQ scores; therefore, these scores were also included for descriptive purposes and should be interpreted with caution.

Regarding screening for psychopathology, the Spanish-dominant group scored significantly higher than the English-dominant group on the Global Severity Index and Positive Symptom Total scales of the SCL90-R. Mean *t* scores of both groups did not exceed the general cutoff used for clinical significance (>70).

Intensity ratings and emotional categorization. The most common emotional categorizations and the average emotional intensity ratings provided by the participants for the EVLT and EVLT-S words are presented in Table 6 in Appendix D. The means for emotional intensity ratings for each word are presented in the first column, followed by standard deviations (*SD*). The third and fourth columns (Cat. 1 and Cat. 2) indicate the percentage of times the participants classified the words into the eight emotional categories (happiness, sadness, anger, surprise, disgust, fear, anxiety, neutral, other), with the most frequent and second most frequent categorizations provided in Table 6. For example, for the EVLT word *angry*, the average intensity rating assigned by participants was 4.9 (*SD* = 1.9), 96.3% classified *angry* as a member of the emotion category anger, and 3.7% classified it as neutral.

Intensity ratings for the Spanish and English emotional words were investigated further. Inspection of the individual word ratings presented in Table 6 suggest that in general, the English-dominant group indicated the words were more intense than the Spanish-dominant group. To examine group differences, average scores were derived for each of the EVLT and EVLT-S four emotion categories (happiness, sadness, anger, anxiety) by summing the intensity

ratings for the four words in each category and then dividing by four. These average scores were then compared across groups using a mixed-model ANOVA, where group (Spanish, English) served as a between-subjects factor and emotion category (happiness, sadness, anger, anxiety) served as a within-subjects factors. Results indicated significant main effects for group, F (1, 55) = 8.84, $p < .005$ $\eta^2 = .138$, and emotion category, F (3, 165) = 12.11, $p < .001$, $\eta^2 = .180$, although the group by emotion category interaction effect was not significant, F (3, 165) = .94, $p = .42$, $\eta^2 = .017$. Results are presented in Figure 1a.

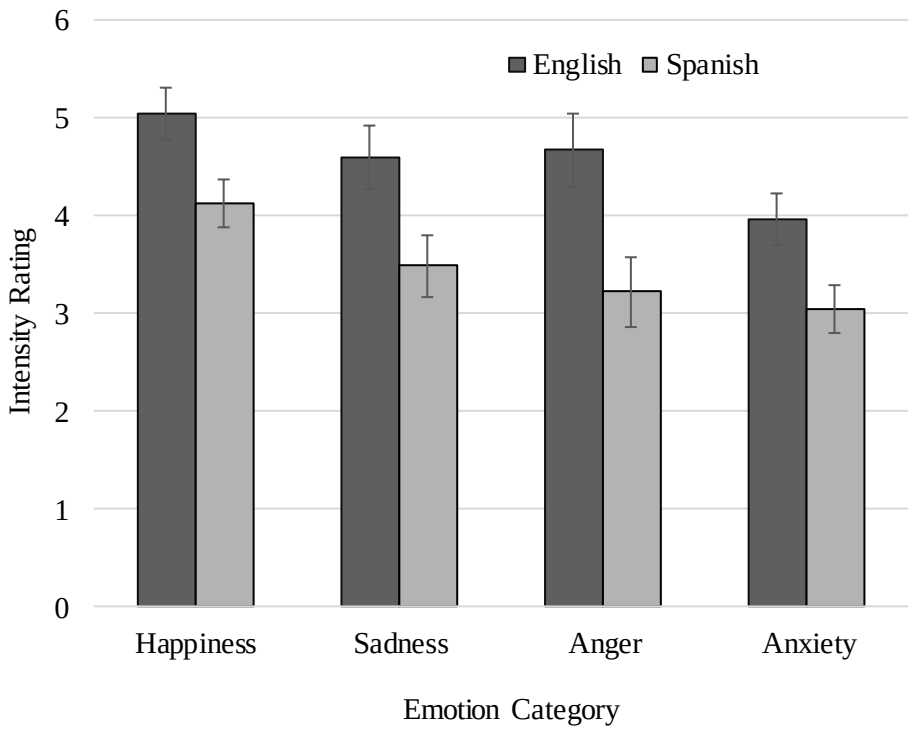

Figure 1a. *Average intensity ratings provided by the English-dominant and Spanish-dominant groups for words across each emotion category. Error bars represent standard errors.*

Post hoc ANOVAs were conducted to determine group differences for each emotion category and indicated significant differences between groups for all emotion categories; happiness, F (1,55) = 6.62, p = .013; sadness, F (1,55) = 5.78, p = .02; anger, F (1,55) = 7.89, p = .007; and anxiety, F (1,55) = 6.26, p = .015. Post hoc analyses examining differences between emotion categories indicated that happiness was rated as significantly more intense than sadness, F (1,55) = 6.79, p = .012, intensity ratings for sadness and anger were not significantly different, F (1,55) = .273, p = .60, and anger was rated as significantly more intense than anxiety, F (1,55) = 6.44, p = .014.

Given group differences on acculturation measures and vocabulary, the analyses were repeated, and MEIM-R and VC scores were included as covariates. The MEIM-R was included to reflect the impact that ethnic identity may have on emotional intensity ratings, and VC was included to reflect the impact that word knowledge might have on emotional intensity ratings. Results indicated that the main effect for group was not significant, F (1, 53) =.36, p = .55, η^2 = .007, nor was the main effect for emotion category, F (3, 159) = .60, p = .62, η^2 = .011, nor was the emotion category by language interaction effect, F (3, 159) = .29, p = .83, η^2 = .005, or the group by emotion category interaction effect, F (3, 159) = .33, p = .81, η^2 = .006. Estimated marginal means are presented in Figure 1b. Comparisons of Figure 1a and 1b indicate that covarying out the influence of word knowledge and ethnic identity resulted in decreased group difference for intensity ratings of emotion categories.

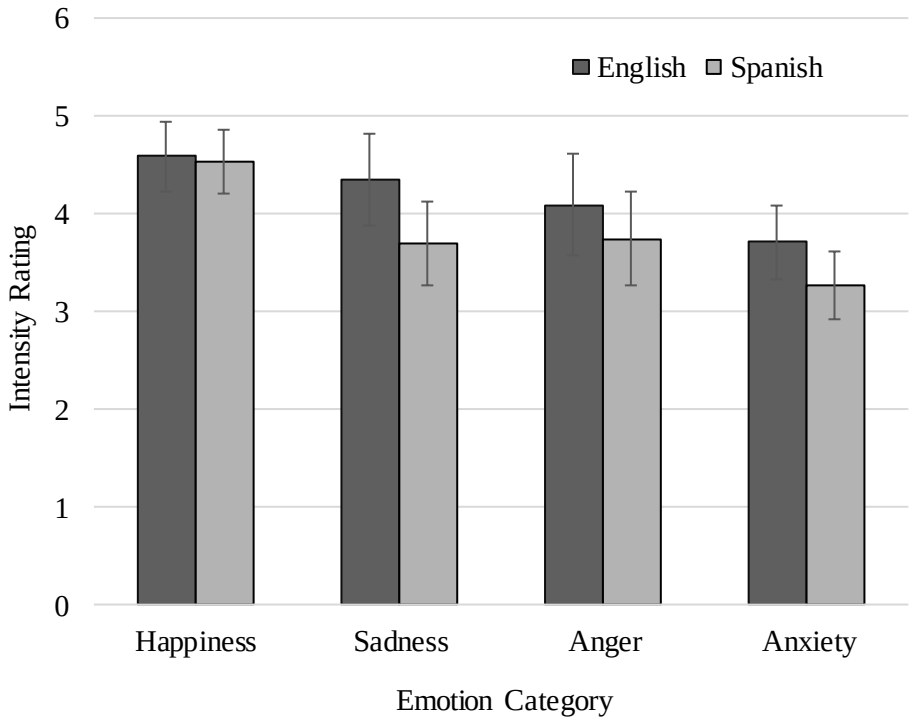

Figure 1b. *Average intensity ratings provided by the English-dominant and Spanish dominant groups for words across each emotion category, covarying out ethnic identity and vocabulary knowledge (estimated marginal means). Error bars represent standard errors.*

Categorization ratings for the EVLT-S and EVLT emotional words were then examined. Based on previous research (Strauss & Allen, 2008) emotional words with categorization ratings of 70% or higher were considered as highly representative of their intended emotion category and considered for inclusion in the EVLT-S. For the current samples, participants in the English-dominant group provided categorization ratings of less than 70% for *enemy*, *tense,* and *honor*. Participants in the Spanish-dominant group provided categorization ratings of less than 70% for *deseperanzado/a (hopeless), nervioso/a (nervous), tenso (tense),* and *melancolia (gloom).* Given that some of the words selected for the EVLT-S fell below the 70% categorization cut-off,

further investigation of word meaning was examined through inspection of semantically related words and conceptual definitions. These findings are discussed below.

Synonyms. Participants in the pilot phase provided at least three words that they believed were similar (synonyms) to the EVLT or EVLT-S word lists. The synonyms that appeared with the greatest frequency are presented in Table 7 in Appendix D for the EVLT words and corresponding EVLT-S words. As the table shows, the most frequently provided synonyms by the English-dominant group were semantically related to the original EVLT words. The same was true for the Spanish-dominant group, with the exception of the synonyms provided for *desesperanzado/a* (*hopeless*). For this word, the most frequent synonym was *triste (sad)*, which is closey related in meaning. However, the second and third most commonly provided synonyms were *ansioso (anxious)* and *desesperado (desperate)*, respectively, which were not similar to *desesperanzado/a* (*hopeless*) or closely associated with sadness. It is noteworthy that in most cases, the synonyms provided were representative of the emotion category of the EVLT-S/EVLT word.

The eight bilingual raters from Phase I also provided similarity ratings for the English-Spanish synonym pairs. Average similarity ratings for each pair of words across the eight raters are also presented in Table 7 in Appendix D. The superscripts numbers show the words that were paired together. For example, for *honor*, *pride* and *orgullo* have superscript 3 and formed pair number 3. As seen from the table, all ratings for synonym Pair 1 were rated at 3.1 or above, suggesting overall that the most frequently produced Spanish and English synonyms were Similar (3) in meaning. Notably, the most frequently provided synonyms belonged to the same emotion category as the original EVLT or EVLT-S word and these synonyms were rated as highly similar to each other. Decreases in synonym correspondence and similarity ratings were

evident for some Pair 2 and Pair 3 words, which we expected. For example, Pair 3 for *joy-alegria* was composed of *excited* and *gloria* (*glory*). Even though these words have different meanings, both of them relate to happiness, suggesting that the constructs associated with *joy* and *alegria* are similar in both languages.

Absolute agreement between the raters' similarity ratings for the Spanish-English synonym pairs were also examined and results are presented in Table 8. Across all three synonym pair ratings, the intraclass correlation coefficient for absolute agreement was *ICC (A,1)* = .97, 95% CI = .95 - .98, F (47, 329) = 32.94, $p < .001$, indicating excellent agreement between the raters. For synonym Pair 1, the intraclass correlation coefficient for absolute agreement was *ICC (A,1)* = .90, 95% *CI* = .80 - .96, F (15, 90) = 11.40, $p < .001$, also indicating excellent agreement between the raters. For synonym Pair 2, the intraclass correlation coefficient for absolute agreement was *ICC (A,1)* = .97, 95% *CI* = .93 - .99, F (15,105) = 30.30, $p < .001$, also indicating excellent agreement between the raters. For synonym Pair 3, the intraclass correlation coefficient for absolute agreement was *ICC (A,1)* = .93, 95% *CI* = .86 - .97, F (15,105) = 21.50, $p < .001$, also indicating excellent agreement between the raters. Overall rater means and means for synonym Pairs 1 and 2 were indicative of Similar or Highly Similar ratings for the synonym pairs. Ratings were somewhat lower for synonym Pair 3, which we expected given that this synonym pair contained less frequently occurring and less alike synonyms.

Table 8.

Absolute Agreement Between the Raters' Similarity Ratings for the Spanish-English Synonym Pairs

Rater (Country)	Similarity Ratings (n = 8)							
	Pair 1		Pair 2		Pair 3		Total	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
1 (Chile)	3.9	0.3	3.6	0.7	2.3	1.2	3.4	1.0
2 (Chile)	3.7	0.5	3.5	0.7	2.7	0.8	3.4	0.7
3 (Mex.)	3.8	0.4	3.6	0.8	2.3	1.2	3.4	1.0
4 (Mex./Spain)	3.9	0.3	3.8	0.6	2.8	0.9	3.6	0.7
5 (Cuba)	3.9	0.3	3.5	1.0	2.2	1.2	3.4	1.1
6 (Cuba)	4.0	0.0	3.6	0.8	2.5	1.2	3.5	0.9
7 (Mex.)	3.9	0.3	3.8	0.5	3.4	0.6	3.8	0.5
8 (Chile)	3.9	0.3	3.7	0.6	2.7	0.9	3.6	0.8

Note. SD = standard deviation; Pair 1 = Spanish English synonym pair 1; Pair 2 = Spanish English synonym pair 2; Pair 3 = Spanish English synonym pair 3.

Conceptual relatedness. Table 9 in Appendix D presents the concepts that the participants provided as being most representative of the original EVLT and EVLT-S words. Most of the concepts provided by the participants in each group were 100% related to the emotion category of the word. The concepts that the participants provided that were unrelated to the words emotion category are also included in Table 8. For one word, *deseperanzado/a (hopeless),* the concepts the participants in the Spanish dominant group provided were related to the emotion category of the word less than 70% of the time.

Discussion of Phase II

In this phase of the study, the acceptability of the EVLT-S instructions and administration were examined, as were the emotional intensity and the semantic and conceptual similarity between the words in the target list of the EVLT-S and the EVLT.

Instructions and administration. Issues regarding EVLT-S administration and whether the participants were understanding the task instructions were discussed in a team meeting with the test administrators. All test administrators, including the primary author, agreed that the instructions were easily understood by the participants and none of them reported relevant difficulties in terms of the participants understanding each section of the EVLT-S. Minor issues were reported that typically apply to any neuropsychological testing situation (e.g., participant was distracted at the beginning of the session and instructions had to be repeated), though no problems were reported that resulted in participants' responses being invalid.

Intensity and categorization ratings. In terms of intensity ratings, the English-dominant group rated each of the words as more intense overall compared to the Spanish-dominant group. However, a similar pattern of ratings was present for the Spanish-dominant and English-dominant groups when intensity ratings for the emotion categories were examined, in that both groups rated the happiness words as more intense than the anger, sadness, and anxiety words. Both groups provided similar ratings for anger and sadness words, although these words were rated as more intense than anxiety words. When the effects of an aspect of acculturation and word knowledge were controlled, the group differences in intensity ratings were reduced and no longer significant. The measure of acculturation was the MEIM-R, which assesses ethnic identity, including commitment to one's own cultural group and willingness to be involved in and learn more about it.

It is unclear why ethnic identity was associated with emotion intensity ratings for the EVLT-S words. However, it does not appear that this was due to unusually high emotion intensity ratings for the English-dominant group. Figure 2 presents comparisons of the average

intensity ratings in the current English-dominant group to those reported in the original emotional word norming study (Strauss & Allen 2008).

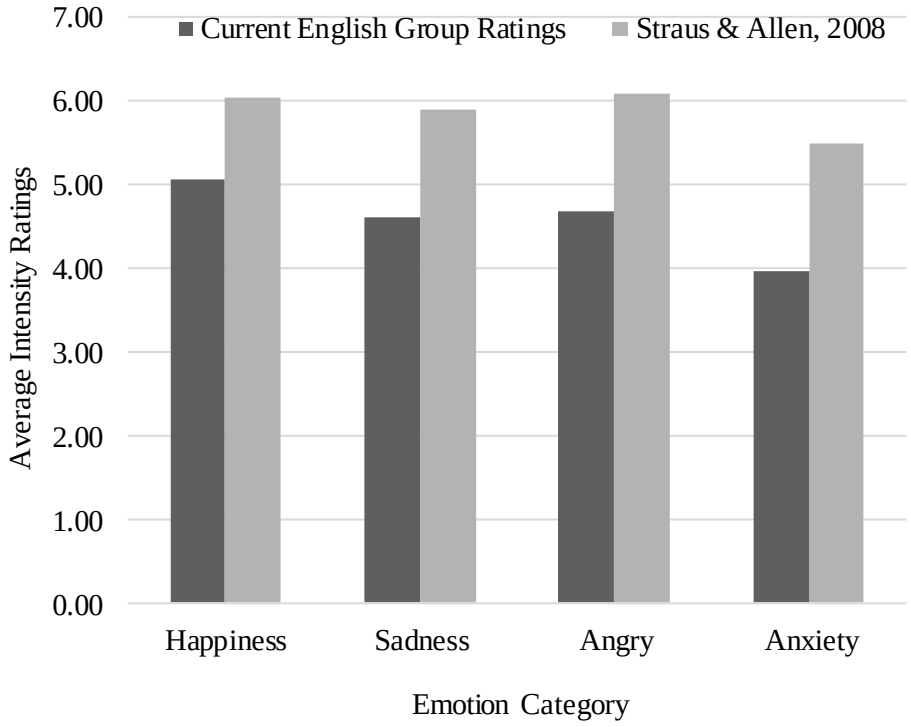

Figure 2. *Comparison of current average word intensity ratings across each emotion category provided by the English dominant group with previous data collected with monolingual English speakers by Strauss and Allen (2008).*

As seen from the figure, the average intensity rating of the current English-dominant group, who was mostly bilingual, was lower compared to the intensity ratings reported by Strauss and Allen (2008) with monolingual English speakers. Therefore, it may be that culture is in fact influencing the rating of emotional words, such that those individuals from Hispanic culture who indicate that Spanish is their primary language provide lower emotional intensity

ratings for Spanish emotional words. Matsumoto (1993) evaluated ethnic differences in affect intensity, emotion judgments, and self-reported emotional expression in a culturally diverse sample from the U. S. Results indicated that African Americans perceived female expressions more intensely than did Asian Americans; Hispanic Americans perceived Caucasian faces more intense than did Caucasian Americans and Asian Americans; and that African Americans perceived anger more intensely than Asian Americans and perceived disgust more intensely than Caucasian Americans and Asian Americans. Even though the primary stimulus in their study were facial expressions, findings such as these underscore the influence that culture can have on intensity ratings of emotional stimuli.

Considered together, the results for intensity ratings suggest that while the English-dominant group perceived the emotional words as more intense than the Spanish-dominant group, the words were otherwise perceived in a similar manner and differences in intensity were at least partly accounted for by cultural considerations and word knowledge. Thus, the EVLT-S will most likely function in a similar manner to the EVLT for assessing emotional learning and memory.

Regarding categorization ratings, 13 of the 16 EVLT words exceeded the 70% categorization threshold indicating the words were good exemplars of their intended emotional categories. Ratings provided by the English-dominant group fell below the 70% categorization threshold for *enemy*, *tense*, and *honor*. For *enemy*, the most common rating was anger (51.9%) which was the intended emotion category, followed by fear (25.9%). For *tense*, the most common rating was anxiety (66.7%), which was the intended emotional category, followed by fear (22.2%). Fear was the second most common categorization for both words. In the case of *tense*, the emotion categories of anxiety and fear are closely associated, and the combined ratings

for these two categories is 88.9%. Although not as closely related, fear is also associated with anger and combined ratings across the fear and anger categories for enemy was 77.8%. For *honor*, the most common rating was happy (66.7%), which was the intended emotion category, followed by neutral (22.2%). The EVLT words were initially selected from 463 words that were rated by 200 individuals with regard to emotion category and intensity (Strauss & Allen, 2008), and the current results are largely consistent with those findings. Considering that categorization ratings were previously obtained for English speakers using a much larger sample (Strauss & Allen, 2008), differences are likely a product of the unique characteristics of the sample of the current study. One unique characteristic that may have influenced word categorization was the high percentage of individuals in the English-dominant group who were bilingual. We could not address this matter directly, although it is relevant to note that there was a significant influence of cultural identity on intensity ratings of emotional words, an effect that may extend to categorization ratings as well.

Regarding categorization ratings for the EVLT-S words, 12 of the 16 target list words exceeded the 70% categorization threshold, suggesting that most of the words were good exemplars of their intended emotional categories. Participants in the Spanish-dominant group provided categorization ratings of less than 70% for four words including *deseperanzado/a (hopeless)*, *nervioso/a (nervous)*, *tenso (tense)*, and *melancolia* (gloom/melancholy). *Deseperanzado/a (hopeless)*, which was selected to represent the emotion category sadness, was most commonly categorized as anxious (55.2%), with a secondary categorization of sadness (20.7%). This was the only word that was more frequently categorized as representing an emotion category (anxiety) that was different than originally intended (sadness). The reason for these categorizations may lie in the fact that *deseperanzado/a* (hopeless), in Spanish is similar in

spelling to *desesperado/a* (desperate), which means *desperate* and is more closely associated with anxiety than sadness.

Nervioso/a (nervous) and *tenso* (tense), which were selected to represent the emotion category anxiety, were primarily categorized as anxiety (62.1% and 65.5%, respectively) with a secondary categorization of fear (27.6% and 24.1%, respectively). Given the close association between the emotion categories of anxiety and fear, the rating of these words across both categories is understandable. Previous research related to norming emotional norms in terms valence and arousal have often included only fear in their design, accounting anxiety as part of the fear construct (e.g., Bradley & Lang, 1999). Other researchers have reported that fear and anxiety are not interchangeable constructs (e. g. Perkins, Kemp, & Corr, 2007). Gray and McNaughton (2000) suggested fear and anxiety trace to separate but interacting brain systems that together allow animals to avoid threats while providing a reasonable chance of engaging in other behaviors necessary for survival. In this animal research, fear is conceptualized as a fight-flight-freeze system (threatening stimuli that can be avoided), while anxiety is conceptualized as the behavioral inhibition system (threatening stimuli that must be faced; Gray & McNaughton, 2000). From a clinical psychopathology perspective there are different disorders associated with pervasive anxiety (e.g., Generalized Anxiety Disorder) or fear (e.g., Specific Phobia), but generally speaking fear and anxiety are viewed as part of the same complex of disabling symptoms that lead to the diagnosis of a mental disorders. Based on these considerations, EVLT and EVLT-S words selected to reflect anxiety are expected to reflect aspects of both anxiety and fear, which is the case for most words examined in this study. Because the animal and clinical research suggest that fear and anxiety are closely related, the less than 70% rating for *nervioso/a*

(nervous) and *tenso* (tense) in the anxiety category was not viewed as particularly problematic for retention of the words in the EVLT-S anxiety emotion category.

Melancolia (gloom/melancholy), which was selected to represent the emotion category of sadness, was primarily rated as sadness (48.3%) and its second most common categorization was neutral (31.0%). *Melancolia* (gloom/melancholy) can be related to not caring, lack of interest, or numbness in Spanish and perhaps this led to some participants rating it as neutral. Nevertheless, its primary meaning is related to sadness. This raises concern regarding whether or not it is a good exemplar of sadness and whether it is sufficiently intense, since neutral words are not typically associated with high emotional intensity. Regarding intensity, the average intensity rating for *Melancolia* (gloom/melancholy) was 3.0, which was the lowest of the sadness words. However, it was similar in intensity compared to words from other emotion categories that were more frequently rated as good exemplars of their intended emotion category. For example, *rabia* (rage) had an intensity rating of 3.0 and was primarily categorized as anger (75.9%), and *intraquilo/a* (uneasy) had an intensity rating of 3.0 and primarily classified as anxiety (72.4%). Moreover, as discussed in the next sections, the concepts that the Spanish participants provided were mostly related to sadness and depression 83.3% of the time, suggesting that *melancholia* is a good exemplar of the emotion category sadness. Additionally, the synonyms provided for *melancolia* (gloom/melancholy) were semantically related to sadness and were rated mostly as highly similar with their English counterparts. Based on these considerations the researchers decided to retain *melancolia* (gloom/melancholy) for further evaluation.

Synonyms and conceptual relatedness. Most of the synonym words and concepts the participants in both groups provided were related to the original EVLT/EVLT-S emotion categories, suggesting that most of the words are related to equivalent constructs in both

languages. The exception was *desesperanzado/a*, which was selected for the English word *hopeless* in the sadness category. For this word, the most frequent synonym was *triste* (sad), which is directly related in meaning to the intended emotion category (sadness). However, the second and third most commonly provided synonyms were *ansioso* (anxious) and *desesperado* (desperate), respectively. Both of these words are more closely related to anxiety, fear, or impatience in Spanish. Further, for *desesperanzado/a* (hopeless), 50% of the concepts provided were related to anxiety and the other half were related to sadness. Qualitative examination of the concepts the participants provided for *desesperanzado/a* (hopeless) indicated that most of the participants who wrote a concept related to anxiety confused the word with *desesperado/a* (desperate), therefore relating it conceptually to anxiety. In Spanish *desesperanzado/a* (hopeless) and *desesperado/a* (desperate) are spelled and pronounced similarly, which likely contributed to the confusion and also affected the intensity and categorization ratings for this word. Additionally, *desesperado/a* (desperate) is a more frequently used word in Spanish compared to *desesperanzado/a* (hopeless). However, they have different meanings and represent different emotion categories (sadness and anxiety, respectively). Thus, 15 of the 16 EVLT-S word concepts provided by the Spanish participants were representative of the intended emotional category 82.8% of the time or more and most of the synonyms were also representative the intended emotional category.

Conclusions. Overall, *desesperanzado/a* (*hopeless*) was the only word that was categorized in the wrong emotion category (anxiety rather than sadness), 50% of the concepts provided were related to anxiety, and some synonyms were also related to anxiety. As noted above, qualitative inspection of the concepts provided by the participants elucidated that half of them confused this word with *desesperado* (desperate), which is more closely associated with

anxiety. We considered replacing *desesperanzado* with another word that is related to sadness, which would not present with the same problem of being similar to another word with different meaning. For example, an option would be to replace it with *tragico* (tragic), which is currently included in the interference list of the test. This would also remove the longest word on the target list. However, when *desesperanzado/a* (hopeless) is not confused with d*esesperado/a* (desperate), it serves as a more direct translation of *hopeless* that clearly relates to sadness. This is likely the reason 50 percent of the Spanish-dominant group understood the meaning and classified the word appropriately. Considering the small sample size of the current pilot study, the question remained whether the findings concerning this word were a product of this particular sample size and its characteristics (bilingual college students) or whether it would be generalized to monolingual Spanish speakers. Additionally, the aim of this study was to create a Spanish version that was equivalent to the English version and that aim was prioritized. Because *desesperanzado/a* is more similar in meaning to *hopeless* (semantic equivalence), we decided to retain the word for Phase III and obtain more data with the current version of the test. For example, exploratory factor analysis was used in the next phase of the study to determine if EVLT-S scores associated with each emotion category form separate factors as was observed with the original EVLT (Strauss & Allen, 2013). If sadness test scores did not group together to form a factor, *desesperanzado/a* (hopeless) could account for that finding. Further consideration of the pros and cons of retaining *desesperanzado/a* (hopeless) in Phase III is provided in the general discussion section.

Concerning the other words in the EVLT-S target list, the current results from intensity ratings, categorization ratings, and semantic and conceptual representations suggest that they were semantically and conceptually equivalent (see Cherner, 2010) to the EVLT words. As

previously mentioned, Matsumoto (2007) warned that achieving a completely equivalent measure across different cultures and languages was not possible and provided recommendations to deal with nonequivalent data. Thus, the we identified nonequivalent data and provided alternatives to increase equivalence (e.g., used *melancolia* as a translation for gloom) and also identified the reason for nonequivalent data (e.g., *desesperanzado* was confused with *desesperado*). Considering that there were no reported issues in terms of test administration (e.g., inappropriate instructions, failure to follow task directions), these findings also provided preliminary evidence for the cultural relevance of the assessment method and the assessment items (see Cherner, 2010). Nevertheless, more data is needed with larger samples in diverse clinical and educational settings to further examine the validity of the EVLT-S.

Phase III: Evaluation of the EVLT-S's Psychometric Properties

Method

Participants and procedures. The participants from Phase II were included in this phase of the study as well (30 in the Spanish-dominant group and 27 in the English-dominant group). Recruitment procedures were the same as in Phase II and 20 additional Spanish speakers were tested for Phase III of the study. The exclusionary criteria were the same as they were for Phase II and no additional participants were excluded. Consequently, the total Spanish-dominant group for Phase III consisted of 50 participants. The testing procedures used in this phase of the study were the same as those used in Phase II. The only differences were that emotional intensity, emotion category, and word concepts were not administered and all testing was conducted in Spanish. Additionally, datum from 25 monolingual English-speaking healthy control participants collected in previous studies of the EVLT were included in one of the principal components analysis conducted in Phase III.

Results

Participants. Demographic characteristics of the samples included in Phase II are presented in Table 10. Univariate ANOVA and Chi Square analyses were used to examine differences in the demographic characteristics of the Spanish and English-dominant groups. There were significant differences in years residing in the U.S. and ethnicity between the groups. As expected, participants in the Spanish-dominant group overall had less years of residence in the U.S. and they were predominantly identified as Hispanic in terms of ethnicity. Nevertheless, similar to Phase II, most of the participants in the Spanish-dominant group identified both Spanish and English as languages they spoke fluently (bilinguals).

Acculturation, language, performance on cognitive tests, and psychopathology screening information for the Phase III participants are presented in Table 11. As the table shows, there were significant differences between groups on VC raw scores and DS raw scores, with the English-dominant group performing significantly better in both tasks.

Table 10.

Demographic Characteristics of Phase III Participants

Variable	Group				*F (1, 76)*	*p*
	English (*n* = 27)		Spanish (*n* = 50)			
	Mean	*SD*	Mean	*SD*		
Age (yrs.)	23.4	9.6	20.3	3.9	3.93	0.051
Years in US	22.4	10.5	16.4	4.9	11.71	<0.05
Educ. (yrs.)	12.9	1.1	12.8	1.2	0.15	0.70
Father's ed.	11.7	3.0	10.9	3.9	0.80	0.37
Mother's ed.	12.5	3.1	11.6	3.9	0.95	0.33
	% (*n*)		% (*n*)		χ^2	
Sex (% Male)	48.1 (13)		28 (14)		3.13	.07
Right Handed	96.3 (26)		82.2 (37)			
Ethnicity					20.51	<.001
Caucasian (not Hisp.)	14.8 (4)		0.0			
Hispanic	59.3 (16)		98 (49)			
Other	25.9 (7)		2 (1)			
Bilingual	51.9 (14)		98.0 (49)			

Note. yrs. = years; Fath. ed. = father's education; Moth. ed. = mother's education; RHand = right handed.

Table 11.

Description of Phase III Participants in Terms of Acculturation, Cognitive Performances, Estimated Intelligence, and Psychopathology

Variable	Group				*F*	*p*
	English (*n* = 27)		Spanish (*n* = 50)			
	Mean	*SD*	Mean	*SD*		
SASH	3.7	0.6	3.3	0.5	7.87	<0.05
BIQ-A	80.2	7.6	75.5	6.9	7.30	<0.05
BIQ-H	64.7	15.2	75.6	10.8	13.24	<0.005
MEIM-T	3.5	0.8	2.06	0.7	74.71	<0.001
MEIM-E	3.5	0.8	2.3	0.8	34.11	<0.001
MEIM-C	3.6	0.9	1.9	0.9	54.33	<0.001
VC (RS)	42.2	10.9	28.6	6.8	44.31	<0.001
VC (SS)	11.1	2.7	10.4	2.1	1.60	0.22
CD (RS)	69.0	18.4	75.8	13.9	3.31	0.07
CD (SS)	8.5	3.0	11.6	2.9	13.22	<0.005
BD (RS)	41.4	10.2	41.7	10.8	0.02	0.90
BD (SS)	10.3	2.4	11.6	2.7	4.76	<0.05
DS (RS)	16.4	3.4	13.4	3.2	15.06	<0.001
DS (SS)	9.4	2.3	10.0	2.9	1.12	0.29
IQ est. (RS)	42.3	7.5	159.6	22.0	2.50	0.12
IQ est. (SS)	9.8	1.7	43.1	6.4	6.30	<0.05
SCL90-GSI	53.9	15.1	65.5	10.4	15.45	<0.001
SCL90-PST	54.0	13.9	62.9	9.2	10.92	<0.005

Note. SASH = The Short Acculturation Scale for Hispanics; BIQ-A = The Bicultural Involvement Questionnaire Americanism; BIQ-H = Bicultural Involvement Questionnaire Hispanicism; MEIM-T = Multi Group Ethnic Identity Measure Total; MEIM-C = Multi Group Ethnic Identity Measure Commitment; MEIM-E = Multi Group Ethnic Identity Measure – Exploration; RS = Raw Score; SS = Scaled score; VC = Vocabulary; CD= Coding; BD = Block Design; IQ est. = Intellectual Quotient Estimate; SCL90-GSI = The Symptom Checklist-90-Revised Global Severity Index; SCL90-GSI = The Symptom Checklist-90-Revised Positive Symptom Total.

Reliability.

Internal consistency. Tests of serial learning (recall ability) generally pose difficulties for calculation of internal consistency because there is item interdependence within trials. This means that recalling any one word on a trial reduces the possibility that other words will be recalled on that same trial because of the inherent limitations of human learning and memory capacity (Delis et al., 1991, 2000). Further, there is interdependence between trials; recalling a word on one trial increases the probability of recalling that same word on successive trials. Due to these difficulties, technical manuals of previous verbal learning test (e.g., CVLT-II, Delis et al., 2000; Strauss & Allen, 2013) have analyzed total trial scores, to reduce problems related to item interdependence. On the EVLT-S, the scores for the five immediate recall trials of the target list serve as global indicators of learning and memory. A reliability estimate can be calculated that reflects the consistency of these five trials. A split half correlation is favored over coefficient alpha because average scores tend to improve across trials (Delis et al., 2000). Descriptive statistics for the EVLT-S learning and memory trials are presented in Table 12. Because there is an odd number of trials (five), we performed a split half correlation by calculating two odd even correlations between immediate free recall Trials 1 + 3 versus Trials 2 + 4, and 2 + 4 versus Trials 3 + 5. We then applied the Spearmen Brown formula, with a lengthening factor of 2.0, to the average of these correlations. Reliability for the Spanish-dominant group was strong (r = .96).

Table 12.

Descriptive Statistics of Performance on the EVLT-S in Phase III

EVLT-S Score	Male (n = 14)		Female (n = 36)		Total (n = 50)	
	M	*SD*	*M*	*SD*	*M*	*SD*
T1 Correct	4.1	1.7	5.5	1.7	5.1	1.8
T2 Correct	6.5	1.9	7.9	2.2	7.5	2.2
T3 Correct	8.1	1.2	9.4	2.3	9.0	2.1
T4 Correct	8.9	2.0	9.7	2.5	9.5	2.4
T5 Correct	9.8	2.0	10.7	2.5	10.4	2.4
T1 - T5 Total Correct	37.5	6.4	43.1	9.4	41.5	9.0
T1 - T5 Total Repetition	1.9	1.4	4.1	2.9	3.5	2.7
T1 - T5 Total Intrusions	4.8	4.0	4.5	3.5	4.6	3.6
Interference List Correct	3.6	1.9	4.5	1.7	4.2	1.8
Short Delay Free Correct	7.3	2.4	8.6	3.3	8.2	3.1
Short Delay Cued Correct	6.4	2.2	8.4	2.6	7.9	2.6
Long Delay Free Correct	7.0	2.5	8.3	2.8	7.9	2.8
Long Delay Cued Correct	6.6	2.3	8.0	2.7	7.6	2.7
Recognition Correct	13.0	2.3	14.3	1.6	14.0	1.9
Recognition False Positives	2.3	2.5	2.1	2.1	2.1	2.2

Note. EVLT-S = Emotional Verbal Learning Test – Spanish; T1 = learning trial 1; T2 = learning trial 2; T3 = learning trial 2; T4 = learning trial 4; T5 = learning trial 5; T1 - T5 = total words correctly recalled on trials one to five; interference list correct = total words correctly recalled on the interference trial; short delay free correct = total words correctly recalled on the short delay free recall trial; short delay cued correct = total words correctly recalled on the short delay cued recall trial; long delay free correct = total words correctly recalled on the log delay free recall trial; long delay cued correct = total words correctly recalled on the log delay cued recall trial; recognition correct = total words identified correctly on the recognition trial; recognition false positives = total number of false positive errors on the recognition trial; *M* = mean; *SD* = standard deviation.

For a second internal consistency estimate, we treated the four emotion categories as two halves of the test by combining two of the categories to make up one half (happiness + anxiety) and the other two categories to make up the other half (sadness + anger). Split half reliability was calculated using the Spearmen Brown formula (with a lengthening factor of 2.0; r = .86). Both of these reliability estimates are comparable with those of other commonly used non-emotional memory tasks (e.g., Delaney et al.,1992; Delis et al., 2000; Woods et al., 2005) and with the EVLT (Strauss & Allen, 2013).

Validity.

Differential item functioning for happiness words. Differential item functioning for happiness words and emotional experience ratings were investigated to provide evidence supporting the internal structure of the EVLT-S scores (AERA, APA, & NCME, 2014). A remarkable characteristic of the EVLT-S is that it permits comparisons of recall and recognition scores across the four emotional categories. Based on previous research on emotion and memory recall, conducted with monolingual English-speaking participants (Strauss & Allen, 2013), we expected that participants would recall more happiness words in comparison with sadness, anger, or anxiety target list words. Such results would serve as evidence supporting the internal structure of the EVLT-S.

To examine whether there was greater immediate recall for happiness words, a repeated measures analysis of variance (ANOVA) was conducted using the total recall scores for the target list trials 1 to 5 for the four emotion categories (happiness, sadness, anger, anxiety) as the repeated measure and language as the between-subjects variable (English, Spanish). Considering that Strauss and Allen (2013) reported differential item functioning for happiness words on the EVLT with monolingual English speakers, English-dominant participants were included in this

analysis to see if those results can be replicated and provide a comparison with the EVLT-S. Total recall scores were calculated for happiness by summing the number of happiness words recalled on trials 1 to 5. The same procedure was used for sadness, anger, and anxiety words. Results indicated significant main effects for emotion, F (3, 225) = 17.84, p <.001, η^2 = .192, and for group, F (1, 75) = 9.26, p < .005, η^2 = .110, as well as a significant emotion X group interaction effect, F (3, 225) = 3.55, p < .05, η^2 = .045. Results are presented in Figure 3.

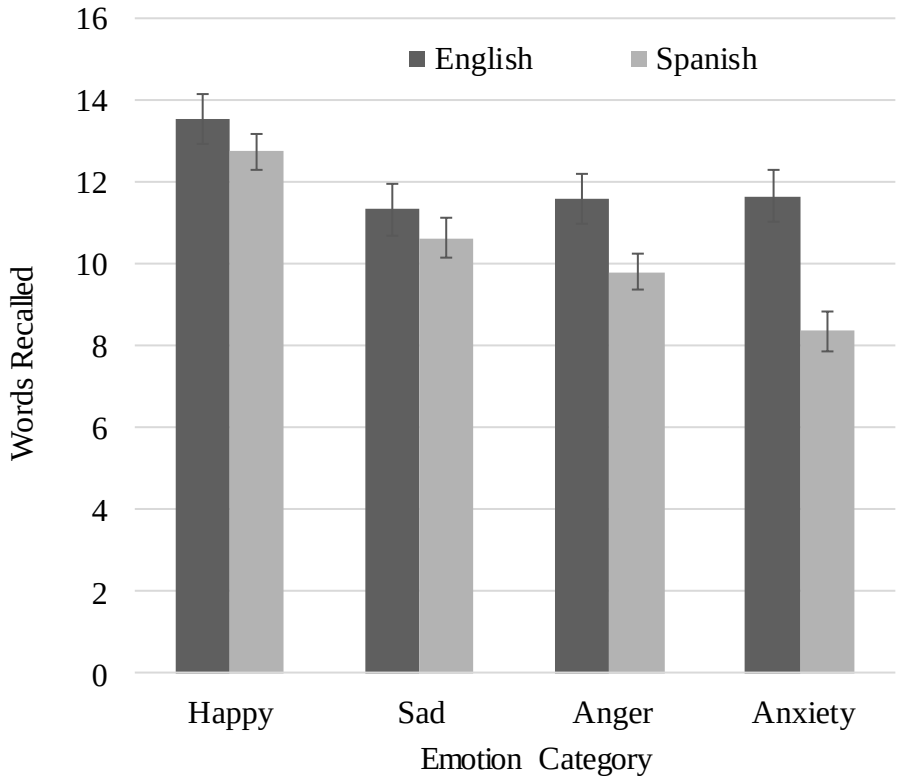

Figure 3. *Average total number of words recalled on trials 1 to 5 from each emotion category by participants in the Spanish-dominant and English-dominant groups. Error bars represent standard errors.*

As the figure shows, happiness words were recalled more often than the other emotion words and there were greater differences between group recall of anger and anxiety words compared to happiness and sadness words. Contrasts confirmed the hypothesis that there was greater recall for happy words compared to sad ($p < .001$), anger ($p < .001$), or anxiety ($p < .001$) words. Post-hoc ANOVAs also indicated that the English-dominant group recalled significantly more anger and anxiety words (p's < .05) and there were no group differences for recall of happiness and sadness words (p's > .30).

The EVLT-S also allows for the examination of self-reported emotional experience ratings for state and trait emotion. Based on previous research, we expected participants would report greater levels of state and trait happiness compared to the other emotions (Strauss & Allen, 2013). The differential item functioning of the self-reported state and trait emotional ratings was investigated in the Spanish-dominant group. A repeated measures ANOVA was conducted to evaluate differences in state and trait emotional experience for the five emotion ratings (happiness, sadness, anger, anxiety, and disgust), where emotion condition served as one repeated measure and state vs. trait emotion served as a second repeated measure. Findings indicated significant main effects for state vs. trait emotion, F (1, 48) = 40.92, $p < .001$, η^2 = .460, and for emotion category, F (4, 192) = 59.73, $p < .001$, η^2 = .554. There was also a significant state vs. trait rating X emotion category interaction effect, F (4, 192) = 2.48, $p < .05$, η^2 = .056. Results of the interaction effect are presented in Figure 4. As we expected, simple contrasts showed higher ratings for happiness than sadness, anger, anxiety, or disgust (p's < .001 for all comparisons). Participants also reported greater experience of sadness and anxiety compared to anger and disgust (p's = .001). Trait emotion ratings were higher than state emotion ratings, with the interaction effect apparently resulting from larger differences in state vs trait

emotion ratings for anger and happiness compared to the other emotions. Considering that the current sample was not clinical, reporting higher levels of state and trait happiness is consistent with expectations and suggest that the EVLT-S experience ratings are valid. Taken together, these findings supported the internal structure of the EVLT-S based on differential item functioning of happiness ratings and recall of happiness words.

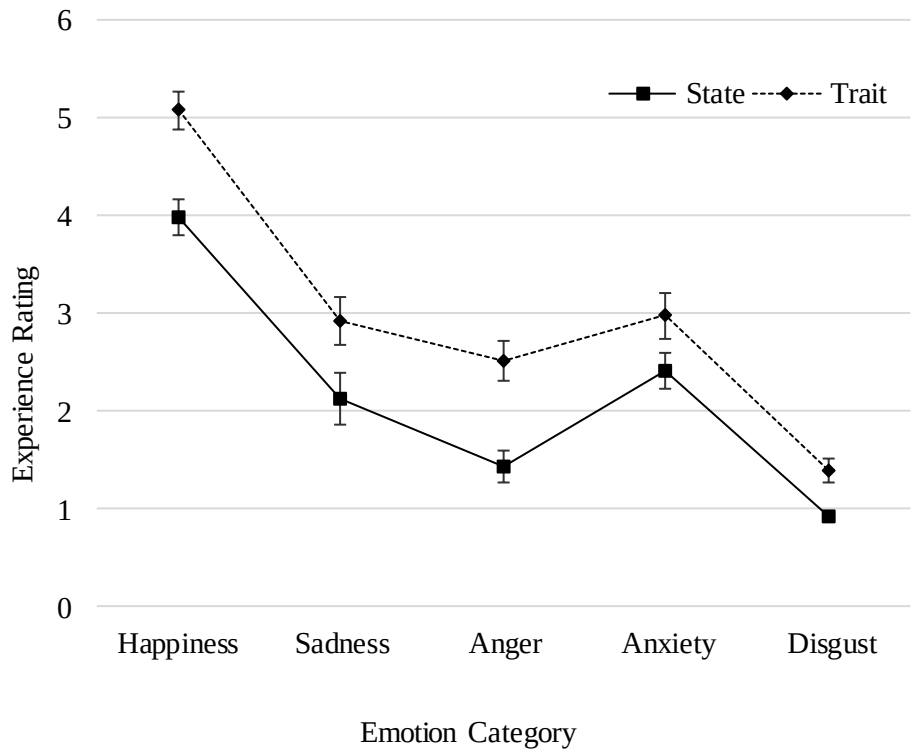

Figure 4. *Differential item functioning of self-reported state and trait emotional experience ratings. Average state and trait emotional experience ratings provided by the Spanish-dominant group for each emotion category. Error bars represent standard errors.*

Differential item functioning based on serial position. To further examine the validity of the internal structure of the EVLT-S, analyses to investigate primacy and recency effects were

conducted. When people with normal learning ability are presented a list of neutral words to remember, they remember more words from the beginning section (primacy) and end section (recency) of the list, compared to the middle section. This is referred to as the primacy/recency effect. Primacy words are more frequently recalled because they tend to get more rehearsal time compared to words presented later on the list and so are more likely to be encoded into long-term memory. Recency words are more frequently recalled because they are maintained in working memory at the end of the list. The middle words are the most infrequently recalled on a list because they are less likely to be encoded into long-term memory and are less available in working memory (Delis et al, 1988; Klatzky, 1980). In the cognitive memory research literature primacy and recency effects are most evident on the first presentation of a words list, so only recall scores from trial one of the EVLT/EVLT-S target lists were examined in these analyses. Based on Salthouse (1980) characterization for the average size of lists, for the EVLT/EVLT-S the first 4 words of the list and the last 4 were considered the primacy and recency sections, respectively. The rest of the words were considered the middle section. This same distribution has been used in previous research of primacy and recency effects with other non-emotional list learning tests (CVLT II; Delis et al., 2000,). If serial position effects are found on trial one of the EVLT-S target list, it would provide additional evidence for its internal structure. We hypothesized that results of the analysis would indicate that participants exhibited greater recall for primacy and recency words compared to words appearing in the middle of the list for both groups.

A mixed model ANOVA was conducted to determine differences in serial position effects for the target list of the EVLT-S and the EVLT. List section (primacy, middle, recency) served as the within-subject factor and the group was the between-subject factor. Primacy,

middle, and recency scores were calculated by summing the number of words that the participants provided for each section on the list. Because there are more middle words on the list (eight), average scores for each section were used in the analysis. Results indicated there was a significant main effect for serial position, F (4, 150) = 21.18, p <.001, η^2 = .220, and a significant main effect for group, F (1, 75) = 858.31, p <.05, η^2 = .097. The serial position X group interaction effect was not significant, F (2, 150) = .03, p = .97, η^2 = .0001. These findings are presented in Figure 5.

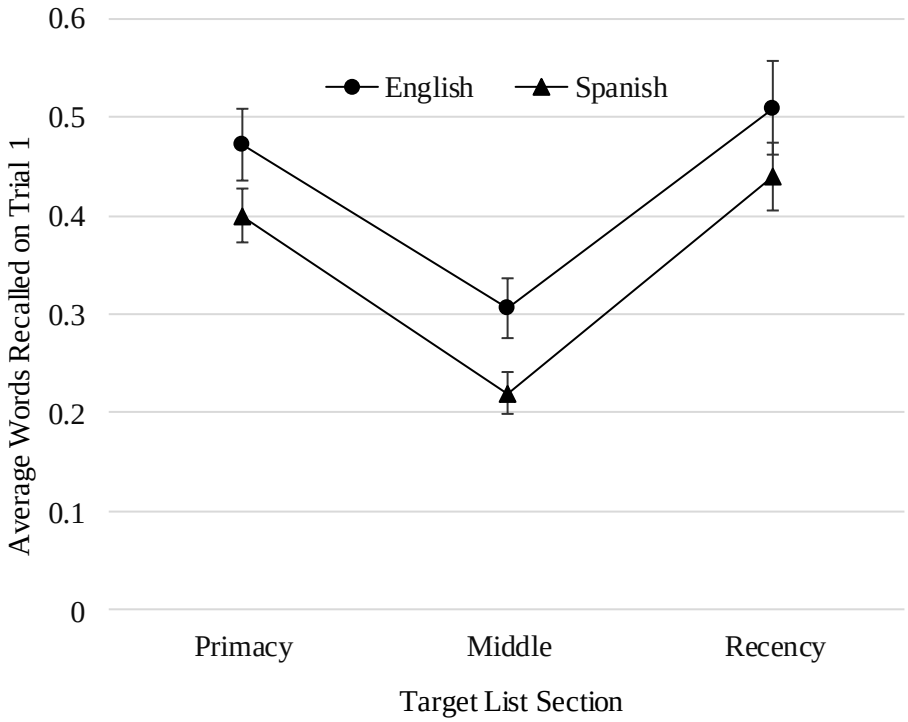

Figure 5. *Differential item functioning based on serial position. Primacy and recency effects on trial one immediate recall scores. Average number of words recalled in each section of the list (primacy, recency, and middle) on trial one by participants on the Spanish-dominant and English-dominant groups. Error bars represent standard errors.*

Consistent with our hypothesis, both groups exhibited primacy/recency effects on trial one recall of the target list, although the English-dominant group recalled more words in each serial position compared to the Spanish-dominant group.

Differential item functioning based on learning curve. There is an extensive literature concerning list learning tests like the EVLT-S that suggests with repeated administration of the same word list, more words are recalled on each successive trial (e.g., Lezak et al., 2012). The improvement in recall across list presentation is referred to as a learning curve, which has been observed for the EVLT, CVLT-II, and other similar tests. Comparisons between the CVLT-II and the EVLT indicated that the EVLT has a learning curve comparable to the CVLT-II (Strauss & Allen, 2013). However, the EVLT appears to be a more difficult test than the CVLT-II because fewer overall words are recalled on each EVLT trial (Strauss & Allen, 2013). Based on these findings, we expected that similar learning curves would be evident for the EVLT-S and LLT-S target list trial scores, although the EVLT-S would be more difficult as indicated by fewer words recalled on each trial.

To investigate learning curves, a mixed model ANOVA was conducted to examine group performances on the EVLT-S learning trials and compare them to comparable performance on the LLT-S learning trials in the English and Spanish-dominant groups. In this analysis, test (EVLT-S/EVLT, LLT-S/LLT-E) and trial served as within-subjects variables and group (Spanish, English) served as a between-subjects variable. The results of the analyses indicated a significant main effect for test, F (1, 75) = 26.99, $p < .001$, $\eta^2 = .265$, for trial, F (4, 300) = 308.10, $p < .001$, $\eta^2 = .804$, and for group, F (1, 75) = 9.46, $p < .005$, $\eta^2 = .112$. The test X trial interaction effect was also significant, F (1, 75) = 3.34, $p < .05$, $\eta^2 = .043$, although the test X

group, trial X group, and test X trial X group interaction effects were not significant (see Table 13 in Appendix D). The interaction effect is presented in Figure 6.

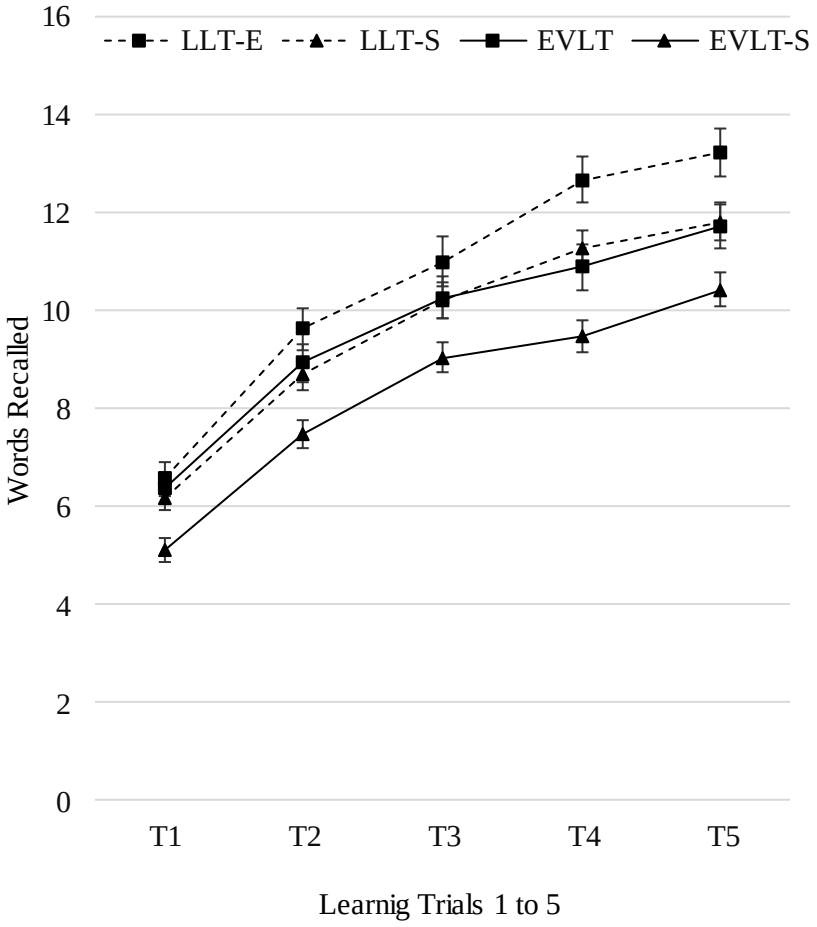

Figure 6. *Differential item functioning based on learning curve. Repeated measures ANOVA. Error bars represent standard errors. LLT-E = List Learning Test-English; LLT-S = List Learning Test-Spanish; EVLT = Emotional Verbal Learning Test; EVLT-S = Emotional Verbal Learning Test – Spanish.*

As seen from the figure, all groups improved from trial 1 to trial 5 on the LLT-E/LLT-S and EVLT/EVLT-S. The test X trial interaction effect appears to be accounted for by a relative

difference in the increase from trials 3 and 4 for LLT and EVLT. The Spanish-dominant group had the lowest overall performance on the EVLT-S, consistent with the significant main effect for group. Post hoc comparisons (paired samples *t* test) of the Spanish-dominant group's LLT-S and EVLT-S performance indicated significant differences at each trail ($p < .01$), with the EVLT-S scores being lower than the LLT-S scores. The differences in scores between the EVLT-S and the LLT-S are consistent with the differences found between the EVLT and the CVLT-II in monolingual English speaking samples (Strauss & Allen, 2013) and with the English-dominant group's performance in the current study.

As mentioned above, there were significant differences between the Spanish and English-dominant groups in terms of VC (word knowledge), DS (attention/working memory), and acculturation scores on the SASH. It was expected that differences in word knowledge and working memory would be associated with list learning performance. It was also possible that differences in acculturation to U.S. culture could impact list learning particularly for the current sample, most of whom were bilingual. To investigate whether these variables affected the difference in learning curves between groups and tests, the ANOVA was repeated with vocabulary, working memory, and acculturation (SASH) included as covariates. Results are presented in Table 13 in Appendix D and Figures 6, 7, and 8. As it is reflected in the figures, the significant main effect for group was largely attenuated when controlling for vocabulary and working memory. When also controlling for acculturation, a trial by acculturation interaction effect emerged, with the English-dominant group generally performing better than the Spanish-dominant group. The results suggest that group differences identified in the original analysis were largely accounted for by word knowledge, working memory, and acculturation differences between the English-dominant and Spanish-dominant groups.

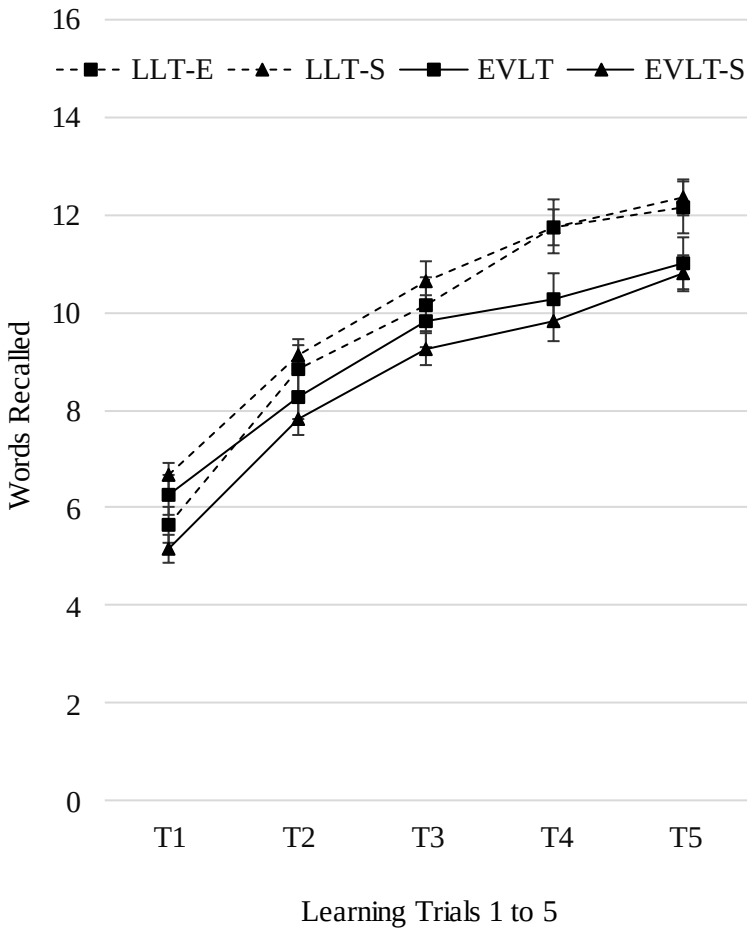

Figure 7. *Repeated measures ANOVA with VC and DS as covariates. Estimated marginal means. Error bars represent standard errors. LLT-E = List Learning Test-English; LLT-S = List Learning Test-Spanish; EVLT = Emotional Verbal Learning Test; EVLT-S = Emotional Verbal Learning Test – Spanish.*

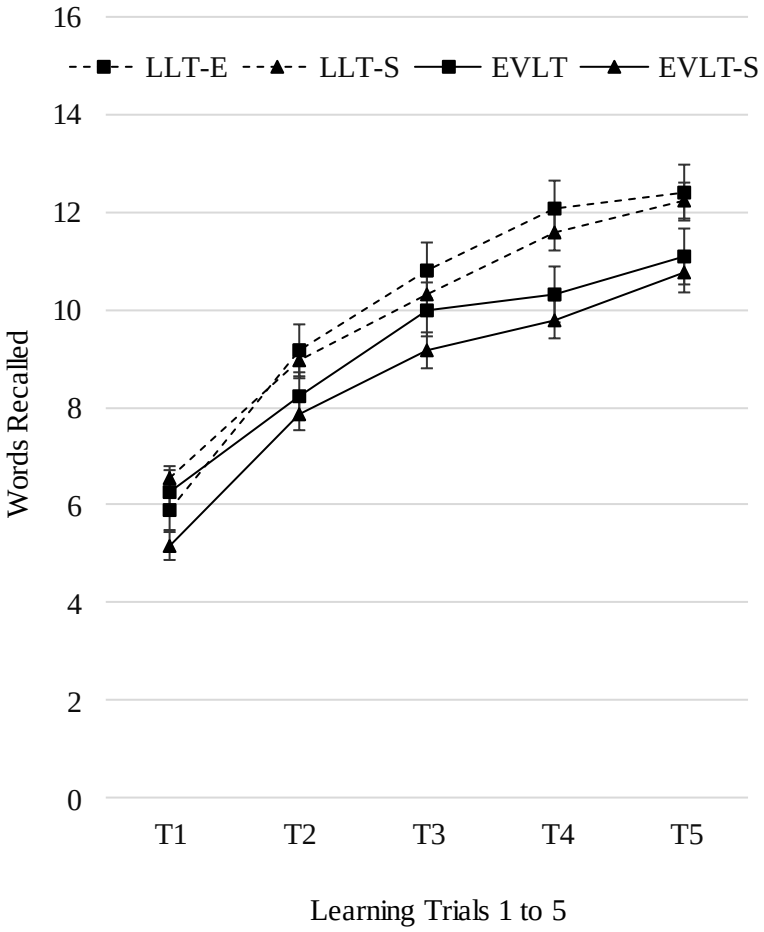

Figure 8. *Repeated measures ANOVA with VC, DS, and SASH as covariates. Estimated marginal means. Error bars represent standard errors. LLT-E = List Learning Test-English; LLT-S = List Learning Test-Spanish; EVLT = Emotional Verbal Learning Test; EVLT-S = Emotional Verbal Learning Test – Spanish.*

Convergent and discriminant validity. The associations between age, gender, level of education, and gender on memory performance are well established in the literature. Higher levels of education have been associated with better cognitive performances, including memory tests (e.g., Schoenberg & Scott, 2011). Females generally perform better on verbal learning tests compared to males (Kramer et al., 1988). Age has been shown to have an inverse correlation with memory performance, with decreasing scores as age increases (e.g., Lezak et al., 2012; Zilmer et al., 2008). More recently acculturation level has also been proposed as possible variable that could affect cognitive performances including verbal memory (e.g., Strutt et al., 2016). These demographic factors can serve as a method of assessing validity if they relate to the EVLT-S scores in the way that it is expected based on previous research. A *t* test was conducted to evaluate the performance of males and females in the immediate learning trials (1 to 5 total), which is one of the most representative scores of the EVLT-S because it provides an estimation of overall learning and retention capacity. Consistent with previous findings, results showed that females performed significantly better than males, t (1, 48) = -2.05, $p < .05$. Descriptive scores are presented in Table 12. Additionally, as expected, there was a significant negative correlation between age and EVLT-S long delay recall score ($r = -.34$, $p < .05$). Contrary to expectations, years of education was not significantly correlated with EVLT-S performance.

Correlations were also calculated between the learning and recall trials of the EVLT-S and the LLT-S. Even though these tests evaluate different types of memory processes, both of them measure verbal learning ability and recall. Therefore, positive correlations among the different scores from these tests would serve as evidence of convergent validity. These correlations are presented in Table 14. As the table shows, there were significant correlations among most trials of both tests. The magnitude of these correlations generally suggests that the

EVLT-S assesses learning and memory similarly to the LLT-S, but that it is also tapping into a different aspect of learning and memory (i.e., emotional memory).

Table 14.

Convergent Validity: Correlations Between EVLT-S and LLT-S Trials

Score	EVLT-S		LLT-S		*r*
	Mean	*SD*	Mean	*SD*	
Trials 1-5 Total Correct	41.54	8.98	48.18	8.81	.46**
Interference List Correct	4.24	1.80	6.78	1.97	.29*
Short Delay Free Correct	8.24	3.08	10.12	2.59	.33*
Short Delay Cued Correct	7.88	2.63	8.84	2.13	.15
Long Delay Free Correct	7.90	2.79	10.14	2.50	.39**
Long Delay Cued Correct	7.60	2.65	9.08	2.36	.35*
Recognition Total Correct	13.96	1.88	14.28	2.48	.23
Recognition Total FP	2.12	2.21	1.22	1.54	.30*
Total Repetitions (T1-5)	3.46	2.74	2.88	2.41	.23
Total Intrusions (T1-5)	4.58	3.61	1.48	2.08	.36**

Note. EVLT = Emotional Verbal Learning Test; LLT-S = List Learning Test – Spanish; T1-5 = Trials 1 to 5; FP = false positive errors; *SD* = standard deviation. ** = $p < .01$; * = $p < .05$.

To further examine convergent and discriminant validity, correlations with the other cognitive tests included in the battery were investigated. Considering that all cognitive abilities tend to be positively correlated, we expected that there would be weak to moderate positive correlations with other verbal tests of cognitive ability and weaker or no significant correlations with visuospatial tests of cognitive ability. These correlations are presented in Table 15. As we expected, results indicated that the EVLT-S trial one to five total correct and long delay recall correct scores were significantly correlated with WAIS-III VC scores. These correlations were

weak, which we expected considering that even though both of these tests are verbal, they measure different constructs. Vocabulary knowledge can be used as an estimation of general verbal ability or premorbid functioning and higher vocabulary scores have been associated with better verbal memory performances. There were no significant correlations with the other cognitive tests included in the battery that measured working memory (DS), processing speed (CD, SIT), visuospatial construction (BD), and simple inhibition/attention (SIT).

Table 15.

Convergent and Discriminant Validity: Correlations with VC and other Cognitive Tests

EVLT-S	SIT			EIWA-III			
	LT	FT	SITT	VC	CD	BD	DS
Trials 1-5 Total Correct	.02	.13	.07	.33*	-.02	.12	.21
Short Delay Free	-.04	.13	.04	.17	.05	.19	.19
Long Delay Free	-.15	.03	-.07	.29*	.06	.25	.20
Recognition Total	-.02	.14	.05	.27	.01	.22	.00

Note. EVLT-S = Emotional Verbal Learning Test – Spanish; Short Delay Free = short delay free recall trial correct score; Long Delay Free = long delay free recall trial correct score; Recognition Total = recognition trial total correct score; SIT = Search Identification Task; LT = SIT letters total score; FT = SIT figures total score; SITT = SIT total score; EIWA-III = Escala de Inteligencia Wechsler para Adultos, Tercera Edicion (Wechsler Adult Intelligence Scale Third Edition); VC = Vocabulary subtest; CD = Coding subtest; BD = Block Design subtest; DS = Digit Span subtest. * = $p < .05$.

Finally, the construct validity of the EVLT-S self-reported emotional experience ratings was evaluated in relation to the PANAS. Correlations were calculated between the EVLT-S self-

report state and trait experience ratings and the PANAS positive and negative affect state and trait ratings. We expected that the EVLT-S happiness state and trait ratings would be positively correlated with the PANAS positive affect state and trait scores. The other EVLT-S experience ratings would be associated with the PANAS negative affect scale scores. This would provide evidence for the convergent and discriminant validity of the EVLT-S emotional experience ratings. These correlations are shown on Table 16.

Table 16.

Convergent and Discriminant Validity: Correlations between EVLT-S Experience Ratings and PANAS Positive and Negative Affect Scores

EVLT-S	PANAS			
Experience Ratings	Pos. State	Neg. State	Pos. Trait	Neg. Trait
State				
State Happiness	.34*	-.05	.22	-.32*
State Sadness	-.28*	.40**	-.24	.28*
State Anger	.03	.57**	-.10	.28*
State Anxiety	.07	.20	-.04	.29*
State Disgust	.18	-.22	-.01	-.18
Trait				
Trait Happiness	.14	-.18	.31*	-.27
Trait Sadness	-.39**	.40**	-.47**	.57**
Trait Anger	-.33*	.40**	-.30*	.55**
Trait Anxiety	.00	.30*	-.05	.45**
Trait Disgust	-.10	.00	-.07	.17

Note. EVLT-S = Emotional Verbal Learning Test – Spanish; PANAS = The Positive and Negative Affect Schedule; Pos. State = state positive affect score; Neg. State = State negative affect score; Pos. Trait = trait positive affect score; Neg. Trait = trait negative affect score. **= $p < .01$; * = $p < .05$.

As we expected, there was a significant positive correlation between the EVLT-S happiness state and PANAS positive affect state ratings (r = .34), as well as the EVLT-S happiness trait and PANAS positive affect trait ratings (r = .31). Numerous positive correlations were also present between the EVLT-S state and trait ratings for sadness, anger, and anxiety, and the PANAS state and trait negative affect ratings. There were also some significant negative correlations present between the EVLT-S state and trait ratings for sadness, anger, and anxiety, and the PANAS state and trait positive affect ratings. There were no significant correlations between the EVLT-S state and trait disgust ratings and the PANAS scores. Taken together, the results of these analyses were mostly consistent with our hypotheses and provided evidence for the convergent and discriminant validity of the EVLT-S learning and memory scores, as well as the EVLT-S emotional rating scores.

Factor structure. To provide a preliminary examination of the factorial validity of the EVLT-S, the factor structure of the EVLT-S was evaluated using principal components analysis (PCA). Results of this analysis were considered preliminary given that the number of participants is below the number generally accepted to produce a stable factor solution (recommended n is 300; Tabachnick & Fidell, 2001). However, considering that Strauss and Allen (2013) previously reported the factor structure of the EVLT (N = 324), which provided a comparison for the results obtained here, this analysis was included for exploratory purposes. A similar statistical approach was used as reported in Strauss and Allen (2013), so that the current results might be directly compared to the findings in that study.

Two PCA's were conducted in this study. The first was conducted on the combined English-dominant and Spanish-dominant groups. For this first analysis, 25 monolingual English-speaking healthy control college student participants whose data were collected in another study

of the EVLT were included to increase the overall *n* to 102. With the addition of these 25 participants, the English-dominant group (*n* = 52) had an average age of 23.1 years (*SD* = 7.3), had an average of 13.4 years of education (*SD* = 1.3), was 32.7% Caucasian, 36.5% Hispanic, and 30.8 % other race, and were 55.8% female. As in Strauss and Allen (2013), emotion scores were calculated by summing the number of words that belonged to each category (happiness, sadness, anger, anxiety) for each trial of the test. Table 17 shows the scores that were entered in the PCA. These scores were selected to mirror those used in the PCA of the original version of the EVLT reported by Strauss and Allen (2013). Considering that the different emotional categories are supposed to tap into different discrete emotions, we expected that factors would be identified for each emotion. We also anticipated that a short-term memory factor composed of trial 1 scores would be identified. The second PCA was conducted with the Spanish sample alone (*n* = 50) using the same procedures as used in the first PCA.

Results of PCA for the entire sample (Spanish and English) on the EVLT emotion scores are presented in Table 17.

Table 17.

Principal Components Analysis with Combined Sample (n = 102)

EVLT/EVLT-S Score	Component					Communalities
	Anger	Sadness	Happiness	Anxiety	STM	
Anger LD	**.79**	.08	.04	.15	.15	.69
Anger SD	**.79**	.17	.11	.19	.11	.72
Anger T1	**.71**	.06	-.05	.29	-.*31*	.69
Anger T5	**.69**	.26	.17	-.04	.29	.65
Sadness LD	.26	**.82**	.16	.12	.08	.79
Sadness SD	.31	**.76**	.12	.10	-.02	.71
Sadness T5	.16	**.75**	.10	.16	-.04	.63
Sadness T1	-.18	**.60**	-.20	.18	.06	.46
Happiness SD	.02	.06	**.84**	.11	-.04	.72
Happiness LD	.26	.05	**.81**	.05	-.14	.75
Happiness T5	-.03	.05	**.79**	.06	.19	.67
Anxiety T5	.25	.08	-.05	**.82**	.14	.77
Anxiety LD	.09	.27	.10	**.81**	.20	.78
Anxiety SD	.19	.28	.*33*	**.78**	.04	.83
Happiness T1	.10	-.03	.17	.09	**.73**	.58
Anxiety T1	.10	.09	-.24	.28	**.64**	.56

Note. EVLT = Emotional Verbal Learning Test; EVLT-S = Emotional Verbal Learning Test – Spanish; STM = Short-Term Memory; LD = long delay trial; SD = short delay trial; T1 = trial 1; T5 = trial 5; Bold = primary loading; italics = secondary loading; STM = Short-Term Memory.

The Kaiser-Guttman criteria was used to determine the number of factors. The factors were rotated using a Varimax rotation. Factors with eigenvalues greater than one were retained, and loadings of 0.40 or higher were considered salient. These procedures and criteria were used to mirror the procedures and criteria used by Strauss and Allen (2013) in their PCA of the EVLT and be able to compare results directly. Findings indicated five components with eigenvalues

greater than 1. These components accounted for 68.61 of the variance. The first component was labeled Anger because it had salient loadings from anger short delay, anger long delay, anger trail one, and anger trial five. The second component was labeled Sadness because it had salient loadings from sadness short delay, sadness long delay, sadness trial one, and sadness trial five. The third component was labeled Happiness because it had salient loadings from happiness short delay, happiness long delay, and happiness trial five. The fourth component had salient loadings from anxiety short delay, anxiety long delay, and anxiety trial five, and so was labeled Anxiety. The fifth factor was labeled Short-Term Memory (STM) because it had salient primary loadings from happiness trial one and anxiety trial one, as well as a secondary loading from anger trial one. These results suggest that the EVLT-S has four factors that consist of indexes of learning that reflect the four emotion categories (sadness, anger, happiness, anxiety). The fifth factor reflects an index of short-term memory because it consists only of trial one scores. These findings are largely consistent with previous PCA results for the EVLT (Strauss & Allen, 2013).

The same analysis was conducted using only the Phase III Spanish sample. Using the same criteria for factor determination, PCA of the Spanish speaking sample also produced five components that accounted for 70.4 percent of the total variance. Results, including components, are shown in Table 18. As the table shows, component loadings were very similar to those obtained with the combined sample. Four components emerged that represented indexes of learning and memory for each emotion category, as well as a fifth component that represented short-term memory. Sadness trial one had a secondary loading with the Short Term Memory factor, which is more consistent with previous PCA finding with the EVLT. Nevertheless, results in this section should be considered with caution due to the inadequate sample sizes that were utilized.

Table 18.

Principal Components Analysis with Spanish-dominant group Only (n = 50)

EVLT-S Score	Component					Communalities
	Anger	Sadness	Happiness	Anxiety	STM	
Anger SD	**.84**	.18	.21	.20	.05	.82
Anger LD	**.78**	.12	.00	.11	.09	.65
Anger T1	**.77**	.05	-.09	.14	-.19	.66
Anger T5	**.70**	.15	.14	.05	.29	.62
Sadness LD	.22	**.82**	.15	.27	.10	.82
Sadness SD	.17	**.81**	.11	.09	.12	.71
Sadness T5	.06	**.69**	.28	.20	.11	.61
Sadness T1	.11	**.59**	-.27	.19	-.*39*	.62
Happiness T5	-.02	.02	**.86**	.11	.16	.78
Happiness LD	.16	.11	**.82**	-.06	-.24	.78
Happiness SD	.06	.22	**.82**	.04	-.08	.72
Anxiety T5	.22	.07	-.10	**.85**	.05	.78
Anxiety SD	.08	.*42*	.*30*	**.76**	-.06	.85
Anxiety LD	.23	.*34*	.04	**.72**	.07	.70
Happiness T1	.16	.14	.03	-.08	**.69**	.53
Anxiety T1	-.03	-.01	-.*32*	.*30*	**.65**	.61

Note. EVLT-S = Emotional Verbal Learning Test – Spanish; LD = long delay trial; SD = short delay trial; T1 = trial 1; T5 = trial 5; Bold = primary loading; italics = secondary loading; STM = Short-Term Memory.

Discussion of Phase III

Phase III of the study consisted of conducting a series of reliability and validity analyses on the EVLT-S. The internal consistency of the EVLT-S was adequate and comparable to that of the EVLT and other non-emotional list learning tests based on two separate split half internal consistency estimates. Validity studies were concerned with the internal structure of the EVLT-S based on differential item functioning, convergent and discriminant validity, and factorial

validity. Each of these validity investigations provided evidence for the validity of the EVLT-S scores.

Concerning differential item functioning, we found the expected patterns of results based on previous research. On trials one to five, happiness words were recalled more often than the other emotion words, which is consistent with previous research showing better recall for positive emotional words compared to negative words (e.g., Libkumen et al., 2004). The EVLT-S target list also showed the expected primacy/recency effects and incremental learning curve, with participants recalling more words on trial one from the primacy and recency sections of the target list as compared to the middle section and increasingly recalling more words from trial one to five. This suggests that the words selected for the EVLT-S are functioning as it would be predicted for a memory word list according to previous findings (e.g., Delis et al., 2000). Furthermore, similar learning curves were evident for the EVLT-S and LLT-S target list trial one to five scores, though participants who were administered the EVLT-S recalled fewer words on each trial. These findings were comparable to the differences in learning curves between the EVLT and the CVLT-II reported by Strauss and Allen (2013) and suggest that the EVLT-S might be a more difficult test compared to the LLT-S. Previous research has shown that the neutral words are better remembered than emotional words when the neutral list is comprised of words that are semantically related (e.g., Talmi & Moscovitch, 2004), as it is the case for the LLT-S. Other studies that have found improved memory for emotional compared to neutral words typically do not utilize neutral words that are semantically related. Additionally, they often use one trial paradigms, different trial structure compared to the EVLT-S, or incidental memory (participants do not know that their memory is being tested), which limits the applicability of those finding to the EVLT-S, which uses a target list that is presented multiple

times and the instructions tell participants what is expected from them at the beginning. Another possible explanation for the worse performance on the EVLT/EVLT-S compared to the LLT-E/LLT-S is that the words on the EVLT/EVLT-S represent abstract concepts as opposed to concrete objects on the LLT-E/LLT-S. Previous studies have shown that abstract words are more difficult to remember compared to concrete words (e.g. Begg et al., 1978; Vellutino & Scanlon, 1985).

Regarding convergent and discriminant validity, most of the correlations we examined between the EVLT-S and other test scores were in the expected directions and strength. Support for convergent validity was provided by significant positive correlations between most of EVLT-S trials and the LLT-S trials, suggesting that both tests are measuring a similar construct (learning and memory). Nevertheless, these correlations were weak to moderate, indicating that both tests are not assessing the same constructs: the EVLT-S is measuring emotional memory. This finding is consistent with the literature suggesting that social cognitive and neurocognitive tests assess associated but separable constructs. Significant correlations were also found between some EVLT-S scores and a measure of word knowledge (VC), which provided additional support for the convergent validity of the EVLT-S. Evidence supporting discriminant validity was provided by correlations with other cognitive tests that measured different constructs. Non-significant correlations were present with a test of attention, visual scanning and processing speed (SIT), cognitive constructs that are largely independent of learning and memory as assessed by list learning tests. Similarly, the EVLT-S scores were not significantly correlated with tests assessing exclusively working memory (DS), processing speed (CD), or visuoconstructional abilities (BD).

The Spanish-dominant group had the lowest overall performance (trials one to five) on the EVLT-S compared to the other tests that were administered. When the effects of vocabulary, working memory, and acculturation were controlled for, the differences in performance were reduced, although the English-dominant group generally performed better than the Spanish-dominant group. The results suggest that group differences were largely accounted for by word knowledge, working memory, and acculturation differences between the English and Spanish-dominant groups. There were differences between the groups on each of these variables. Regarding working memory, the EVLT-S is a verbal test that requires some degree of working memory (particularly on trial one), with the recency effects noted on target list trial one providing evidence for the role of working memory. Further, the correlations noted between the EVLT-S scores and VC also suggest that word knowledge plays a role in EVLT performance. Therefore, the influence of vocabulary and working memory on performance was somewhat expected.

Acculturation is a concept that has not been studied extensively in relation to cognitive performances; therefore, it is difficult to ascertain in what way it influenced the current performances. Most participants in both groups were bilingual, so it would be interesting to see whether culture in monolingual groups would have a similar impact as observed here. Even though both groups were mostly bilingual, the Spanish-dominant group had significantly less acculturation to the mainstream U.S culture compared to the English-dominant group. A possible explanation for these findings is that the Spanish-dominant group had less experience with exposure to typical testing situations in English, which might have negatively affected performances. Cultural values might also play a role, participants in the Spanish-dominant group might have adopted an approach to remember the words that favored reducing errors (saying

only words that they remembered for sure), whereas participants in the English-dominant group might have been trying to remember as many words as possible as quickly as possible. The reason for the influence of cultural differences on EVLT/EVLT-S performance could not be directly addressed, although they do appear to impact performance.

PCA was used to preliminarily evaluate the underlying structure of the EVLT-S. Although the factor structure for the EVLT has been previously reported for English speaking populations in a large sample (n = 329; Strauss & Allen, 2013), the analyses conducted in this study were exploratory in nature, primarily because the sample size precluded a robust evaluation of internal structure using exploratory or confirmatory factor analytic approaches. Given that different factor analytic approaches can sometimes produce quite different results, we chose to replicate the analyses reported for the much larger sample of monolingual English speakers (Strauss & Allen, 2013), which was a principal components analysis with varimax rotation that utilized the Kaiser-Guttman criteria to determine the number of factors. The current results were highly consistent with those previously reported for the EVLT. In the current analysis the main difference was that for the EVLT-S, two of the trial one emotion scores (angry and sad) did not load on Short Term Memory factors. This was the case when the English and Spanish-dominant groups were combined and when the Spanish-dominant group was examined by itself. It was noted that in cases where trial one scores did not have primary loadings on the STM factor, they did have secondary loadings on the STM factor. Concerning the word *desesperanzado/a* (hopeless), which fell below the 70% cutoff for emotion categorization in Phase II, retention of this word did not preclude identification of a Sadness component. A Sadness component consisting of the four EVLT/EVLT-S sadness scores was identified in the combined and Spanish only samples. There were also no cross loadings with EVLT-S scores that

composed the Anxiety component, which might be expected given that *desesperanzado/a* (hopeless) was often classified as an anxiety word.

These principal components analyses were exploratory in nature primarily due to a limited sample size but do provide strong preliminary support for the factorial validity of the EVLT-S. These results were remarkably consistent with the results reported by Strauss and Allen (2013), even when the Spanish sample was examined alone, reducing the number of participants to 50. It may be that with larger samples and use of confirmatory analyses a different factor structure will be identified for the EVLT and EVLT-S. This might include a structure consisting of fewer factors, given that the Kaiser-Guttman criteria has been shown to overestimate the number of factors compared to procedures like parallel analysis and MAP tests (Velicer, Eaton, & Fava, 2000). Stronger evidence might also be provided for the presence of a STM factor composed of trail one scores from all emotional categories, rather than the two STM components reported by Strauss and Allen (2013) or the one component made up of two of the trial scores in the current samples. However, these preliminary results do suggest a stable and generalizable factorial structure of the EVLT in both Spanish and English versions. Further, considering the substantial similarity of the current PCA findings compared to Strauss and Allen (2013), these results serve as evidence for the factorial validity of the EVLT-S.

Validity of the self-reported emotional experience ratings was also accomplished by examining differential item functioning and convergent and discriminant validity. For differential item functioning, on the self-reported emotional experience ratings, participants reported greater levels of state and trait happiness compared to the other emotions. These findings are consistent with the most frequently reported self-reported emotional experience ratings among healthy individuals (moderately positive mood), suggesting that the EVLT-S

ratings are useful ratings of emotional experience. Regarding convergent and discriminant validity, the EVLT-S's emotional experience ratings (both state and trait) also showed the expected correlation patterns with the PANAS. Happiness ratings were significantly positively correlated with PANAS positive affect and in some instances, negatively correlated with PANAS negative affect. The other emotional ratings of the EVLT-S, which reflect negative emotions (sadness, anger, anxiety), were significantly positively correlated with the PANAS negative affect scores.

Overall, the current reliability and validity results provide psychometric support for the EVLT-S and were largely consistent with previous findings utilizing the EVLT (Strauss & Allen, 2013). Even in instances where sample size limited the conclusions that can be drawn (e.g., PCA), the results obtained for the EVLT-S are consistent with those reported for the EVLT.

CHAPTER 4

GENERAL DISCUSSION AND FUTURE DIRECTIONS

General Remarks and Discussion

The current study consisted of three phases with the general aim to adapt the EVLT to Spanish. Phase I consisted of translating the EVLT, Phase II consisted of pilot testing the EVLT-S, and Phase III consisted of an analysis of the EVLT-S's psychometric properties. The results examined in Phase III generally provided support for the validity and reliability EVLT-S. However, a number of challenges were encountered during the test development phases. Also, interesting differences emerged between the groups in word recall and emotion intensity ratings. These matters are considered in the following sections.

Practical Challenges to Translation of Neuropsychological Tests

Some of the challenges in assessing Spanish speakers discussed in the introduction were highlighted in the process of creating the EVLT-S. The first was the difficulty in finding professionals with the necessary expertise (e.g., Hernandez-Cardenache et al., 2016). The process of gathering a team of bilingual psychologist/neuropsychologist who were willing to spend the time translating the test without any form of compensation was encumbering. The primary author was fortunate in that he has had opportunities to work with prominent researchers in the areas of social cognition and cross-cultural assessment in clinical neuropsychology. This facilitated the process and allowed translations by a number of experts with diverse Hispanic cultural backgrounds, including three of the countries with the largest Spanish-speaking populations (Mexico = 1st largest; Spain = 3rd largest; and United States = 5th largest). Translators were also included from diverse countries where Spanish is the official language (e.g. Chile, Cuba, Puerto Rico, Mexico). Nevertheless, it was not possible to recruit translators from all of

the most representative Spanish-speaking countries in the world, particularly large South American countries (e.g., Columbia = 2nd largest an; Argentina = 4th largest), or Central American countries. The extent to which this might limit the usefulness of the EVLT-S in these other Hispanic cultural groups is not known, but the current strategy did ensure the that EVLT-S would be useful for assessing individuals from countries making up approximately 44.8 % of the Spanish-speaking population worldwide (approximately 235/525 million individuals).

Second, recruitment of participants and examiners who were fluent in Spanish was a slow and difficult process. Recruitment of Spanish-speaking participants was slow, even when using a southwestern university subject pool for recruitment and providing monetary compensation for community participants. Regarding examiners, the main challenge was the scarcity of fluent bilingual individuals who were capable of completing the test administration training. This is somewhat expected when conducting research with a minority group that is not representative of the U.S. mainstream culture and underscores inherent challenges in conducting cross-cultural research (e.g., Pedraza & Mungas, 2008). On a related issue, most of the individuals in the sample were bilingual, regardless of whether they indicated Spanish or English as their primary language. Only a few participants in the Spanish-dominant group were fluent only in Spanish, and approximately half of the English-dominant group indicated they were bilingual in English and Spanish. The reasons why bilingual individuals volunteered at an increased frequency to participate in the study could not be directly evaluated, but in future studies care should be taken in developing recruitment and other materials to avoid unintended exclusion of a particular language group (monolingual Spanish and English speakers).

The third challenge was limited test availability in Spanish. When conducting cross-cultural research in neuropsychology in two different languages, it can be difficult to obtain the

appropriate versions of the tests that are equivalent enough to make comparisons. In the current study, this was the case for the Spanish version of the WAIS-III. The most current version of the WAIS in English is the fourth edition; however, the company that develops the test has not published a Spanish version of the fourth edition that is sold in the U.S. They also hold copyrights, so the subtests cannot be duplicated or copied. The only version of the WAIS tests in Spanish that is available for purchase in the U.S. is the EIWA-III (described above). There are other Spanish versions of the test, including a Mexican and a Spanish one (from Spain), but these are limited in application for a number of reasons (normative sample, Spanish dialect reflected in test items, etc.). Further, there is debate in the literature regarding the appropriateness of these translations in terms of whether they are equivalent to the original English version and whether test items and normative scores are comparable across languages (see Hernandez-Meija & Puente; 2015; Mejia et al., 2014; Melendez, 1994; Funes et al., 2016). However, the primary author did not have access to any other version than the EIWA-III. The EIWA-III was developed in Puerto Rico and its norming sample consists of 330 adults, which is considerably less than the sample of people used in the English version. This is one of the reasons raw scores were used to make comparisons between groups in the current study. However, that does not imply that both tests are equivalent at the item level and there is not enough evidence available to draw such a conclusion. Nevertheless, the adaptation process reported in the EIWA-III manual is sound and provides relatively more information than the average test manuals available in Spanish in the U.S. Renteria, Tinsley, and Pliskin (2008) reported support for the reliability and validity of the EIWA-III when used with urban Spanish-speaking individuals in the U.S. (n = 100). Though, they recommend caution when administering specific subtests, due to the nature of the Latin American alphabet and potential test bias.

With these considerations in mind, it is noteworthy that some of the measures used in this study were Spanish adaptations (e.g., PANAS, MEIM-R) and not originally developed in Spanish. Therefore, it is difficult to ascertain how much the limitations in the instruments in Spanish affected the findings of the current study. Regardless of these challenges, based on the data available at the end of Phase II, we considered the EVLT-S to be a sufficiently equivalent version to the EVLT.

Spanish Dominant and English Dominant Group Differences in Word Recall

Interesting between-group findings emerged from the different analyses that were conducted comparing the performance of the Spanish-dominant and English-dominant groups on the EVLT-S/EVLT. The Spanish-dominant group consistently obtained lower scores across trials and it is unclear why this was the case. One possibility is that the words selected in Spanish for the EVLT-S resulted in a test version that was more difficult. Possible effects of word length and frequency were already discussed, though it is possible that they affected the Spanish-dominant group memory scores, particularly on trial one. Future research should address this possibility systematically.

Another explanation for the differences in performances between the Spanish-dominant and English-dominant groups lies in the characteristics of the samples. As mentioned before, unexpectedly, both groups were composed of primarily bilingual individuals. These individuals were tested in either English or Spanish based on their self-report of preferred language and language they spoke more fluently. Previous research has identified a number of disadvantages associated with the cognitive performance of bilinguals, particularly on verbal tasks, some of which are relevant to the current study. When words from both languages are counted, bilinguals generally have larger vocabularies because of their knowledge of two words for many concepts.

Nevertheless, compared to monolinguals' vocabulary (in one language), bilinguals have a smaller vocabulary size within each language (Rivera Mindt et al., 2008). For example, bilingual children possess smaller receptive and productive vocabularies relative to their monolingual counterparts (e.g., Bialystok & Feng, 2011; Nicoladis & Giovanni, 2000). Compared to monolinguals, bilinguals recognize fewer difficult vocabulary words on confrontation naming tasks, they have more retrieval failures, and they name pictures more slowly (e.g., Gollan et al., 2008; Gollan & Brown, 2006; Roberts et al., 2002). Notably, these bilingual disadvantages were found even when bilinguals were tested in their dominant language (acquired first; Gollan & Acenas, 2004; Ivanova & Costa, 2008). Other studies have reported that bilinguals perform worse on verbal fluency tasks compared to monolinguals, with worse performances on semantic than on letter fluency (e.g., Gollan et al., 2002; Rosselli et al., 2000). For a review see Rivera Mindt et al. (2008).

Because the EVLT-S is a verbal test, some of these disadvantages could have negatively affected performances in the current study. Alternatively, there is a vast literature on the cognitive advantages of bilingual individuals, particularly as they relate to inhibitory/attentional control, mental switching, and other higher order cognitive skills (e.g. Bialystok & Craik, 2010; Green, 1998), though a review of those findings is beyond the scope of this discussion (see Rivera Mindt et al., 2008). It appears then, that bilingualism is associated with both cognitive advantages and disadvantages, depending on the specific cognitive ability and the test used to assess it. For learning and memory of verbal information on tests like the EVLT-S, there appears to be a cognitive disadvantage. Future research could be conducted with nonverbal equivalents of verbal list learning tests, like the Biber Figure Learning Test (Glosser, Goodglass, & Biber,

1989), and including groups of monolingual individuals to determine whether it is the verbal nature of the information or the learning process itself that is disadvantaged.

In the current study, the participants' language proficiency was estimated using vocabulary scores in either preferred language (either English and Spanish) in conjunction with their self-reported language use. The scale scores of the VC test suggested that the vocabulary level of the participants in both groups was well within the average range relative to normative expectations. Nevertheless, the English-dominant group's raw scores were significantly higher, suggesting that the English-dominant group might have had a higher vocabulary level. As previously mentioned, the equivalence of the VC subtest in English and Spanish is not well established; therefore, group comparisons have to be interpreted with caution. Self-report data suggested that the majority of the Spanish-dominant group learned Spanish first and used mostly Spanish at home. This is consistent with census data (Krogstad & Lopez, 2017) reporting that 73% of Hispanics in the U.S. spoke predominantly Spanish at home in 2015. However, in the current sample, both groups also reported using mostly English at work or school. This was expected given that most of them were college students and suggests that participants in both groups should be more used to experiencing testing situations in English. It is possible that the Spanish-dominant group had less experience being tested in Spanish or that they had not been tested in Spanish for a long time and that the novelty of the situation negatively affected their scores. Additionally, bilinguals can develop certain aspects of their vocabulary in a particular area of expertise and it is possible that the Spanish-dominant group had better academic language (testing skills) in English, even though they considered that they spoke Spanish better overall.

Having a more in-depth language proficiency assessment in both languages would have been useful to answer some of these questions. For example, administering a formal test of

language proficiency to participants in both groups would have clarified further how many participants were unbalanced bilinguals. However, such a measure would have added at least one or two hours of testing, which was not feasible for the current study procedures. Testing sessions would have to have been divided in two sessions, one for language proficiency assessment and another for cognitive testing (including memory tasks). Considering the difficulties with recruitment mentioned above and that the main purpose of this study was to develop a new test and not to compare performance across groups, more extensive evaluation of language was not utilized. Nevertheless, future research using the EVLT-S with bilingual populations should consider including a priory standardized language proficiency assessment and/or focusing on recruitment of monolingual Spanish or English-dominant groups.

The influence of acculturation on cognitive or memory performances have not been studied extensively, though in theory the more acculturated individuals are to the mainstream culture, the more they would be accustomed to testing practices and constructs that are relevant in academic and work settings (e.g., Hernandez-Cardenache, 2016; Strut et al., 2016). This would lead to them generally performing better on cognitive tests compared to less acculturated individuals. Boone et al. (2007) reported that when tested in English, less acculturated bilinguals (English as second language) performed worse on tests of working memory, confrontation naming, and verbal fluency compared to more acculturated bilinguals (Spoke English as first language). Considering that the Spanish-dominant group in the current study was less acculturated than the English-dominant group based on three measures, it is possible that this had negative effect on their memory performances as well.

Differences in Emotional Intensity Ratings Between Groups

Previous research has shown that people have better recall for more intense emotional stimulus compared to less intense stimuli, because the heighten arousal facilitates memory encoding (e.g., Maddock & Frein, 2009). The Spanish-dominant group rated the intensity level of the emotion words in the EVLT-S as less intense compared to the English-dominant group, despite similar patterns of ratings across emotional categories for both groups. It is possible the perception of the words in the EVLT-S as less intense made them less memorable and more difficult to recall. The extent to which this matter could be addressed in the translation process is questionable if a main goal of the translation is to develop an equivalent Spanish language form of an existing test. In the current study, selection of more intense emotional words for the EVLT-S would have resulted in a largely different set of words, rather than translations that are semantically and conceptually similar to the original EVLT words. These findings highlight practical considerations and tradeoffs (e.g., similar intensity vs. similar semantic/conceptual meaning) that must be considered during the test translation process and addressed in the overall goals.

With regard to differences in intensity ratings between the Spanish-dominant and English-dominant groups, cultural differences and level of acculturation might have influenced the differences in intensity ratings of both groups. As mentioned above, Matsumoto (1993) showed that there can be differences in intensity ratings of facial expression among different ethnic groups.

Bilingualism could also have contributed to the differences in intensity ratings that were found between the English-dominant and Spanish-dominant groups. Previous studies involving emotional intensity ratings and bilinguals have reported that the primary language might be

experienced as more emotionally intense than languages learned subsequently (e.g., bilinguals typically prefer to swear in their primary language; Dewaele, 2004). For example, bilinguals typically endorse that obscene words generate less anxiety and are perceived as less intense when spoken in the second language (Gonzalez Reigosa, 1976; Dewaele, 2004). Additionally, studies have reported that the second language can be utilized to create emotional detachment when saying emotional words (e.g., Altarriba & Rivera Santiago, 1994). Furthermore, interviews and case studies of bilinguals, who learned a second language later in life, in therapy show that they frequently express emotional involvement in their first language and emotional detachment in their second (e.g., Grosjean, 1982; Schrauf, 2000,). These findings suggest that bilingualism could influence emotional intensity ratings, though other studies have found no differences in perceptions of emotional intensity regardless of the proficiency in the first or second language. For example, Ferre et al. (2010) investigated the contributions of some variables that may modulate the effect of emotionality of second language words on recall. Memory for positive, negative, and neutral words were tested using an incidental memory task. Participants included two groups of proficient bilinguals (Spanish and Catalan with differing language dominance), who learned their second language early in life in an immersion context. A third group of proficient bilinguals (Spanish and English) who learned their second language later in life in an educational setting was also tested. Results indicated that the three groups had better recall for emotional words compared to neutral words, regardless of language used (first or second). The authors suggested that language dominance, the age of second language acquisition, and the similarity between languages did not seem to have any effect on memory for emotional words in the second language. Additionally, in their sample, words were perceived as having the same emotional intensity in the first and in the second language (Ferre et al., 2010). It is noteworthy

that, although relevant to the studies in which they were used, the tasks and stimuli used in these cognitive psychology memory experiments are considerably different from the EVLT-S and often vary from one study to another. Furthermore, none of the tasks used in those experiments were developed or intended for clinical use. Additionally, some of these studies were conducted in Spain and have not been replicated in other Spanish-speaking countries with different dialects. Future research with the EVLT-S and EVLT should continue to explore possible cultural influences in emotional intensity ratings.

Limitations and Future Directions

The current study has several limitations, some of which have already been discussed above. Sample size was a limitation of this study, particularly for examination of the factorial validity of the EVLT-S. Future research should aim to replicate the analysis performed in the current study with a larger sample size. Another limitation was that most of the participants were bilingual college students. This limits our ability to generalize the current results to monolingual Spanish and English speakers. Future research with the EVLT-S should focus on administering the test to samples of monolingual Spanish speakers with the aim to replicate the current findings. Along these same lines, questions remain regarding whether monolingual Spanish speakers would have categorized and rated the EVLT-S words similarly or if *desesperanzado/a (hopeless)* would have been a problem word for monolinguals as well. Alternatively, many first- and second-generation Hispanics in the U.S are bilingual; therefore, having data that supports the usefulness of the EVLT-S with this population is of relevance. Considering that *desesperanzado/a (hopeless)* proved to be problematic at multiple levels in the current study and that the test is likely to be used with bilinguals in the future, a follow-up study should be conducted with *desesperanzado/a (hopeless)* removed from the target list. We discussed how to

proceed in future research and decided to create an alternate version of the test, with *tragico/a (tragic)* replacing *desesperanzado/a (hopeless)*. *Tragico/a (tragic)* is currently in the interference list, but *angustia (anguish)* would be placed in the interference list instead. *Melancolia* (*gloom/melancholy*) was another word that was sometimes miscategorized and a good alternative to replace it could be *depresion (depression)*. *Tragico/a (tragic)* and *depression (depression)* are both more commonly used in Spanish than *desesperanzado (hopeless)* and *melancolia* (*gloom/melancholy*); however, they differ in semantic similarity from the original English words.

It is also noteworthy that none of the raters selected for this study had the problem of confusing *desesperanzado (hopeless)* with *desesperado (desperate)* that the participants had. A notable difference between the raters and the participants is that the raters had higher levels of education (typically 16 or more years) and some of them lived in Spanish-speaking countries (e.g., Chile). Therefore, it could be the case that *desesperanzado (hopeless) or melancolia (gloom/melancholy)* were too difficult or infrequent Spanish words for the current sample. Future research should focus on administering the EVLT-S with these changes incorporated, ideally to a sample of bilingual and monolingual Spanish speakers, and compare findings with the current study.

Results of this study showed consistent evidence for preferential encoding and recall of happiness words over words from the other emotion categories. As was the case with the EVLT (Strauss & Allen, 2013), a possible explanation for these findings is that the EVLT-S target list consists of more unpleasant than pleasant words, which might increase the salience of the happiness words. However, as suggested by Strauss and Allen (2013), this is unlikely considering that the previous research reported that normal controls have better memory for

positive than negative words when word lists are equated for the total number of pleasant and unpleasant stimulus (Matlin et al., 1979).

Finally, future research should focus on collecting data with the EVLT-S and EVLT with clinical populations. Strauss and Allen (2013) collected data with patients diagnosed with schizophrenia and found that those with schizophrenia had a normal learning curve for the CVLT-II, but demonstrated a flat learning curve on EVLT trials two to five. This finding suggests a unique difficulty for the schizophrenia group in learning emotional words. Administering the EVLT-S to Spanish-speaking samples of patients with schizophrenia would allow for comparison of results with previous findings and examination of the potential role of cultural factors on emotional memory in serious mental illnesses. Data with other clinical groups that commonly present with emotional disturbance (e.g., depression, anxiety, and post-traumatic stress disorder) may also provide evidence of unique learning and memory disturbances. Such studies would allow for examination of associative semantic network and mood-congruent memory theories. If such abnormalities are identified, they may be further investigated using functional neuroimaging techniques, such as fMRI paradigms that investigate whether brain regions associated with learning and memory of emotional words are distinct from those activated during a neutral learning and memory task.

In sum, even though the current study highlighted some of the challenges when developing assessment tools for use with Spanish speakers in the U.S., it also demonstrated interesting interactions between culture, language, and emotional learning and memory. Overall, the results suggest that the EVLT-S is sufficiently equivalent to the EVLT and has good reliability and validity – making it a promising tool for use in clinical and research settings.

APPENDICES

Appendix A

The Emotional Verbal Learning Test – Spanish (EVLT-S)

Test Verbal de Memoria Emocional (TVME) /
Emotional Verbal Learning Test – Spanish (EVLT-S)

Notas: 1) Lea la lista con un tono neutral y con fluidez, **leer la lista completa debería tomar aproximadamente 20 segundos**. Cuando termine de leer las 16 palabras, pregunte: "**dígame todas las palabreas que recuerde**." :2) Todas las palabras deben ser escritas como son mencionadas y en el orden en que son dictadas, incluyendo repeticiones y intrusiones.

Ensayo 1:

Diga: Voy a leer una lista de palabras relacionadas con emociones. Escuche cuidadosamente porque cuando termine de leer le voy a pedir que repita todas las palabras que recuerde. Me puede decir las palabras en cualquier orden, tan solo dígame todas las palabras que pueda.

Ensayos 2-5:

Diga: Voy a leer la misma lista de palabras emocionales nuevamente. Cuando termine de leer, repita todas las palabras que recuerde en cualquier orden, incluyendo las palabras que dijo anteriormente.

	Ensayo 1	Ensayo 2	Ensayo 3	Ensayo 4	Ensayo 5
1. Enojado/a					
2. Amor					
3. Intranquilo/a					
4. Desesperanzado/a					
5. Nervioso/a					
6. Gloria					
7. Triste					
8. Enemigo/a					
9. Ansioso/a					
10. Rabia					
11. Honor					
12. Llorar					
13. Furioso/a					
14. Tenso/a					
15. Melancolía					
16. Alegría					

Lista de interferencia:

Diga: Voy a leer una nueva lista de palabras relacionadas con emociones. Quiero ver cuantas palabras puede recordar de esta nueva lista. Me puede decir las palabras en cualquier orden. No me diga palabras de la primera lista, solo de esta nueva lista.

1. Trágico/a	1.
2. Gusano	2.
3. Inquieto	3.
4. Podrido/a	4.
5. Odio	5.
6. Descomponer	6.
7. Animado	7.
8. Apestoso	8.
9. Pena	9.
10. Hongo	10.
11. Severo	11.
12. Vomito	12.
13. Sonrisa	13.
14. Suciedad	14.
15. Urgente	15.
16. Diarrea	16.
	17.
	18.
	19.
	20.

Memoria a corto plazo:

Diga: ¿Se acuerda de la primera lista de palabras que leí 5 veces? Ahora dígame todas las palabras que recuerde de la primera lista en cualquier orden.

Lista 1 **(No Lea)**	Memoria a corto plazo
1. Enojado/a	1.
2. Amor	2.
3. Intranquilo/a	3.
4. Desesperanzado/a	4.
5. Nervioso/a	5.
6. Gloria	6.
7. Triste	7.
8. Enemigo/a	8.
9. Ansioso/a	9.
10. Rabia	10.
11. Honor	11.
12. Llorar	12.
13. Furioso/a	13.
14. Tenso/a	14.
15. Melancolía	15.
16. Alegría	16.
	17.
	18.
	19.
	20.
	21.
	22.

Notas: 1) Lea la lista con un tono sin emociones y con fluidez, **leer la lista completa debería tomar aproximadamente 20 segundos.** Cuando termine de leer las 16 palabras, pregunte: "**dígame todas las palabreas que recuerde**". 2) Todas las palabras deben ser escritas como son mencionadas, y en el orden que son dictadas, incluyendo repeticiones y intrusiones. 3) **Hay un periodo de 20 minutos de pausa entre el término del ensayo con ayuda y el comienzo del ensayo de memoria a largo plazo.** 4) No le diga al participante que habrá más ensayos.

Memoria con claves:

Dígame las palabras de la primera lista que están más relacionadas con felicidad.

1.
2.
3.
4.
5.
6.
7.

Dígame las palabras de la primera lista que están más relacionadas con tristeza.

1.
2.
3.
4.
5.
6.
7.

Dígame las palabras de la primera lista que están más relacionadas con enojo.

1.
2.
3.
4.
5.
6.
7.

Dígame las palabras de la primera lista que están más relacionadas con ansiedad.

1.
2.
3.
4.
5.
6.
7.

20 Minutos de pausa después de este ensayo.
Hora de comienzo de pausa: _____
Hora de termino de pausa: _____

Memoria a largo plazo:

Diga: Le leí dos listas de palabras emocionales anteriormente. La primera lista que leí 5 veces y la segunda que leí una vez. Por favor dígame todas las palabras que recuerde de la primera lista. No diga palabras de la segunda lista, solo de la primera.

Lista 1 **(No Lea)**	Memoria a largo plazo
1. Enojado/a	1.
2. Amor	2.
3. Intranquilo/a	3.
4. Desesperanzado/a	4.
5. Nervioso/a	5.
6. Gloria	6.
7. Triste	7.
8. Enemigo/a	8.
9. Ansioso/a	9.
10. Rabia	10.
11. Honor	11.
12. Llorar	12.
13. Furioso/a	13.
14. Tenso/a	14.
15. Melancolía	15.
16. Alegría	16.
	17.
	18.
	19.
	20.
	21.
	22.

Memoria largo plazo con claves:

Dígame las palabras de la primera lista que están más relacionadas con felicidad.

1.
2.
3.
4.
5.
6.
7.

Dígame las palabras de la primera lista que están más relacionadas con tristeza.

1.
2.
3.
4.
5.
6.
7.

Dígame las palabras de la primera lista que están más relacionadas con enojo.

1.
2.
3.
4.
5.
6.
7.

Dígame las palabras de la primera lista que están más relacionadas con ansiedad.

1.
2.
3.
4.
5.
6.
7.

Memoria de reconocimiento a largo plazo

Ahora le voy a leer algunas palabras. Después de que lea cada palabra, diga "Si" si la palabra pertenece a la primera lista, la lista que leí 5 veces, o diga "No" si la palabra no pertenece a la primera lista.

Nota: 1) Si el participante no puede proveer una respuesta, diga: "**¿Estaba_____en la primera lista?**" **"Adivine lo mejor que pueda"**; 2) Mayúsculas = objetivos.

Reconocimiento						
Palabra	**Si**	**No**		**Palabra**	**Si**	**No**
descomponer	S	N		peligro	S	N
ALEGRIA	S	N		inquieto	S	N
temeroso/a	S	N		**HONOR**	S	N
asustado/a	S	N		**LLORAR**	S	N
agradable	S	N		expectación	S	N
DESESPERANZADO/A	S	N		sorprendido/a	S	N
ENEMIGO/A	S	N		suciedad	S	N
sonrisa	S	N		**FURIOSO/A**	S	N
odio	S	N		urgente	S	N
suicidio	S	N		terror	S	N
TENSO/A	S	N		**NERVIOSO/A**	S	N
agonía	S	N		terco	S	N
horror	S	N		vomito	S	N
ANSIOSO/A	S	N		ataque	S	N
severo	S	N		**GLORIA**	S	N
podrido/a	S	N		serpiente	S	N
INTRANQUILO/A	S	N		**TRISTE**	S	N
diarrea	S	N		hongo	S	N
animado/a	S	N		pena	S	N
AMOR	S	N		incomodo	S	N
paz	S	N		trágico/a	S	N
gusano	S	N		admiración	S	N
ENOJADO/A	S	N		apestoso	S	N
MELANCOLIA	S	N		**RABIA**	S	N

Reporte de experiencia emocional:

Estado emocional:

Diga: Ahora le voy a hacer algunas preguntas sobre cómo se está sintiendo. ¿En este momento en una escala de 1 a 7, siendo 1 para nada y 7 extremadamente, que tan feliz se siente usted en este momento? ¿Usando la misma escala, que tan triste se siente en este momento? ¿Qué tan enojado se siente en este momento? ¿Qué tan ansioso se siente en este momento? ¿Cuánto asco siente en este momento?

	Estado
Felicidad	
Tristeza	
Enojo	
Ansiedad	
Asco	

Animo en general:

Diga: Ahora le voy a hacer algunas preguntas sobre cómo se siente en general. ¿Usando una escala de 1 a 7, siendo 1 para nada y 7 extremadamente, que tan feliz se siente usted en general? ¿Usando la misma escala, que tan triste se siente en general? ¿Qué tan enojado se siente en general? ¿Qué tan ansioso se siente en general? ¿Cuánto asco siente en general?

	Rasgo
Felicidad	
Tristeza	
Enojo	
Ansiedad	
Asco	

Tablas de Resumen de Resultados

	1	2	3	4	5	Total	
Correctas							
Repeticiones							
Intrusiones							

	Lista de Interferencia	Memoria a Corto Plazo	Memoria con Ayuda	Felicidad	Tristeza	Enfado	Ansiedad
Correctas							
Repeticiones							
Intrusiones							
Categorización incorrecta							

Resumen		
	Correcto	Falsos Positivos
Reconocimiento Total		

Appendix B

Table 19.

Demographic Characteristics of Phase II Spanish-Dominant Participants

Characteristic	%				
Handedness	77.8 Right	22.2 Left	3.7 Ambi.		
Country	73.3 USA	16.6 El Salvador	3.3 Cuba	3.3 Honduras	3.3 Puerto Rico
Generation	60 first	36.7 second	3.3 third		
First lang.	13.3 En	76.7 Sp	10 Both		
Fluid lang.	0 En	3.3 Sp	96.7 Both		
Lang. home	6.7 En	56.7 Sp	36.7 Both		
Lang. W/S	80 En	0 Sp	20 Both		
Lang. social	60 En	0 Sp	40 Both		
Read Sp	100 Yes				
Write Sp	90 Yes	10 No			
Talk Sp	100 Yes				
Read En	100 Yes				
Write En	96.7 Yes	3.3 No			
Talk En	100 Yes				
Education	93.3 HS	3.3 BA/BS	3.3 Assoc.		
Moth. Lang.	0.0 En	100 Sp			
Fath. Lang.	6.7 En	93.3 Sp			

Note. % = percentage; Sp = Spanish; En = English; Lang = language; W/S = work/school; Ambi. = ambidextrous; Moth. = mother; Fath. = father; HS = high school dipoma; BA = bachelor of arts; BS = bachelor of science; Assoc. = associates degree.

Appendix C

Table 20.

Demographic Characteristics of Phase II English-Dominant Participants.

Characteristic	%				
Handedness	96.3 Right	11.1 Left	3.7 Ambi.		
Country	85.2 USA	7.4 Mexico	3.3 Peru	3.3 Philippines	
Generation	58.3 1st	25 2nd	8.3 3rd	4.2 4th	4.2 5th
First lang.	40.7 En	44.4 Sp	14.8 Both		
Fluid lang,	48.1 En	0 Sp	51.9 Both		
Lang. home	40.7 En	56.7 Sp	36.7 Both		
Lang. W/S	77.8 En	0 Sp	22.2 Both		
Lang. social	60 En	0 Sp	40 Both		
Read Sp	70.4 Yes	29.6 No			
Write Sp	66.7 Yes	33.3 No			
Talk Sp	66.7 Yes	33.3 No			
Read En	100 Yes				
Write En	100 Yes				
Talk En	100 Yes				
Educacion	85.2 HS	3.7 BA	11.1 Assoc.		
Moth. Lang.	29.6 En	63 Sp	7.4 Both		
Fath. Lang.	44.4 En	48.1 Sp	7.4 Both		

Note. % = percentage; Sp = Spanish; En = English; Lang = language; W/S = work/school; Ambi. = ambidextrous; Moth. = mother; Fath. = father; HS = high school dipoma; BA = bachelor of arts; BS = bachelor of science; Assoc. = associates degree.

Appendix D

Additional Tables

Table 6.

Emotional Intensity Ratings and Emotion Categorization Ratings Provided by Participant

English (n = 27)					Spanish (n = 30)				
EVLT word	Intensity		Cat. 1	Cat. 2	EVLT-S word	Intensity		Cat. 1	Cat. 2
	Mean	*SD*	Emotion %	Emotion %		Mean	*SD*	Emotion %	Emotion %
Angry	4.9	1.9	Ag 96.3	Nu 3.7	Enojado/a	3.3	2.3	Ag 100.0	
Love	5.9	1.6	Hp 92.6	Sa 3.7	Amor	4.6	2.1	Hp 93.1	Ot 3.4
Uneasy	3.4	1.7	Ax 77.8	Fe 14.8	Intraquilo/a	3.0	1.7	Ax 72.4	Nu 13.8
Hopeless	5.0	2.0	Sd 74.1	Ax 11.1	Desesperanzado/a	3.2	2.0	Ax 55.2	Sd 20.7
Nervous	4.3	1.8	Ax 96.3	Fe 3.7	Nervioso/a	3.0	1.7	Ax 62.1	Fr 27.6
Glory	4.7	1.7	Hp 88.9	Ot 7.4	Gloria	3.3	2.2	Hp 89.7	Nu 3.4
Sad	4.6	2.0	Sd 100.0		Triste	3.8	2.4	Sd 93.1	Hp 3.4
Enemy	4.0	2.2	Ag 51.9	Fr 25.9	Enemigo/a	2.7	2.0	Ag 75.9	Dg 13.8
Anxious	4.5	1.7	Ax 92.6	Fr/Sp 3.7	Ansioso/a	3.2	1.8	Ax 89.7	Fr 6.9
Rage	5.4	2.3	Ag 96.3	Ax 3.7	Rabia	3.0	2.5	Ag 75.9	Ax 6.9
Honor	4.8	1.9	Hp 66.7	Nu 22.2	Honor	3.6	2.1	Hp 86.2	Nu 10.3
Cry	4.4	2.2	Sd 96.3	Nu 3.7	Llorar	4.0	2.5	Sd 100.0	
Mad	4.4	1.9	Ag 100.0		Furioso/a	3.8	2.7	Ag 93.1	Sd 6.9
Tense	3.7	1.5	Ax 66.7	Fr 22.2	Tenso/a	2.9	1.7	Ax 65.5	Fr 24.1
Gloom	4.4	1.9	Sd 88.9	Hp 7.4	Melancolia	3.0	1.9	Sd 48.3	Nu 31.0
Joy	4.9	1.7	Hp 96.3	Sp 3.7	Alegria	5.0	1.6	Hp 96.6	Sp 3.4

Note. EVLT = Emotional Verbal Learning Test; EVLT-S = Emotional Verbal Learning Test – Spanish; Mean = mean emotional intensity; *SD* = standard deviation; Cat. 1 = emotional category that the word most highly represents; Cat. 2 = category of which the word is second most representative; Ag = anger; Ax = anxiety; Dg = disgust; Fr = fear; Hp = happiness; Nu = neutral; Sd = sadness; Sp = surprise; Ot = Other; underlined = words categorized < .70 on their respective category.

Table 7.

Synonyms Provided Most Frequently by Participants

Ord	EVLT/EVLT-S W	Synonym 1 (%)	Synonym 2 (%)	Synonym 3 (%)	Similarity Ratings (n = 8)					
					Pair 1		Pair 2		Pair 3	
					M	*SD*	*M*	*SD*	*M*	*SD*
1	Angry	mad (74.0)[1]	rage (48.1)[2]	anger (33.3)[3]	3.1	0.4	4.0	0.0	1.9	0.6
	Enojado/a	furioso/a (43.3) [1]	rabia (30.0)[2]	odiar (20.0)[3]						
2	Love	happy (59.3) [1]	joy (44.4)[2]	like (11.1)[3]	4.0	0.0	3.9	0.4	1.8	0.7
	Amor	feliz (60.0) [1]	sonrisa (33.3)[3]	alegria (20.0)[2]						
3	Uneasy	nervous (63) [1]	anxious (59.0) [2]	restless (15.0) [3]	4.0	0.0	4.0	0.0	3.9	0.4
	Intraquilo/a	ansioso/a (43.3) [2]	nervioso/a (40) [1]	inquieto/a (20.0) [3]						
4	Hopeless	sad (51.9) [1]	depressed (18.5)[2]	cry (14.8)[3]	4.0	0.0	1.8	0.5	1.8	0.7
	Desesperanzado/a	triste (36.7) [1]	ansioso (20.0)[2]	desesperado (16.7)[3]						
5	Nervous	anxious (70.4) [1]	uneasy (29.6)[2]	tense (22.2)[3]	4.0	0.0	3.9	0.4	4.0	0.0
	Nervioso/a	intranquilo/a (33.3) [2]	ansioso/a (30.0)[1]	tenso/a (23.3)[3]						
6	Glory	proud (48.1) [3]	happy (40.7)[1]	honor (37.0)[2]	3.8	0.5	4.0	0.0	2.0	0.8
	Gloria	felicidad (73.3) [1]	honor (40.0)[2]	alegria (23.3)[3]						
7	Sad	cry (66.7) [1]	depressed (29.6)[3]	unhappy (25.9)[2]	4.0	0.0	4.0	0.0	2.9	0.6
	Triste	llorar (63.3) [1]	infeliz (16.7)[2]	tristeza (13.3)[3]						
8	Enemy	anger (40.7) [1]	hate (40.7)[2]	fight (14.8)[3]	4.0	0.0	4.0	0.0	2.1	0.8
	Enemigo/a	enojo (46.7) [1]	odio (26.7)[2]	furioso (23.3)[3]						
9	Anxious	nervous (62.9) [1]	uneasy (33.3)[2]	worried (18.5)[3]	4.0	0.0	2.9	0.6	2.5	0.8
	Ansioso/a	nervioso (50.0) [1]	ansiedad (16.7)[2]	tenso (10.0)[3]						
10	Rage	anger (77.7) [1]	mad (51.8)[2]	upset (25.9)[3]	3.9	0.4	2.9	0.4	1.5	0.8
	Rabia	enojo (66.7) [1]	furia (33.3)[2]	odio (16.7)[3]						
11	Honor	pride (55.5) [3]	happy (37.03) [1]	glory (33.3) [2]	3.8	0.5	4.0	0.0	4.0	0.0
	Honor	felicidad (53.3) [1]	gloria (36.6) [2]	orgullo (16.7) [3]						
12	Cry	sad (88.8) [1]	depressed (29.6)[3]	upset (25.9)[2]	4.0	0.0	2.9	1.0	2.6	0.7

	Llorar	triste (86.7) [1]	enojo (16.6)[2]	melancolia (13.3)[3]						
13	Mad	angry (81.4) [1]	upset (33.3)[3]	rage (29.6)[2]	4.0	0.0	4.0	0.0	1.8	0.7
	Furioso/a	enojado/a (80.0) [1]	rabia (36.7)[2]	tenso (13.3)[3]						
14	Tense	nervous (44.4) [1]	anxious (40.7)[2]	uneasy (40.7)[3]	4.0	0.0	4.0	0.0	3.8	0.5
	Tenso/a	nervioso/a (56.7) [1]	ansioso/a (26.7)[2]	intranquilo/a (16.7)[3]						
15	Gloom	sad (74.1) [1]	cry (25.9)[2]	depressed (18.5)[3]	4.0	0.0	4.0	0.0	2.9	0.6
	Melancolia	triste (56.7) [1]	llorar (26.7)[2]	infeliz (6.7)[3]						
16	Joy	happy (96.2) [1]	smile (25.9)[2]	excited (25.9)[3]	3.9	0.4	4.0	0.0	2.4	0.9
	Alegria	felicidad (86.7) [1]	sonrisa (40.0)[2]	gloria (20.0)[3]						

Note. EVLT = Emotional Verbal Learning Test; EVLT-S = Emotional Verbal Learning Test – Spanish; W. = word; Ord. = order of the words on the EVLT/EVLT-S; Synonym 1 = most frequently provided synonym; Synonym 2 = second most frequently provided synonym; Synonym 3 = third most frequently provided synonym; [1] = word pair 1; [2] = word pair 2; [3] = word pair 3; *M* = mean; *SD* = standard deviation; Underlined = word not related to intended category.

Table 9.

Most Frequent Concepts Provided by Participants for each EVLT-S/EVLT Words

Word English/Spanish	Related word concept		Unrelated word concept
	%	Concept	
1 Angry	96	Feeling mad, upset, hurt, fighting, hatred	unpleasant high
Enojado/a	96.7	Feeling angry/frustrated, fighting, enemy	perder (lose)
2 Love	100	Feelings of happiness, family/relationships, romance	
Amor	100	Feeling of happiness, family/relationships, romance	
3 Uneasy	100	Feelings of anxiety, nervousness, restlessness, insecurity	
Intranquilo/a	82.8	Feelings of anxiety, desperation, stress, waiting for something	tranquilo (stillness)
4 Hopeless	100	Feelings of depression, pessimism, hopelessness	
Desesperanzado/a	50	Feelings of sadness, anguish, hopelessness	ansiedad (anxiety)
5 Nervous	100	Feelings of anxiety, uneasy, worry, feeling scared, insecurity	
Nervioso/a	100	Feelings of anxiety, being tense/preoccupied, school/work stress	
6 Glory	96	Feelings of happiness, honor, achievement, accomplishment, pride	mother
Gloria	100	Feelings of happiness, winning, accomplishment, religious glory	
7 Sad	100	Feelings of sadness, depression, unhappiness, death, cry	
Triste	100	Feelings of sadness/depression, cry, unhappiness, loneliness	
8 Enemy	100	Not liking a person, a rival, competing, someone that hurt you	
Enemigo/a	100	Not liking/hating somebody, being mad at somebody, a bad person	
9 Anxious	100	Feelings of anxiety/nervousness, stress, insecurity, uncertainty	
Ansioso/a	100	Feelings of anxiety/nervousness, stress, fear	
10 Rage	100	Feeling of intense anger, hate, being mad	
Rabia	93.1	Feeling of intense anger, fury, dog sickness	rabia (rabies)
11 Honor	100	Feelings of happiness, pride, respect, positive achievement	
Honor	100	Feelings of happiness, being proud, being good, victory	
12 Cry	100	Very sad, depressed, tears, overwhelming happiness,	
Llorar	96.7	Being very sad/very happy, a great deal of sadness, tears	odio (hate)
13 Mad	100	Very angry, being upset, aggravated, frustrated	
Furioso/a	100	Very angry, angry with somebody else, betrayal	
14 Tense	100	Feelings of anxiety/nervousness, stress, stiffness/uptight, pressure	

	Tenso/a	96.7	Feelings of anxiety, muscle tension/pain, nervousness, stress	debil (weak)
15	Gloom	100	Sadness, depression, feeling down, darkness	
	Melancolia	83.3	Sadness, depression, no energy	ansiedad (anxiety), no importa (not caring)
16	Joy	100	Feelings of extreme happiness, having fun, smiling, celebration	
	Alegria 96.7		Feelings of extreme happiness, family/positive relationships, smiling	odio (hate)

Note. % = percentage of concepts provided that were related to the emotion category of the word.

Table 13.

Mixed Model ANOVAS and ANCOVAS

No Covariates				
Source	df	*F*	*p*	η^2
Test	1, 75	26.996	**0.000**	0.265
Test X Group	1, 75	0.623	0.432	0.008
Trial	4, 300	308.098	**0.000**	0.804
Trial X Group	4, 300	0.886	0.472	0.012
Test X Trial	4, 300	3.337	**0.011**	0.043
Test X Trial X Group	4, 300	0.644	0.632	0.009
Group	1, 75	9.458	**0.003**	0.112
Covariates: VC, DS				
Source	*df*	*F*	*p*	η^2
Test	1, 73	0.283	0.596	0.004
Test X VC	1, 73	2.193	0.143	0.029
Test X DS	1, 73	0.264	0.609	0.004
Test X Group	1, 73	2.735	0.102	0.036
Trial	4, 292	4.295	**0.002**	0.056
Trial X VC	4, 292	0.175	0.951	0.002
Trial X DS	4, 292	2.091	0.082	0.028
Trial X Group	4, 292	0.078	0.989	0.001
Test X Trial	4, 292	1.171	0.324	0.016
Test X Trial * VC	4, 292	0.627	0.643	0.009
Test X Trial * DS	4, 292	0.326	0.861	0.004
Test X Trial * Group	4, 292	1.138	0.339	0.015
Group	1, 73	0.033	0.856	0.000
Covariates: VC, DS, SASH				
Source	*df*	*F*	*p*	η^2
Test	1, 72	1.368	0.246	0.019
Test X VC	1, 72	0.871	0.354	0.012
Test X DS	1, 72	0.336	0.564	0.005
Test X SASH	1, 72	4.039	**0.048**	0.053
Test X Group	1, 72	0.653	0.422	0.009
Trial	4, 288	4.092	**0.003**	0.054
Trial X VC	4, 288	0.366	0.833	0.005
Trial X DS	4, 288	2.109	0.080	0.028
Trial X SASH	4, 288	1.705	0.149	0.023
Trial X Group	4, 288	0.247	0.911	0.003

Test X Trial	4, 288	0.789	0.533	0.011
Test X Trial X VC	4, 288	0.759	0.553	0.010
Test X Trial X DS	4, 288	0.336	0.854	0.005
Test X Trial X SASH	4, 288	0.589	0.671	0.008
Test X Trial X Group	4, 288	1.020	0.397	0.014
Group	1, 72	0.669	0.416	0.009

Note. Test = EVLT-S/EVLT, LLT-S/LLT-E; Trial = learning trials 1 to 5 of corresponding test; Group = Spanish/English; SASH = The Short Acculturation Scale for Hispanics; VC = Vocabulary; CD= Coding; Bold = $p < .05$.

REFERENCES

Abramson, L. Y., Seligman, M. E. P., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology, 87*(1), 49-74. doi: 10.1037/0021-843X.87.1.49.

Agranovich, A. V., & Puente, A. E. (2007). Do Russian and American normal adults perform similarly on neuropsychological tests? Preliminary findings on the relationship between culture and test performance. *Archives of Clinical Neuropsychology, 22*(3), 273-282. doi: 10.1016/j.acn.2007.01.003.

Agranovich, A. V., Panter, A.T., Puente, A. E., & Touradji, P. (2011). The culture of time in neuropsychological assessment: Exploring the effects of culture-specific time attitudes on timed test performance in Russian and American samples. *Journal of the International Neuropsychological Society, 17*(4), 692-701. doi: 10.1017/S1355617711000592.

Alegria, M., Canino, G., Shrout, P. E., Woo, M., Duan, N. Vila, D., Torres, M., Chen, C., & Meng, X. (2008). Prevalence of mental illness in immigrant and non-immigrant U.S. Latino groups. *American Journal of Psychiatry, 165*(3), 359-369. doi: 10.1176/appi.ajp.2007.07040704.

Allen, D. N., Strauss, G. P., Donohue, B., & van Kammen, D. P. (2007). Factor analytic support for social cognition as a separable cognitive domain in schizophrenia. *Schizophrenia Research, 93*(1-3), 325-333. doi:10.1016/j.schres.2007.02.008.

Allen, P. A., Kaut, K. P., Lord, R. G., Hall, R. J., Grabbe, J. W., & Bowie, T. (2005). An emotional mediation theory of differential age effects in episodic and semantic memories. *Experimental Aging Research, 31*(4), 355-91. doi: 10.1080/03610730500206642.

Alonso, M. A., Fernandez, A., & Díez, E. (2011). Oral frequency norms for 67,979 Spanish words. *Behavior Research Methods, 43*(2), 449-458. doi: 10.3758/s13428-011-0062-3.

Altarriba, J., & Rivera Santiago, A. L. (1994). Current perspectives on using linguistic and cultural factors in counseling the Hispanic client. *Professional Psychology: Research and Practice, 25*(4), 388-397. doi: 10.1037/0735-7028.25.4.388.

Alzheimer's Association (2018). 2018 Alzheimer's Disease Facts and Figures. *Alzheimer's Dementia, 14*(3), 367-429.

American Educational Research Association (AERA), American Psychological Association (APA), & National Council on Measurement in Education (NCME). (2014). *Standards for educational and psychological testing (Rev. Ed.)*. Washington DC: American Educational Research Association.

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual or Mental Disorders (5 ed.)*. Arlington, VA: American Psychiatric Publishing.

American Psychological Association (APA). (2003). Guidelines on multicultural education, training, research, practice, and organizational change for psychologists. *American Psychologist, 58*(5), 377-402. doi:10.1037/0003-066X.58.5.377.

American Psychological Association (APA). (2007). *The Doctorate Employment Survey (2009).* Retrieved from http://www.apa.org/workforce/publications/07-doc-empl/index.aspx.

American Psychological Association (APA). (2008). *APA Survey of Psychology Health Service Providers.* Retrieved from http://www.apa.org/workforce/publications/08-hsp/index.aspx.

American Psychological Association (APA). (2012). *Crossroads: The psychology of immigration in the new century.* Report of the APA presidential task force on

immigration executive summary. Retrieved from http://www.apa.org/topics/immigration/executive-summary.pdf.

Amster, H. (1964). Evaluative judgment and recall in incidental learning. *Journal of Verbal Learning and Verbal Behavior, 3*(6), 466-473. doi: 10.1016/S0022-5371(64)80017-7.

Anastasi, A., & Urbina, S. (1997). *Psychological testing* (7th ed.). Upper Saddle River, N.J: Prentice Hall.

Anderson, A. K. (2005). Affective Influences on the Attentional Dynamics Supporting Awareness. *Journal of Experimental Psychology: General*, 134(2), 258-281. doi: 10.1037/0096-3445.134.2.258.

Anderson, A. K., Yamaguchi, Y., Grabski, W., & Lacka, D. (2006). *Learning & Memory, 13*(6), 711-718. doi: 10.1101/lm.388906.

Ardila, A, Rosselli, M., Ostrosky-Solis, F., Marcos, J., Granda, G., & Soto, M. (2000). Syntactic comprehension, verbal memory, and calculation abilities in Spanish-English bilinguals. *Applied Neuropsychology, 7*(1), 3-16. doi: 10.1207/S15324826AN0701_2.

Ardila, A. (1995). Directions of research in cross-cultural neuropsychology. *Journal of Clinical and Experimental Neuropsychology, 17*(1), 143-150. doi: 10.1080/13803399508406589.

Ardila, A. (1996). Towards a cross-cultural neuropsychology. *Journal of Social and Evolutionary Systems, 19*(3), 237-248. doi: 10.1016/S1061-7361(96)90034-X.

Ardila, A., Bertolucci, P. H., Braga, L. W., Castro-Caldas, M., Judd, T., Kosmodis, M. H., Esmeralda, M., Ricardo, N., Ostrosky-Solis, F., & Roselli, M. (2010). Illiteracy: The neuropsychology of cognition without reading. *Archives of Clinical Neuropsychology, 25* (8), 689-712. doi :10.1093/arclin/acq079.

Ardila, A., Rodríguez-Menéndez, G., & Rosselli, M. (2002). Current issues in neuropsychological assessment with Hispanic/Latinos. In F. R. Ferraro (Ed.), *Minority and cross-cultural aspects of neuropsychological assessment* (pp. 161-179). Lisse, Netherlands: Swets & Zeitlinger Publishers.

Ardila, A., Rosselli, M., & Puente, A. E. (1994). *Neuropsychological Evaluation of the Spanish Speaker*. New York, NY: Premium Press.

Arentoft, A., Byrd, D., Robbins, R. N., Monzones, J., Miranda, C., Rosario, A., . . .Mindt, M. R. (2012). Multidimensional effects of acculturation on English-language neuropsychological test performance among HIV+ Caribbean Latinas/os. *Journal of Clinical and Experimental Neuropsychology, 34* (8), 814–825. doi: 10.1080/13803395.2012.683856.

Artiola i Fortuny, L., Hermosillo, R. D., Heaton, R. K., & Pardee, R. E., III. (1999). *Manual de Normas y Procedimientos para la Batería Neuropsicologica en Espanol (Manual of norms and procedures for the batería neuropsicológica en español)*. Lisse, Netherlands: Swets & Zeitlinger.

Bartolini, E., Bell, G. S., &Sander, J. W. (2011) Multicultural challenges in epilepsy. *Epilepsy & Behavior, 20*(3), 428-434. doi: 10.1016/j.yebeh.2010.12.045.

Bazin, N., Perruchet, P., & Feline, A. (1996). Mood congruence effect in explicit and implicit memory task: A comparison between depressed patients, schizophrenic patients and controls. *European Psychiatry, 11*(8), 390-395. doi: 10.1016/S0924-9338(97)82575-8.

Begg, I., Upfold, D., & Wilton, T. D. (1978). Imagery in verbal communication. *Journal of Mental Imagery, 2*(2), 165-186.

Bello, D. T., Allen, D. N., & Mayfield, J. (2008). Sensitivity of the children's category test level 2 to brain dysfunction. *Archives of Clinical Neuropsychology, 23*(3), 329-339. doi:10.1016/j.acn.2007.12.002.

Benedet, M. J., & Alejandre, M. A. (1998). *Test de aprendizaje verbal España-Complutense*. Madrid: Publicaciones de Psicologia Aplicada.

Benuto, L. T. (Ed). (2013). *Guide to psychological assessment with Hispanics*. New York, NY: Springer Science + Business Media.

Bertrand, M. C., Sutton, H., Achim, A. M., Malla, A. K., & Lepage, M. (2007). Social cognitive impairments in first episode psychosis. *Schizophrenia Research, 95*(1-3), 124-133. doi: 10.1016/j.schres.2007.05.033.

Bialystok, E. (2001). *Bilingualism in development: Language, literacy and cognition*. New York: Cambridge University Press.

Bialystok, E., & Craik, F. (2010). Cognitive and linguistic processing in the bilingual mind. *Current Directions in Psychological Science, 19*(1), 19-23. doi: 10.1177/0963721409358571.

Bialystok, E., & Feng, X. (2011). Language proficiency and its implications for monolingual and bilingual children. In A. Y. Durgunoglu & C. Goldenberg (Eds.), *Language and Literacy Development in Bilingual Settings* (pp. 121-137). New York: Guilford Press.

Bireta, T. J., Neath, I., & Surprenant, A. M. (2006). The syllable-based word length effect and stimulus set specificity. *Psychonomic Bulletin & Review, 13*(3), 434-438. doi: 10.3758/BF03193866.

Blake, T. M., Varnhagen, C. K., & Parent, M. B. (2001). Emotionally arousing pictures increase blood glucose levels and enhance recall. *Neurobiology of Learning and Memory, 75*(3), 262-273. doi: 10.1006/nlme.2000.3973.

Blaney, P. H. (1986). Affect and memory: A review. *Psychological Bulletin, 99*(2), 229-246. doi: 10.1037/0033-2909.99.2.229.

Blaney, P. H., & Millon, T. (2009). *Oxford textbook of psychopathology* (2nd ed.). New York, NY: Oxford University Press.

Boone, K. B., Victor, T. L. Wen, J., Razani, J., & Pontón, M. (2007). The association between neuropsychological scores and ethnicity, language, and acculturation variables in a large patient population. *Archives of Clinical Neuropsychology, 22*(3), 355-365. doi: 10.1016/j.acn.2007.01.010.

Bower, G. H. (1981). Mood and memory. *American Psychologist, 36*(2), 129-148. doi: 10.1037/0003-066X.36.2.129.

Bower, G. H. (1991). How might emotions affect learning? In S. Christianson (Ed.), *The handbook of emotion and memory* (pp. 3-31). Hillsdale, NJ: Erlbaum.

Bradley, B. P., Mogg, K., & Williams, R. (1995). Implicit and explicit memory for emotion congruent information in clinical depression and anxiety. *Behavior Research and Therapy, 33*(7), 755-770. doi: 10.1016/0005-7967(95)00029-W.

Bradley, M. M., & Lang, P. J. (1999). *Affective norms for English words (ANEW): Stimuli, instruction manual and affective ratings (Technical Report No. C-1)*. Gainesville: University of Florida, NIMH Center for Research in Psychophysiology.

Bradley, M. M., & Lang, P. J. (2000). Affective reaction to acoustic stimuli. *Psychophysiology 37*(2), 204-15. doi: 10.1017/S0048577200990012.

Bradley, M. M., Codispoti, M., Cuthbert, B. N., & Lang, P. J. (2001). Emotion and motivation: I. Defensive and appetitive reactions in picture processing. *Emotion, 1*(3), 276-298. doi: 10.1037/1528-3542.1.3.276.

Breslau, J., Kendler, K. S., Su, M., Gaxiola-Aguilar, S., & Kessler, R. C. (2005). Lifetime risk and persistence of psychiatric disorders across ethnic groups in the United States. *Psychological Medicine, 35*(3), 317-327. doi: 10.1017/S0033291704003514.

Brown, A. & Patten, E. (2014). *2012, Hispanics in the United States Statistical Portrait*. Pew Research Center. Retrieved from http://www.pewhispanic.org/2014/04/29/2012-statistical-information-on-hispanics-in-united-states/.

Brune, M. (2003). Theory of mind and the role of IQ in chronic disorganized schizophrenia. *Schizophrenia Research, 60*(1), 57-64. doi: 10.1016/S0920-9964(02)00162-7.

Bryson, G., Bell, M., & Lysaker, P. (1997). Affect recognition in schizophrenia: a function of global impairment or a specific cognitive deficit. *Psychiatry Research, 71*(2), 105-113. doi: 10.1016/S0165-1781(97)00050-4.

Buré-Reyes, A., Hidalgo-Ruzzante, N., Vilar-López, R. Gontier, J., Sánchez, L., Pérez-García, M., & Puente, A. E. (2013). Neuropsychological test performance of Spanish speakers: Is performance different across different Spanish-speaking subgroups? *Journal of Clinical and Experimental Neuropsychology, 35*(4), 404-412. doi: 10.1080/13803395.2013.778232.

Buschke, H. (1973). Selective reminding analysis of memory and learning. *Journal of Verbal Learning and Verbal Behavior, 12*(5), 543-550. doi: 10.1016/S0022-5371(73)80034-9.

Calhoon, S. W. (1935). Influence of syllabic length and rate of auditory presentation on ability to reproduce disconnected word lists. *Journal of Experimental Psychology, 18*(5), 612-620. doi: 10.1037/h0056639.

Camara, W. J., Nathan, J. S., & Puente, A. E. (2000). Psychological test usage: Implications in professional psychology. *Professional Psychology: Research and Practice, 31*(2), 141-154. doi:10.1037/0735-7028.31.2.141.

Campo, P., & Morales, M. (2004). Normative data and reliability for a Spanish version of the verbal Selective Reminding Test. *Archives of Clinical Neuropsychology, 19*(3), 421-435. doi: 10.1016/S0887-6177(03)00075-1.

Cardenas, V., Mausbach, B., Barrio, C., Bucardo, J., Jeste, D., & Patterson, T. (2008). The relationship between functional capacity and community responsibilities in middle-aged and older Latinos of Mexican origin with chronic psychosis. *Schizophrenia Research, 98*(1), 209-216. doi: 10.1016/j.schres.2007.09.008.

Center for Disease Control and Prevention (2008). *CDC fact sheet: Estimates of new HIV infections in the United States*. Retrieved from http://www.cdc.gov/nchhstp/Newsroom/docs/Fact-Sheet-on-HIV-Estimates.pdf.

Cherner, M. (2010). Considerations in the cross-cultural assessment of functional abilities. In T. D., Marcotte & I., Grant (Eds.), *Neuropsychology of everyday functioning* (pp. 209-221). New York, NY: Guilford Press.

Cherner, M. Suarez, P. Lazzaretto, D. Fortuny, L. A., Mindt, M. R., Dawes, S. Marcotte, T., Grant, I. & Heaton, R. (2007). Demographically corrected norms for the Brief Visuospatial Memory Test-revised and Hopkins Verbal Learning Test-revised in

monolingual Spanish speakers from the U.S.-Mexico border region. *Archives of Clinical Neuropsychology, 22*(3), 343-353. doi: 10.1016/j.acn.2007.01.009.

Chin, A., Negash, S., & Hamilton, R. (2011). Diversity and disparity in dementia: The impact of ethnoracial differences in Alzheimer disease. *Alzheimer Disease and Associated Disorders, 25*(3), 187-195. doi: 10.1097/WAD.0b013e318211c6c9.

Coles, M. E., & Heimberg, R. G. (2002). Memory biases in the anxiety disorders: Current status. *Clinical Psychology Review, 22*(4), 587-627. doi: 10.1016/S0272-7358(01)00113-1.

Colombel, F. (2000). The processing of emotionally positive words according to the amount of accessible retrieval cues. *International Journal of Psychology, 35*(6), 279-286. doi: 10.1080/002075900750047996.

Cowan, N., Baddeley, A. D., Elliott, E. M., & Norris, J. (2003). List composition and the word length effect in immediate recall: A comparison of localist and globalist assumptions. *Psychonomic Bulletin & Review, 10*(1), 7479. doi: 10.3758/BF03196469.

Craik, F. I. M., Bialystok, E., & Freedman, M. (2010). Delaying the onset of Alzheimer disease: Bilingualism as a form of cognitive reserve. *Neurology, 75*(19), 1726-1729. doi: 10.1212/WNL.0b013e3181fc2a1c.

Curiel, R. E., Hernández-Cardenache, R., Giraldo, N., Rosado, M., Restrepo, L., Raffo, A., Lavado, M., Santos, J., & Whitt, N. (2016). A compendium of neuropsychological measures for Hispanics in the United States. In F. R., Ferraro (Ed.), *Minority and cross-cultural aspects of neuropsychological assessment: Enduring and emerging trends* (pp. 471-514). Philadelphia, PA: Taylor & Francis.

Cusi, A. M., Nazarov, A., Holshausen, K., Macqueen, G. M., & McKinnon, M. C. (2012). Systematic review of the neural basis of social cognition in patients with mood disorders. *Journal of Psychiatry and Neuroscience, 37*(3), 154-169. doi:10.1503/jpn.100179.

Deese, J. (1960). Frequency of usage and number of words in free recall: The role of association. *Psychological Reports, 7*, 337-344. doi:10.2466/PR0.7.6.337-344.

Delaney, R. C., Prevey, M. L., Cramer, J., & Mattson, R. H., & the VA Epilepsy Cooperative Study #264 Research Group. (1992). Test-retest comparability and control subject data for the Rey-Auditory Verbal Learning Test and the Rey-Osterrieth/Taylor Complex Figures. *Archives of Clinical Neuropsychology, 7*(6), 523-528. doi: 10.1016/0887-6177(92)90142-A.

Delis, D. C., Freeland J., Kramer, J. H., & Kaplin E. (1988). Integrating clinical assessment with cognitive neuroscience: Construct validation of the California Verbal Learning Test. *Journal of Consulting and Clinical Psychology, 56*(1), 123-130. doi: 10.1037/0022-006X.56.1.123.

Delis, D. C., Kramer, J. H., Kaplan, E., & Ober, B. A. (2000). *California Verbal Learning Test-Second Edition (CVLT-II).* San Antonio, TX: The Psychological Corporation.

Delis, D. C., McKee, R., Massman, P. J., Kramer, J. H., Kaplan, E., & Gettman, D. (1991). Alternate form of the California Verbal Learning Test: Development and reliability. *The Clinical Neuropsychologist, 5*(2), 154-162. doi: 10.1080/13854049108403299.

Denny, E. B., & Hunt, R. R. (1992). Affective valence and memory in depression: Dissociation of recall and fragment completion. *Journal of Abnormal Psychology, 101*(3), 575-580. doi: 10.1037/0021-843X.101.3.575.

Dere, E., Pause, B. M., & Pietrowsky, R. (2010). Emotion and episodic memory in neuropsychiatric disorders. *Behavioral Brain Research, 215*(2), 162-171. doi: 10.1016/j.bbr.2010.03.017.

Derogatis L. R., Rickels K., & Rock A. F. (1976). The SCL-90 and the MMPI: A step in the validation of a new self-report scale. *British Journal of Psychiatry, 128*(280), 280-289. http://dx.doi.org/10.1192/bjp.128.3.280.

Derogatis, L. R. & Cleary, P. A. (1977). Confirmation of the dimensional structure of the scl-90: A study in construct validation. *Journal of Clinical Psychology, 33*(4), 981-989. doi: 10.1002/1097-4679(197710)33:4<981.

Derogatis, L. R. (1983). *SCL-90-R: Administration, scoring, & procedures manual for the revised version*. Baltimore: Clinical Psychometric Research.

Dewaele, J. M. (2004). The emotional force of swearwords and taboo words in the speech of multilinguals. *Journal of multilingual and multicultural development, 25*(2-3), 204-222. doi: 0143-4632/04/02 204-19.

Dingfelder, S. F. (2005). Closing the gap for Latino patients. *Monitor on Psychology, 36*(1), 58. Retrieved from http://www.apa.org/monitor/jan05/closingthegap.aspx.

Doerksen, S., & Shimamura, A. P. (2001). Source memory enhancement for emotional words. *Emotion, 1*(1), 5-11. doi: 10.1037//1528-3542.1.1.5.

Dolan, R. J. (2002). Emotion, cognition, and behavior. *Science, 298* (5596), 1191-1194. doi: 10.1126/science.1076358.

Echemendia, R. J., & Harris, J. G. (2004). Neuropsychological test use with Hispanic/Latino populations in the united states: Part II of a national survey. *Applied Neuropsychology, 11*(1), 4-12. doi:10.1207/s15324826an1101_2.

Echemendia, R., Harris, J. Congrett, S., Diaz, M. & Puente, A. E. (1997). Neuropsychological training and practices with Hispanics. A national survey. *The Clinical Neuropsychologist, 11*(3), 229-243. doi: 10.1080/13854049708400451.

Erber, R. & Erber, M. W. (1994). Beyond mood and social judgment: Mood incongruent recall and mood regulation. *European Journal of Social Psychology, 24*(1), 79-88. doi: 10.1002/ejsp.2420240106.

Fernandez, K., Boccaccini, M. T., & Noland, R. M. (2007). Professionally responsible test selection for Spanish speaking clients: A four step approach for identifying and selecting translated tests. *Professional Psychology: Research and Practice, 38*(4), 363-374. doi: 10.1037/0735-7028.38.4.363.

Ferraro, F. R., & King, B. (2004). Release from proactive interference with positive and negative words. *The Psychological Record, 54*(2), 199-206.

Ferre, P., Garcia, T., Fraga, I., Sanchez Casas, R., & Molero, M. (2010). Memory for emotional words in bilinguals: Do words have the same emotional intensity in the first and in the second language? *Cognition and Emotion, 24*(5), 760-785. doi: 10.1080/02699930902985779.

Fett, A. K., Viechtbauer, W., Dominguez, M. D., Penn, D. L., van Os, J., & Krabbendam, L. (2011). The relationship between neurocognition and social cognition with functional outcomes in schizophrenia: a meta-analysis. *Neuroscience and Biobehavioral Reviews, 35*(3), 573-588. doi:10.1016/j.neubiorev.2010.07.001.

Florez, A., Lopez, G., & Radford, J. (2017). *Facts on U.S. Latinos, 2015 Statistical portrait of Hispanics in the United States.* Pew Research Center. Retrieved from http://www.pewhispanic.org/2017/09/18/facts-on-u-s-latinos-current-data/.

Funes, C. M., Rodriguez, J. H., & Lopez, S. R. (2016). Norm comparisons of the Spanish-language and English-language WAIS-III: Implications for clinical assessment and test adaptation. *Psychological Assessment, 28*(12), 1709-1715. doi:10.1037/pas0000302.

Gallo, L. C., Penedo, F. J., de los Monteros, K. E., & Arguelles, W. (2009). Resiliency in the face of disadvantage: Do Hispanic cultural characteristics protect health outcomes? *Journal of Personality, 77* (6), 1707-1746. doi: 10.1111/j.1467-6494.2009.00598.x.

Gasquoine, P. G. (1999). Variables moderating cultural and ethnic differences in neuropsychological assessment: The case of Hispanic Americans. *The Clinical Neuropsychologist, 13*(3), 376-383. doi: 10.1076/clin.13.3.376.1735.

Gasquoine, P., Croyle, K. , Cavazos-Gonzalez, C. & Sandoval, O. (2007). Language of administration and neuropsychological test performance in neurologically intact Hispanic. *Archives of Clinical Neuropsychology, 22*(8), 991-1001. doi: 10.1016/j.acn.2007.08.003.

Geisinger, Kurt F. (Ed) (2015). *Psychological testing of Hispanics.* Washington, DC: American Psychological Association.

Glosser G., Cole L., Khatri U., Della Pietra L., & Kaplan E. (2002). Assessing non-verbal memory with the Biber Figure Learning Test-Extended in temporal lobe epilepsy patients. *Archives of Clinical Neuropsycholy, 17*(1), 25-35. doi: 10.1016/S0887-6177(00)00093-7.

Gollan, T. H., Montoya, R. I., & Werner, G. (2002). Semantic and letter fluency in Spanish-English bilinguals. *Neuropsychology, 16*(4), 562-276. doi: 10.1037//0894-4105.16.4.562.

Gollan, T., & Acenas, L. (2004). What is a TOT? Cognate and translation effects on tip-of-the-tongue States in Spanish–English and Tagalog–English Bilinguals. *Journal of*

Experimental Psychology: Learning, Memory, and Cognition, 30(1), 246-269. doi: 10.1037/0278-7393.30.1.246.

Gollan, T., & Brown, A. (2006). From Tip-of-the-Tongue (TOT) Data to theoretical implications in two steps: When more TOTs means better retrieval. *Journal of Experimental Psychology: General, 135*(3), 462-483. doi: 10.1037/0096-3445.135.3.462.

Gollan, T., Montoya, R., Cera, C., & Sandoval, T. (2008). More use almost always means a smaller frequency effect: Aging, bilingualism, and the weaker links hypothesis. *Journal of Memory and Language, 58*(3), 787-814. doi: 10.1016/j.jml.2007.07.001.

Gonzalez Reigosa, F. (1976). The anxiety arousing effect of taboo words in bilinguals. In C. D. Spielberger & R. Diaz Guerrero (Eds.), *Crosscultural anxiety* (pp. 89-105). Washington, DC: Hemisphere.

González, H. M., Mungas, D., & Haan, M. N. (2002). A verbal learning and memory test for English- and Spanish-speaking older Mexican-American adults. *The Clinical Neuropsychologist, 16*(4), 439-451. doi: 10.1076/clin.16.4.439.13908.

González, H. M., Mungas, D., Reed, B. R., Marshall, S., & Haan, M. N. (2001). A new verbal learning and memory test for English-and Spanish-speaking older people. *Journal of the International Neuropsychological Society, 7*(5), 544-555. doi: 10.1017/S1355617701755026.

Gray, J. A., & N. McNaughton (2000). *The neuropsychology of anxiety: An enquiry into the functions of the septohippocampal system* (2nd ed.). Oxford: Oxford University Press.

Green, D. W. (1998). Mental control of the bilingual lexico-semantic system. *Bilingualism: Language and Cognition, 1*(2), 67-81. doi: 10.1017/S1366728998000133.

Green, M. F., Penn, D. L., Bentall, R., Carpenter, W. T., Gaebel, W., Gur, R. C., ... Heinssen, R. (2008). Social cognition in schizophrenia: an NIMH workshop on definitions, assessment, and research opportunities. *Schizophrenia Bulletin, 34*(6), 1211-1220. doi:10.1093/schbul/sbm145.

Greig, T. C., Bryson, G. J., & Bell, M. D. (2004). Theory of mind performance in schizophrenia: diagnostic, symptom, and neuropsychological correlates. *Journal of Nervous and Mental Disease, 192*(1), 12-18. doi:10.1097/01.nmd.0000105995.67947.fc.

Grosjean, F. (1982). *Life with two languages.* Cambridge, MA: Harvard University Press.

Guitard, D., Gabel, A. J., Saint-Aubin, J., Surprenant, A. M., & Neath, I. (2018). Word length, set size, and lexical factors: Re-examining what causes the word length effect. *Journal of Experimental Psychology: Learning, Memory, and Cognition*. Advance online publication. doi: 10.1037/xlm0000551.

Guo, X., Suarez-Morales, L., Schwartz, S. J., & Szapocznik, J. (2009). Some evidence for multidimensional biculturalism: Confirmatory factor analysis and measurement invariance analysis on the Bicultural Involvement Questionnaire-Short Version. *Psychological Assessment, 21*, 22-31. doi: 10.1037/a0014495.

Hamann, S. B., Ely, T. D., Grafton, S. T., & Kilts, C. D. (1999). Amygdala activity related to enhanced memory for pleasant and aversive stimuli. *Nature Neuroscience, 2*(3), 289-293. doi: 10.1038/6404.

Hancock, T. U. (2005). Cultural competence in the assessment of poor Mexican families in the rural southeastern united states. *Child Welfare: Journal of Policy, Practice, and Program, 84*(5), 689-711.

Harris, J. G., Cullum, C., & Puente, A. E. (1995). Effects of bilingualism on verbal learning and memory in Hispanic adults. *Journal of the International Neuropsychological Society, 1*(1), 10-16. doi: 10.1017/S1355617700000059.

Hayward, J. A., & Strongman, K. T. (1987). Emotional words, free recall, and laterality. *Bulletin of the Psychonomic Society, 25*(3), 161-162. doi: 10.3758/BF03330316.

Helms, J. E. (1997). The triple quandary of race, culture, and social class in standardized cognitive ability testing. In D. Flanagan, J. Genshaft, & P. Harrison (Eds.), *Contemporary intellectual assessment: Theories, tests, and issues.* (pp. 517-532). New York, NY: Guilford Press.

Henry, J. D., Phillips, L. H., & von Hippel, C. (2014). A meta-analytic review of theory of mind difficulties in behavioral-variant frontotemporal dementia. *Neuropsychologia, 56*, 53-62. doi:10.1016/j.neuropsychologia.2013.12.024.

Henry, M., Morera, A., Preciado, J., Frugoni, A., et al. (1994). Validez concurrente de la escala de depresión del SCL-90-R y la S. D. S. de Zung (Concurrent validity of SCL-90-R depression scale and Zung's S. D. S). *Anales de Psiquiatría*, *10*(6), 235-237.

Herbener, E. S. (2008). Emotional memory in schizophrenia. *Schizophrenia Bulletin*, *34*(5), 875-887. doi:10.1093/schbul/sbn081.

Hernández-Cardenache, R., Curiel, R. E., Raffo, A., Kitalgorodsky, M., & Burguera, L. (2016). Current trends in neuropsychological assessment with Hispanic/Latinos. In F. R. Ferraro (Ed), *Minority and cross-cultural aspects of neuropsychological assessment: Enduring and emerging trends* (pp. 259-278). Philadelphia, PA: Taylor & Francis.

Hernandez-Mejia, M. & Puente, A. E. (2015). *An Assay of Three Spanish Versions of the Wechsler Adult Intelligence Scale-Third Edition (WAIS-III)*. Poster presented at the Council of University Directors of Clinical Psychology, Albuquerque, New Mexico.

Howe, M., & Malone, C. (2011). Mood-congruent true and false memory: Effects of depression. *Memory, 19*(2), 192-201. doi: 10.1080/09658211.2010.544073.

Hulme, C., Suprenant, A. M., Bireta, T. J., Stuart, G., & Neath, I. (2004). Abolishing the word-length effect. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 30*(1), 98-106. doi: 10.1037/0278-7393.30.1.98.

Imada, H. (1989). Cross-language comparisons of emotional terms with special reference to the concept of anxiety. *Japanese Psychological research, 31*(1), 10-19.

International Test Commission. (2017). *The ITC Guidelines for Translating and Adapting Tests* (2nd ed.). Retrieved from www.InTestCom.org.

Ivanova, I., & Costa, A. (2008). Does bilingualism hamper lexical access in speech production? *Acta Psychologica, 127*(2), 277-288. doi: 10.1016/j.actpsy.2007.06.003.

Jacobs, D. M., Sano, M., Albert, S., Schofield, P., Doonief, G., & Stern, Y. (1997). Crosscultural neuropsychological assessment: A comparison of randomly selected, demographically matched cohorts of English- and Spanish-speaking older adults. *Journal of Clinical and Experimental Neuropsychology, 19*(3), 331-339. doi:10.1080/01688639708403862.

Jermann, F., Van der Linden, M., Laurencon, M., & Schmitt, B. (2009). Recollective experience during recognition of emotional words in clinical depression. *Journal of Psychopathology and Behavioral Assessment, 31*(1), 27-35. doi: 10.1007/s10862-008-9093-1.

Judd, T., Capetillo, D., Carrión-Baralt, J., Mármol, L. M., San Miguel-Montes, L., Navarrete, M. G., …Valdés, J. (2009). Professional considerations for improving the neuropsychological evaluation of Hispanics: A national academy of neuropsychology education paper. *Archives of Clinical Neuropsychology, 24*(2), 127-135. doi: 10.1093/arclin/acp016.

Kee, K. S., Kern, R. S., & Green, M. F. (1998). Perception of emotion and neurocognitive functioning in schizophrenia: what's the link? *Psychiatry Research, 81*(1), 57-65. doi: 10.1016/S0165-1781(98)00083-3.

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age of onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry, 62*(6), 593-602. doi: 10.1001/archpsyc.62.6.593.

Klatzky, R. L. (1980). *Human memory. Structures and processes* (2nd ed.). San Francisco: Freeman.

Kochhar, R. & Cilluffo, A. (2018). *Incomes of whites, blacks, Hispanics and Asians in the U.S., 1970 and 2016.* Pew Research Center. Retrieved from http://www.pewsocialtrends.org/2018/07/12/incomes-of-whites-blacks-hispanics-and-asians-in-the-u-s-1970-and-2016/.

Koelkebeck, K., Pedersen, A., Suslow, T., Kueppers, K. A., Arolt, V., & Ohrmann, P. (2010). Theory of Mind in first-episode schizophrenia patients: Correlations with cognition and personality traits. *Schizophrenia Research, 119*(1-3), 115-123. doi: 10.1016/j.schres.2009.12.015.

Kramer, J. H., Delis, D. C., & Daniel, M. H. (1988). Sex differences in verbal learning. *Journal of Clinical Psychology, 44*(6), 907-915. doi: 10.1002/1097-4679(198811)44:6<907::AID-JCLP2270440610>3.0.CO;2-8.

Krogstad, J. M. & Lopez, M. H. (2017). *Use of Spanish declines among Latinos in major U.S. metros.* Pew Research Center. Retrieved from http://www.pewresearch.org/fact-tank/2017/10/31/use-of-spanish-declines-among-latinos-in-major-u-s-metros/.

LaBar, K. S., & Phelps, E. A. (1998). Arousal-mediated memory consolidation: Role of the medial temporal lobe in humans. *Psychological Science, 9*(6), 490-493. doi: 10.1111/1467-9280.00090.

Lara, L. & Martínez-Molina, A. (2016). Validación de la Escala de Identidad Étnica Multigrupo-Revisada en adolescentes inmigrantes y autóctonos residentes en España. *Revista Latinoamericana de Ciencias Sociales, Niñez y Juventud, 14*(1), 591-601.

Lazarus, G. & Puente A. E. (2009). The evolution of neuropsychological test usage in different geographical locations and the role of the neuropsychologist. *Archives of Clinical Neuropsychology, 24*(5), 461.

Leany, B. D., Benuto, L. T., & Thaler, N. S. (2013). Neuropsychological assessment with Hispanic clients. In L. T. Benuto (Ed.), *Guide to psychological assessment with Hispanics* (pp. 351-376*)*. New York, NY: Springer Science + Business Media.

Levens, S. M. & Gotlib, I. H. (2009). Impaired selection of relevant positive information in depression. Depression and Anxiety, 26(5), 403-410. doi: 10.1002/da.20565.

Levine, L. J. & Edelstein, R. S. (2009). Emotion and memory narrowing: A review and goal-relevance approach. *Cognition and emotion, 23*(5), 833-875. doi: 10.1080/02699930902738863.

Lewis P. A., & Critchley, H. D. (2003). Mood-dependent memory. *Trends in Cognitive Science, 7*(10), 431-433. doi: 10.1016/j.tics.2003.08.005.

Lewis P. A., Critchley, H. D., Smith, A. P., & Dolan, R. J. (2005). Brain mechanisms for mood congruent memory facilitation. *Neuroimage, 25*(4), 1214-1223. doi: 10.1016/j.neuroimage.2004.11.053.

Lezak, M., Howieson, D. B., & Loring, D. W. (2012). *Neuropsychological assessment*. New York, NY: Oxford University Press.

Libkumen, T. M., Stabler, C. L., & Otani, H. (2004). Arousal, valence, and memory for detail. *Memory, 12*(2), 237-247. doi: 10.1080/09658210244000630.

Lishman, W. A. (1972). Selective factors in memory: II Affective disorder. *Psycholollgical Medicine, 2*(3), 248-253. doi: 10.1017/S0033291700042549.

Lisman, J. E., & Grace, A. A. (2005). The hippocampal-VTA loop: Controlling the entry of information into long-term memory. *Neuron, 46*(5), 703-713. doi: 10.1016/j.neuron.2005.05.002.

Lopez, M. H., & Dockterman, D. (2011). U.S. Hispanic *country of origin counts for nation, top 30 metropolitan areas.* Retrieved from Pew Research Center*:* http://www.pewhispanic.org/2011/05/26/us-hispanic-country-of-origin-counts-for-nation-top-30-metropolitan-areas/.

Maddock, R. J., & Frein, S. T. (2009). Reduced memory for the spatial and temporal context of unpleasant words. *Cognition and Emotion, 23*(1), 96-117. doi: 10.1080/02699930801948977.

Mancuso, F., Horan, W. P., Kern, R. S., & Green, M. F. (2011). Social cognition in psychosis: multidimensional structure, clinical correlates, and relationship with functional outcome. *Schizophrenia Research, 125*(2-3), 143-151. doi:10.1016/j.schres.2010.11.007.

Mandler, G., Goodman, G. O., & Wilkes-Gibbs, D. L. (1982). The word-frequency paradox in recognition. *Memory & Cognition, 10*(1), 33-42. doi:10.3758/BF03197623.

Manuel-Dupont, S., Ardila, A., Rosselli, M., & Puente, A. E. (1992). In A. E. Puente & R. J. McCaffrey (Eds.), *Handbook of neuropsychological assessment: A biopsychosocial perspective* (pp. 193-210). New York, NY: Plenum Press.

Marin, G., Sabogal, F., Marin, B. V., Otero-Sabogal, R., & Perez-Stable, E. J. (1987). Development of a Short Acculturation Scale for Hispanics. *Hispanic Journal of Behavioral Sciences, 9*(2), 183-205. doi: 10.1177/07399863870092005.

Martinez, S., Stillerman, L., & Waldo, M. (2005). Reliability and validity of the SCL-90-R with Hispanic college students. *Hispanic Journal of Behavioral Sciences, 27*(2), 254-264. doi: 10.1177/0739986305274911.

Mash, E. J., & Barkley, R. A. (2006). *Treatment of childhood disorders* (3rd ed.). New York, NY: Guilford Press.

Mash, E. J., & Barkley, R. A. (2007). *Assessment of childhood disorders* (4th ed.). New York, NY: Guilford Press.

Mather, M. (2009). When emotion intensifies memory interference. In B. H. Ross (Ed), *The psychology of learning and motivation* (Vol. 51, pp. 101-120). San Diego, CA, US: Elsevier Academic Press.

Mather, M., & Carstensen, L. L. (2005). Aging and motivated cognition: The positivity effect in attention and memory. *Trends in Cognitive Sciences, 9*(10), 496-502. doi: 10.1016/j.tics.2005.08.005.

Mathews, A., Ridgeway, V., & Williamson, D. A. (1996). Evidence for attention to threatening stimuli in depression. *Behavior Research and Therapy 34*(9), 695-705. doi: 10.1016/0005-7967(96)00046-0.

Matlin, M. W., Stang, D. J., Gawron, V. J., Freedman, A., & Derby, P. L. (1979). Evaluative meaning as a determinant of spew position. *Journal of General Psychology, 100*(1), 3-11. doi: 10.1080/00221309.1979.9710520.

Matsumoto, D. (1993). Ethnic differences in affect intensity, emotion judgements, display rule attitudes, and self-reported emotional expression in an American sample. *Motivation and Emotion, 17*(2), 107-123. doi: 10.1007/BF00995188.

Matsumoto, D., & Yoo, S. H. (2007). Methodological considerations in the study of emotion across cultures. In J. A. Coan & J. J. B. Allen (Eds.). *The handbook of emotion elicitation and assessment* (pp. 332–348). New York, NY: Oxford University Press.

McCleery, A., Horan, W. P., & Green, M. F. (2014). Social cognition during the early phase of schizophrenia. In P. Lysaker, G. Dimaggio, & M. Brune (Eds.), *Social Cognition and Metacognition in Schizophrenia: Psychopathology and Treatment Approaches* (pp. 49-67). San Diego, CA: Elsevier Academic Press.

McGaugh J. L. (2004). The amygdala modulates the consolidation of memories of emotionally arousing experiences. *Annual Review of Neuroscience,* 27, 1-28. doi: 10.1146/annurev.neuro.27.070203.144157.

McGaugh J. L. (2013). Making lasting memories: Remembering the significant. *Proceedings of the National Academy of Sciences of the United States of America, 110*(Suppl 2), 10402-10407.

Mehta, U. M., Thirthalli, J., Naveen Kumar, C., Keshav Kumar, J., Keshavan, M. S., & Gangadhar, B. N. (2013). Schizophrenia patients experience substantial social cognition deficits across multiple domains in remission. *Asian Journal of Psychiatry, 6*(4), 324-329. doi:10.1016/j.ajp.2013.02.001.

Mejia, A., Hernandez-Mejia, M., Lindsey, H. M., & Puente, A. E. (2014). *Distinctions across different Spanish WAIS-III similarities and digit span subtests across Mexican and Central American-born individuals.* Poster presented at the National Academy of Neuropsychology Annual Convention.

Melendez, F. (1994). The Spanish version of the WAIS: Some ethical considerations, *Clinical Neuropsychologist, 8*(4), 388-393. doi:10.1080/13854049408402041.

Meyer, M. B., & Kurtz, M. M. (2009). Elementary neurocognitive function, facial affect recognition and social-skills in schizophrenia. *Schizophrenia Research, 110*(1-3), 173-179. doi:10.1016/j.schres.2009.03.015.

Mungas, D., Reed, B. R., Crane, P. K., Haan, M. N., & González, H. (2004). Spanish and English neuropsychological assessment scales (SENAS): Further development and psychometric characteristics. *Psychological Assessment, 16*(4), 347-359. doi: 10.1037/1040-3590.16.4.347.

Muniz, J., Fernandez-Hermida, J. R., Fonseca-Pedrero, E., Campillo-Alvarez, A., & Pena-Suarez, E. (2011). Review of tests published in Spain. *Papeles del Psicólogo, 32*(2), 113-128.

Muñoz-Sandoval, A. F., Woodcock, R. W., McGrew, K. S., & Mather, N. (2005). *Batería III Woodcock-Muñoz.* Itasca, IL: Riverside Publishing.

Murphy, K. R., & Davidshofer, C. O. (2005). *Psychological testing: Principles and applications* (6th ed.). Upper Saddle River, NJ: Pearson/Prentice Hall.

Myers, H., Lesser, I., Rodrigues, N., Mira, C. B., Hwang, W. C., Camp, C., Anderson, D., Erickson, L., & Wohl, M. (2002). Ethnic differences in clinical presentation of depression in adult women. *Cultural Diversity and Ethnic Minority Psychology, 8*(2), 138–156. doi: 10.1037//1099-9809.8.2.138.

Nairne, J. S. (2002). Remembering over the short-term: The case against the standard model. *Annual Review of Psychology, 53*(1), 53-81. doi: 10.1146/annurev.psych.53.100901.135131.

Neblina, C. (2012). *Construct and criterion validity of the Rey Auditory Verbal Learning Test-Spanish version in adults with traumatic brain injury.* Master's thesis. University of Nevada Las Vegas.

Nelson, D. L., & McEvoy, C. L. (2000). What is this thing called frequency? *Memory & Cognition, 28*(4), 509-522. doi:10.3758/BF03201241.

Nicoladis, E., & Giovanni, S. (2000). The role of a child's productive vocabulary in the language choice of a bilingual family. *First Language, 20*(58), 3-28. doi: 10.1177/014272370002005801.

Ochsner, K. V. (2008). The social-emotional processing stream: Five core constructs and their translational potential for schizophrenia and beyond. *Biological Psychiatry, 64*(1), 48-61. doi: 10.1016/j.biopsych.2008.04.024.

Olmedo, E. L. (1981). Testing linguistic minorities. *American Psychologist, 36*(10), 1078-1085. doi: 10.1037/0003-066X.36.10.1078.

Ostrosky-Solis, F. & Lozano, A. (2006). Digit Span: effect of education and culture. *International Journal of Psychology, 41*(5), 333-341. doi: 10.1080/00207590500345724.

Ostrosky-Solis, F., Gómez-Perez, M., Matute, E., Rosselli, M., Ardila, A., & Pineda, D. (2007). NEUROPSI Attention and Memory: A neuropsychological test battery in Spanish with norms by age and educational level. *Applied Neuropsychology, 14*(3), 156-170. doi: 10.1080/09084280701508655.

Ostrosky-Solis, F., Ramirez, M., & Ardila, A. (2007). Same or different? Semantic verbal fluency across Spanish speakers from different countries. *Archives of Clinical Neuropsychology, 22*(3), 367-377. doi: 10.1016/j.acn.2007.01.011.

Ostrum, T. M. (1984). The sovereignty of social cognition. In R. S. Ryer & T. K. Skull (Eds.), *Handbook of Social Cognition*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Packard, M. G., & Cahill, L. (2001). Affective modulation of multiple memory systems. *Current Opinion in Neurobiology, 11*(6), 752-756. doi:10.1016/S0959-4388(01)00280-X.

Parrott, W. G., & Sabini, J. (1990). Mood and memory under natural conditions: Evidence for mood incongruent recall. *Journal of Personality and Social Psychology, 59*(2), 321-336. doi: 10.1037/0022-3514.59.2.321.

Passel J. S.& Cohn, D. (2011). Unauthorized immigrant population: national and state trends, 2010. Retrieved from http://www.pewhispanic.org/2011/02/01/unauthorized-immigrant-population-brnational-and-state-trends-2010/.

Passel J. S., Cohn, D., & Lopez (2011). *Census 2010: 50 million Latinos Hispanics account for more than half of nation's growth in past decade.* Retrieved from http://www.pewhispanic.org/files/reports/140.pdf.

Pearson (2018). *Escala de Inteligencia de Wechsler para Adultos-Tercera Edicion (EIWA-III).* Retrieved from https://www.pearsonclinical.com/psychology/products/100000192/escala-de-inteligencia-de-wechsler-para-adultostercera-edicion-eiwa-iii.html#tab-details.

Pearson (2018). *Symptom Checklist-90-Revised (SCL-90-R).* Retrieved from https://www.pearsonclinical.com/psychology/products/100000645/symptom-checklist-90-revised-scl-90-r.html#tab-details.

Pearson (2018). *Wechsler Adult Intelligence Scale-Third Edition (WAIS-III).* Retrieved from https://www.pearsonclinical.com/psychology/products/100000243/wechsler-adult-intelligence-scale--third-edition-wais-iii.html?origsearchtext=100000243#tab-details.

Pedraza, O. & Mungas, D. (2008). Measurement in cross-cultural neuropsychology. *Neuropsychology Review, 18*(3), 184-193. doi: 10.1007/s11065-008-9067-9.

Pelphrey, K. A., Shultz, S., Hudac, C. M., & Vander Wyk, B. C. (2011). Research review: Constraining heterogeneity: The social brain and its development in autism spectrum disorder. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 52*(6), 631-644. doi:10.1111/j.1469-7610.2010.02349.x.

Pena Casanova, J., Quinones-Ubeda, S., Quintana-Aparicio, M., Aguilar, M., Badenes, D., Molinuevo, J. L., ... NEURONORMA Study Team. (2009). Spanish multicenter normative studies (NEURONORMA project): Norms for verbal span, visuospatial span, letter and number sequencing, trail making test, and symbol digit modalities test. *Archives of Clinical Neuropsychology, 24*(4), 321-341. doi: 10.1093/arclin/acp038.

Penn, D. L., Corrigan, P. W., Bentall, R. P., Racenstein, J. M., & Newman, L. (1997). Social cognition in schizophrenia. *Psychological Bulletin, 121*(1), 114-132. doi: 10.1037/0033-2909.121.1.114.

Perez-Arce, P. & Puente, A.E. (1996). Neuropsychological evaluation of ethnic minorities. In R.J. Sbordone & C.J. Long (Eds.), *Ecological validity of neuropsychological testing* (283-300). Delray Beach, FL: St. Lucie Press.

Perkins, A. M., Kemp, S. E., & Corr, P. J. (2007). Fear and anxiety as separable emotions: An investigation of the revised reinforcement sensitivity theory of personality. *Emotion, 7*(2), 252-261. doi: 10.1037/1528-3542.7.2.252.

Phelps, E. A., LaBar, K. S., & Spencer, D. D. (1997). Memory for emotional words following unilateral temporal lobectomy. *Brain and Cognition, 35*(1), 85-109. doi: 10.1006/brcg.1997.0929.

Phinney, J., & Ong, A. (2007). Conceptualization and measurement of ethnic identity: Current status and future directions. *Journal of Counseling Psychology, 54*(3), 271-281. doi: 10.1037/0022-0167.54.3.271.

Pijnenborg, G. H., Withaar, F. K., Evans, J. J., van den Bosch, R. J., Timmerman, M. E., & Brouwer, W. H. (2009). The predictive value of measures of social cognition for community functioning in schizophrenia: implications for neuropsychological assessment. *Journal of the International Neuropsychological Society, 15*(2), 239-247. doi:10.1017/S1355617709090341.

Pineda, D. A., Rosselli, M., Ardila, A., Mejia, S. E., Romero, M. G., & Perez, C. (2000). The Boston diagnostic aphasia examination-Spanish version: The influence of demographic

variables. *Journal of International Neuropsychological Society, 6*(7), 802-814. doi: 10.1017/S135561770067707X.

Pinkham, A. E. (2014). Social cognition in schizophrenia. *Journal of Clinical Psychiatry, 75*(Suppl 2), 14-19. doi: 10.4088/JCP.13065su1.04.

Pinkham, A. E., Penn, D. L., Green, M. F., Buck, B., Healey, K., & Harvey, P. D. (2014). The social cognition psychometric evaluation study: Results of the expert survey and RAND panel. *Schizophrenia Bulletin, 40*(4), 813-823. doi: 10.1093/schbul/sbt081.

Pontón, M. O. & Ardila, A. (1999). The future of neuropsychology with Hispanic populations in the United States. *Archives of Clinical Neuropsychology, 14*(7), 565-580. doi: 10.1016/S0887-6177(99)00006-2.

Pontón, M. O., José J. Gonzalez J. J., Hernandez, I., Herrera, L., & Higareda, I. (2000). Factor Analysis of the Neuropsychological Screening Battery for Hispanics (NeSBHIS). *Applied Neuropsychology, 7*(1), 32-39. doi: 10.1207/S15324826AN0701_5.

Portinga, Y. H. (1989). Equivalence of cross-cultural data: An overview of basic issues. *International Journal of Psychology, 24*(6), 737-756. doi: 10.1080/00207598908247842.

Puente, A. E. & Perez-Garcia, M. (2000). Neuropsychological assessment of ethnic minorities: Clinical issues. In I. Cuéllar (Ed.) & F. A. Paniagua (Ed.), *Handbook of multicultural mental health* (pp. 419-435). San Diego, CA: Academic Press.

Puente, A. E. & Puente, N. (2009). The challenges of measuring abilities and competencies in Hispanics/Latinos. In E. L. Grigorenoko (Ed.), *Multicultural psychoeducational assessment* (pp. 417-441). New York, NY: Springer.

Puente, A. E. & Salazar, G. (1998). Assessment of minority and culturally diverse children. In A. Prifitera & D. H. Saklofske (Eds.), *WISC III Clinical use and interpretation: scientist practitioner perspectives* (pp. 227-248). San Diego, CA: Academic Press.

Puente, A. E., & Agranovich, A. (2004). The cultural in cross-cultural neuropsychology. In M. Hersen, G. Goldstein, & S. R. Beers (Eds.), *Comprehensive handbook of psychological assessment. Vol. 1: Intellectual and neuropsychological assessment* (pp. 321-332). Hoboken, NJ: Willey.

Puente, A. E., Ojeda, C., Zink, D. N., & Portillo Reyes, V. (2015). Neuropsychological testing of Spanish speakers. In K. F. Geisinger (Ed.), *Psychological testing of Hispanics: Clinical, cultural, and intellectual issues* (pp. 135-152). Washington, DC: American Psychological Association.

Puente, A. E., Zink, D. N., Hernandez, M., Jackman-Venanzi, T., & Ardila, A. (2013). Bilingualism and its impact on psychological assessment. In L. T. Benuto (Ed.), *Guide to psychological assessment with Hispanics* (pp. 15-31). New York, NY: Springer Science + Business Media.

Rabin, L. A., Barr, W. B. & Burton, L. A. (2005). Assessment practices of clinical neuropsychologists in the United States and Canada: A survey of INS, NAN, and APA Division 40 Members. *Archives of Clinical Neuropsychology, 20*(1), 33-65. doi: 10.1016/j.acn.2004.02.005.

Real Academia Española (2018). Corpus de referencia del español actual (CREA; Corpus of reference of current Spanish). Retrieved from http://www.rae.es/recursos/banco-de-datos/crea and http://corpus.rae.es/lfrecuencias.html.

Reidy, T. J., Bowler, R. M., Rauch, S. S., & Pedroza, G. I. (1992). Pesticide exposure and neuropsychological impairment in migrant farm workers. *Archives of Clinical Neuropsychology, 7*(1), 85-95. doi: 10.1016/0887-6177(92)90021-E.

Renteria, L. (2010). *Current practices survey in the neuropsychological assessment of Hispanics in the U.S.* Presentation at the first conference of the Hispanic Neuropsychological Society. Acapulco, Mexico.

Renteria, L., Tinsley Li, S., & Pliskin, N. H. (2008). Reliability and validity of the Spanish language Wechsler Adult Intelligence Scale (3rd edition) in a sample of American, urban, Spanish-Speaking Hispanics. *The Clinical Neuropsychologist, 22*(3), 455-470. doi: 10.1080/13854040701336428.

Rey, A. (1964). *L'Examin clinique en psychologie*. Paris: Universitaire de France.

Reynolds, C. R. (2000). Methods for detecting and evaluating cultural bias in neuropsychological tests. In E. Fletcher-Janzen, T. L. Strickland, C. R. Reynolds, E. Fletcher-Janzen, T. L. Strickland & C. R. Reynolds (Eds.). *Handbook of cross-cultural neuropsychology*. (pp. 249-285). Dordrecht, the Netherlands: Kluwer Academic.

Rinck, M., Glowalla U., & Schneider K. (1992). Mood-congruent and mood-incongruent learning. *Memory & Cognition, 20*(1), 29-39. doi: 10.3758/BF03208251.

Rivera Mindt, M., Arentoft, A., Germano, K. K., D'Aquila, E., Scheiner, D., Pizzirusso, M., Sandoval, T. C., & Gollan, T. H. (2008). Neuropsychological, cognitive, and theoretical considerations for evaluation of bilingual individuals. *Neuropsycholy Review, 18*(3), 255-268. doi:10.1007/s11065-008-9069-7.

Roberts, P. M., Garcia, L. J., Desrochers, A., & Hernandez, D. (2002). English performance of proficient bilingual adults on the Boston Naming Test. *Aphasiology, 16*(4-6), 635-645. doi: 10.1080/02687030244000220.

Robles, R. & Páez, F. (2003). Estudio sobre la traducción al español y las propiedades psicométricas de las escalas de afecto positivo y negativo (PANAS; Study of the translation and psychometric properties of the positive and negative affect schedule). *Salud Mental, 26*(1), 69-75.

Rosselli, M., Ardila, A., Arujo, K., Weekes, V. A., Caracciolo, V., Padilla, M., & Ostrosky-Solís, F. (2000). Verbal fluency and repetition skills in healthy older Spanish-English bilinguals. *Applied Neuropsychology, 7*(1), 17-24. doi: 10.1207/S15324826AN0701_3.

Rosselli, M., Ardila, A., Santisi, M., Arecco, M., Salvatierra, J., Conde, A., & Lenis, B. (2002). Stroop effect in Spanish-English bilinguals. *Journal of the International Neuropsychological Society, 8*(6), 819-827. doi: 10.1017/S1355617702860106.

Rosselli, M., Tappen, R., Williams, C., & Salvatierra, J. (2006). The relation between education and gender on the attention items of the Mini-Mental State Examination in Spanish speaking orders. *Archives of Clinical Neuropsychology, 21*(7), 677-686. doi: 10.1016/j.acn.2006.08.001.

Rusting, C. L. & DeHeart, T. (2000). Retrieving positive memories to regulate negative mood: Consequences for mood-congruent memory. *Journal of Personality and Social Psychology, 78*(4), 737-52. doi: 10.1037/0022-3514.78.4.737.

Rusting, C. L. (1998). Personality, mood, and cognitive processing of emotional information: Three conceptual frameworks. *Psychological Bulletin, 124*(2), 165-196. doi: 10.1037/0033-2909.124.2.165.

Rychlak, J. F., & Saluri, R. E. (1973). Affective assessment in the learning of names by fifth- and sixth-grade children. *Journal of Genetic Psychology, 123*(2), 251-261. doi: 10.1080/00221325.1973.10532684.

Salazar, G. D., Perez-Garcia, M., & Puente, A. E. (2007). Clinical neuropsychology of Spanish speakers. The challenge and pitfalls of a neuropsychology of heterogeneous population. In B. Uzzel (Ed.), *International Handbook of Cross-Cultural Neuropsychology*. New Jersey: LEA Publishers.

Salinas, C. M., Edgar, V. B., & Puente, A. E. (2016). In F. R. Ferraro (Ed), *Minority and cross-cultural aspects of neuropsychological assessment: Enduring and emerging trends* (pp. 229-258). Philadelphia, PA: Taylor & Francis.

Salthouse, T. A. (1980). Age and memory: Strategies for localizing the loss. In L. W. Poon, J. L. Fozard, L. S. Cermak, D. Arenberg, & L. W. Thompson (Eds.), *New directions in memory and aging: Proceedings of the George A. Talland Memorial Conference* (pp. 47–65). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Santiago-Rivera, A.L., Benson, G., Santos, M.M., & Lopez, M. (2015). Latinos and Depression: Assessment Issues. In K. Geisinger (Ed.), *Psychological Testing of Hispanics: Clinical and Intellectual Issues*. Washington, DC, APA.

Savla, G. N., Vella, L., Armstrong, C. C., Penn, D. L., & Twamley, E. W. (2013). Deficits in domains of social cognition in schizophrenia: A meta-analysis of the empirical evidence. *Schizophrenia Bulletin, 39*(5), 979-992. doi:10.1093/schbul/sbs080.

Schlueter, J. E., Carlson, J. F., Geisinger, K. F., & Murphy, L. (2013). *Pruebas publicadas en español (Tests published in Spanish).* Lincoln, NE: Buros Center for Testing.

Schrauf, R. W. (2000). Bilingual autobiographical memory: Experimental studies and clinical cases. *Culture and Psychology, 6*(4), 387-417. doi: 10.1177/1354067X0064001.

Scott, J. G., & Schoenberg, M. R. (Eds.). (2011). *The little black book of neuropsychology: A syndrome-based approach*. New York: Springer Science.

Seligman, M. E., Abramson, L., Semmel, A., & von Baeyer, C. (1984). Depressive attributional style. *Southern Psychologist, 2*(1), 18-22.

Sergi, M. J., & Green, M. F. (2003). Social perception and early visual processing in schizophrenia. *Schizophrenia Research, 59*(2-3), 233-241. doi: 10.1016/S0920-9964(01)00405-4.

Sharma, P., & Kerl, S. B. (2002). Suggestions for psychologists working with Mexican American individuals and families in health care settings. *Rehabilitation Psychology, 47*(2), 230-239. doi:10.1037/0090-5550.47.2.230.

Siddiqui, A. P., & Unsworth, N. (2011). Investigating the role of emotion during the search process in free recall. *Memory and Cognition, 39*, 1387-1400. doi: 10.3758/s13421-011-0125-9.

Singer, J. A., & Salovey, P. (1988). Mood and memory: Evaluating the network theory of affect. *Clinical Psychology Review, 8*(2), 211-251. doi:10.1016/0272-7358(88)90060-8.

Sinzig, J., Morsch, D., & Lehmkuhl, G. (2008). Do hyperactivity, impulsivity and inattention have an impact on the ability of facial affect recognition in children with autism and ADHD? *European Child & Adolescent Psychiatry, 17*(2), 63-72. doi:10.1007/s00787-007-0637-9.

Skilback, W. M., Acosta, F. X., Yamamoto, J., & Evans, L. A. (1984). Self-reported psychiatric symptoms among Black, Hispanic, and White outpatients. *Journal of Clinical*

Psychology, 40(5), 1184-1189. doi: 10.1002/1097-4679(198409)40:5<1184::AID-JCLP2270400510>3.0.CO;2-G.

Strauss, G. P. & Allen, D. N. (2013). Emotional verbal learning test: Development and psychometric properties. *Archives of Clinical Neuropsychology, 28*(5), 435-451. doi: 10.1093/arclin/act007.

Strauss, G. P. & Allen, D. N. (2013b). Emotional verbal learning test: Development and psychometric properties (supplemental material). *Archives of Clinical Neuropsychology, 28*(5), 435-451.

Strauss, G. P., & Allen, D. N. (2008). Emotional intensity and categorization ratings for emotional and nonemotional words. *Cognition and Emotion, 22*(1),114-133. doi.org/10.1080/02699930701319154.

Strauss, G. P., Allen, D. N., Jorgensen, M. L., & Cramer, S. L. (2005). Test-retest reliability in Stroop and Emotional Stroop Tasks: An investigation of color word and picture-word versions. *Assessment, 12*(3), 330-337. doi: 10.1177/1073191105276375.

Strutt, A. M., Burton, V. J., Resendiz, C. V., & Peery, S. (2016). Neurocognitive assessment of Hispanic individuals residing in the United States: Current issues and potential solutions. In F. R. Ferraro (Ed), *Minority and cross-cultural aspects of neuropsychological assessment: Enduring and emerging trends* (pp. 201-228). Philadelphia, PA: Taylor & Francis.

Sue, D.W., & Sue, D. (2013). *Counseling the culturally diverse: Theory and practice*. New Jersey: Wiley & Sons.

Suzuki, L. A., & Ponterotto, J. G. (Eds.). (2008). *Handbook of multicultural assessment: Clinical, psychological, and educational applications*. San Francisco, CA: Jossey-Bass.

Szapocznik, J., Kurtines, W. M., & Fernandez, T. (1980). Biculturalism involvement and adjustment in Hispanic-American youths. *International Journal of Intercultural Relations, 4,* 353-365. doi: 10.1016/0147-1767(80)90010-3.

Tabachnick, B. G., & Fidell, L. S. (2001). *Using Multivariate Statistics.* Boston: Allyn and Bacon.

Talmi, D., & Moscovitch, M. (2004). Can semantic relatedness explain the enhancement of memory for emotional words? *Memory and Cognition, 32*(5), 742-751. doi: 10.3758/BF03195864.

Talmi, D., Schimmack, U., Paterson, T., & Moscovitch, M. (2007). The role of attention and relatedness in emotionally enhanced memory. *Emotion, 7*(1), 89-102. doi: 10.1037/1528-3542.7.1.89.

Tanaka-Matsumi, J. & Marsella, A. J. (1976). Cross-cultural variations in the phenomenological experience of depression. Word association studies. *Journal of Cross-Cultural Psychology, 7*(4), 379-396. doi: 10.1177/002202217674001.

Tarsia, M., Power, M. J., & Sanavio, E. (2003). Implicit and explicit memory biases in mixed anxiety-depression. *Journal of Affective Disorders, 77*(3), 213-225. doi: 10.1016/S0165-0327(02)00119-2.

U.S. Census Bureau (2009). Retrieved on March 4, 2011 from http://www.census.gov/Press-Release/www/releases/archives/facts_for_features_special_editions/013984.html.

U.S. Census Bureau (2011). *The Hispanic Population: 2010. 2010 Census Briefs*. Retrieved from U.S. Census Bureau online database: http://www.census.gov/prod/cen2010/briefs/c2010br-04.pdf.

Vauth, R., Rusch, N., Wirtz, M., & Corrigan, P. W. (2004). Does social cognition influence the relation between neurocognitive deficits and vocational functioning in schizophrenia? *Psychiatry Research, 128*(2), 155-165. doi:10.1016/j.psychres.2004.05.018.

Velicer, W. F., Eaton, C. A., & Fava, J. L. (2000). Construct explication through factor or component analysis: A review and evaluation of alternative procedures for determining the number of factors or components. In R. D. Goffin & E. Helmes (Eds.), *Problems and Solutions in Human Assessment: Honoring Douglas N. Jackson at Seventy* (pp. 41-71). Boston, MA: Kluwer Academic.

Vellutino, F. R. (1985) Free recall of concrete and abstract words in poor and normal readers. *Journal of Experimental Child Psychology, 39*(2), 363-380. doi: 10.1016/0022-0965(85)90046-3.

Watkins, P. C. (2002). Implicit memory bias in depression. *Cognition and Emotion, 16*(3), 381-402. doi: 10.1080/02699930143000536.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063-1070. doi: 10.1037/0022-3514.54.6.1063.

Wechsler, D. (1997). *Wechsler Adult Intelligence Scale - Third Edition.* San Antonio, TX: The Psychological Corporation.

Wechsler, D. (2008). *Escala de inteligencia de Wechsler para Adultos Tercera Edicion*. San Juan, PR: Pearson Education.

Weissman, M. M., Sholomskas, D., Pottenger, M., Prusoff, B. A., & Locke, B. Z. (1977). Assessing depressive symptoms in five psychiatric populations: A validation

study. *American Journal of Epidemiology*, *106*(3), 203-214. doi: 10.1093/oxfordjournals.aje.a112455.

Williams, D. R., Mohammed, S. A., Leavell, J., & Collins, C. (2010). Race, socioeconomic status, and health: Complexities, ongoing challenges, and research opportunities. *Annals of the New York Academy of Sciences, 1186*, 69-101. doi: 10.1111/j.1749-6632.2009.05339.x.

Williams, J. M. G., Mathews, A., & MacLeod, C. (1996). The emotional Stroop task and psychopathology. *Psychological Bulletin, 120*(1), 3-24. doi: 10.1037/0033-2909.120.1.3.

Williams, L. M., Whitford, T. J., Flynn, G., Wong, W., Liddell, B. J., Silverstein, S., Galletly, C., Harris, A. W. F., & Gordon, E. (2008). General and social cognition in first episode schizophrenia: Identification of separable factors and prediction of functional outcome using the IntegNeuro test battery. *Schizophrenia Research*, *99*(1-3), 182-191. doi:10.1016/j.schres.2007.10.019.

Wittmann, B. C., Schiltz, K., Boehler, C. N., & Duzel, E. (2008). Mesolimbic interaction of emotional valence and reward improves memory formation. *Neuropsychologia*, *46*, 1000-1008. doi:10.1016/j.neuropsychologia.2007.11.020.

Woods, S. P., Dean C. Delis, D. C., Scott, J. C., Kramer, J. H., & Holdnack, J. A. (2006). The California Verbal Learning Test-second edition: Test-retest reliability, practice effects, and reliable change indices for the standard and alternate forms. *Archives of Clinical Neuropsychology, 21*(5), 413-420. doi: 10.1016/j.acn.2006.06.002.

Yiend, J. (2010). The effects of emotion on attention: A review of attentional processing of emotional information. *Cognition and Emotion, 24*(1), 3-47. doi: 10.1080/02699930903205698.

Zillmer, E. A., Spiers, M. V., & Culbertson, W. C. (2008). *Principles of neuropsychology*. Belmont, CA: Wadsworth/Thomson Learning.

CURRICULUM VITAE

Davor N. Zink
davor13nzp@gmail.com

EDUCATION

Doctor of Philosophy **2018**
University of Nevada Las Vegas (UNLV) Advisor: Daniel N. Allen, Ph.D.
Las Vegas, NV
APA-Accredited Clinical Psychology Program
Neuropsychology Track
Dissertation: Development of the Emotional Verbal Learning Test - Spanish (EVLT-S)

Master of Arts in Psychology **2012**
University of North Carolina Wilmington (UNCW) Advisor: Antonio E. Puente, Ph.D.
Wilmington, NC.
Thesis: Development of a Neuropsychological Test Battery for the Evaluation of Spanish Speakers

Bachelor of Science in Psychology **2008**
Armstrong Atlantic State University (AASU) Advisor: Wendy Wolfe, Ph.D.
Savannah, GA.
Magna Cum Laude

CLINICAL EXPERIENCE

Henry Ford Health System Jun., 2017 – Jun. 2018
Division of Neuropsychology Supervisors: Brent Funk, Psy.D., ABPP/CN
APA-Accredited Clinical Internship Adrianna J. Zec, Psy.D.
Adult Neuropsychology Track Jin Lee Kim, Ph.D., ABPP/CN
Detroit, MI Brad Merker, Ph.D., ABPP/CN

Adult Neuropsychology Intern

- Conduct neuropsychological assessments using a flexible battery approach, including scoring, interpretation, and integrative report writing (2 to 3 patients per week).
- Conduct clinical interviews and feedback sessions.
- Diverse general clinic population including patients with stroke or other vascular disease, movement disorders, traumatic brain injury and sports-concussions, various dementing disorders, psychiatric disorders, MS, and others.
- Perform pre- and post-surgical evaluations on patients with intractable epilepsy (inpatients) and other neurological conditions including Parkinson's disease (DBS) and brain tumors.
- Observe WADA procedures.
- Minor rotations in Sport Concussion, Sleep Medicine, and Trauma Surgery.

- Weekly multidisciplinary case conferences, didactics (e.g. neuroanatomy, fact finding), and grand rounds.

Children's Specialty Center of Nevada/ Aug., 2016 – May, 2017
Cure 4 the Kids Foundation Supervisor: Danielle T. Bello, Ph.D., ABPP/CN
Las Vegas, NV

Pre-Doctoral Practicum Student

- Neuropsychology service set in multidisciplinary medical clinic focusing on life-threatening diseases of childhood including brain tumors, leukemia and other cancers, sickle cell anemia, rheumatologic conditions, inherited bleeding disorders and genetic conditions.
- Conduct neuropsychological assessments using a flexible battery approach, including scoring, interpretation, and integrative report writing.
- Participation in interviews and feedback sessions.
- Brief consults and neuropsychological assessments in childhood cancer survivor clinic.
- Participate in weekly multidisciplinary provider meetings, didactics, and case conferences.
- Shadow pediatric hematology/oncology physicians.

Cleveland Clinic Lou Ruvo Center for Brain Health Jul., 2015 – Jul., 2016
Las Vegas, NV Supervisors: Sarah Banks, Ph.D. ABPP/CN
Justin B. Miller, Ph.D., ABPP/CN

Pre-Doctoral Practicum Student

- Conducted comprehensive neuropsychological assessments with adult individuals in an outpatient specialized medical clinic.
    - Scoring, interpretation, interviewing (under live supervision), and comprehensive report writing.
- Commonly presented patient diagnoses include individuals suspected of having neurodegenerative disease, particularly dementias, movement disorders, and multiple sclerosis referred from neurology and psychiatry.
- Co-facilitated a weekly support group for caregivers with a psychologist.
- Weekly individual supervision meetings in addition to weekly case conferences and group supervision with neuropsychology supervisors, post-doctoral fellows, and students.
- Weekly multidisciplinary case conferences, didactics, or grand rounds with neurology, psychiatry, physical therapy, and/or social work.
- Conducted research related to neurodegenerative disorders and sports concussions, including assessing former and active combat sport athletes as part of The Professional Fighters Brain Health Study.

Neuropsychology Technician Jul., 2016 – May 2017

- After formal practicum training, I was hired to continue conducting neuropsychological assessments, scoring, and report writing on an as-needed basis.

Center for Applied Neuroscience Jul., 2014 – Aug., 2015
Las Vegas, NV Supervisors: Thomas F. Kinsora, Ph.D.
Sharon Jones-Forrester, Ph.D.

Pre-Doctoral Practicum Student

- Conducted neuropsychological and forensic assessments with children and adults in an outpatient private practice setting or the Clark County Detention center.
- Responsibilities included scoring, interpretation, integrative report writing, and participation in intake interviews and feedback sessions.
- Commonly presented patient diagnoses included cognitive disorders of varying etiologies, affective disorders, pervasive developmental disorders, learning disabilities, and TBI.
- Weekly individual supervision and group supervision, as well as didactic training and case conferences.

Testing Assistant Aug., 2015 - May 2017

- After the formal practicum training, I was hired to continue conducting neuropsychological assessments, scoring, and report writing over summer and winter breaks and on an as needed basis.

Family and Child Treatment of Southern Nevada (FACT) Aug., 2014 - May 2017
Las Vegas, NV Supervisor: John Matthias, Ph.D.

Pre-Doctoral Practicum Student

- Individual and group therapy in a non-profit organization dedicated to helping children, adults, and families overcome and heal from the traumas of abuse, neglect, and violence through education, prevention, and treatment services.
    - Conduct weekly group psychotherapy sessions in Spanish with adult sex offenders of Hispanic origin.
    - Co-facilitate weekly group psychotherapy sessions in English with adult sex offenders.
    - Conduct individual psychotherapy sessions in Spanish and English with trauma victims.
- Significant exposure to patients of diverse cultural background and low socioeconomic status.
- Case conceptualization and treatment planning.
- Weekly individual supervision, including live supervision during group therapy.
- Theoretical approach is integrative mainly relying on psychodynamic orientation.

The Partnership for Research, Assessment, Counseling, Therapy, and Innovative Clinical Education (The PRACTICE) Aug., 2013 – Aug., 2014; May, 2016 – Aug., 2016
University of Nevada Las Vegas Supervisors: Michelle Paul, Ph.D.
Jeremy Gallas, Ph.D.

Pre-Doctoral Practicum Student

- Provided individual psychotherapy to a caseload of approximately 4-7 patients per week.
- Co-facilitated weekly DBT skills group with children and adolescents and their parents.
- Conducted clinical intakes.

- Patients included adolescents and adults of diverse cultural backgrounds from the community.
- Diagnoses seen included affective disorders, adjustment disorders, trauma, and severe mental illness, including bipolar disorder and delusional disorder.
- Theoretical approach was integrative, including biopsychosocial, CBT, and interpersonal orientations and aspects of DBT and ACT.

Psychological Assessment and Testing Clinic Aug., 2013 – Aug., 2014
University of Nevada Las Vegas Supervisor: Michelle Paul, Ph.D.

Pre-Doctoral Practicum Student
- Conducted comprehensive neuropsychological and psychoeducational assessments, using a flexible battery approach, for adult patients referred from the community and the university disability resource center.
- Conducted intake interview and feedback sessions.
- Scoring, interpretation, integrative report writing, and provision of feedback.

Cape Fear Clinic Aug., 2010 – Jul., 2012
Wilmington, NC Supervisor: Antonio Puente, Ph.D.

Volunteer
- Shadowed Clinical Neuropsychologist, Clinical Psychologists, and Counselors at a nonprofit community health clinic for the poor and uninsured.
- Collaborated with clinical research.
- Translator (English-Spanish).
- Organizational duties (set appointments, call patients, referrals, assist patients) in English and Spanish.

Testing Assistant
- Neuropsychological/psychological testing in English and Spanish at Cape Fear Clinic.
- Scoring and interpretation of test results.
- Weekly group supervision meetings.

University Neuropsychology Aug., 2010 – Jul., 2012
Wilmington, NC Supervisor: Antonio Puente, Ph.D.

Psychometrician
- Conducted neuropsychological testing in English and Spanish in a private practice setting on an as needed basis.
- Scoring and interpretation of test results.
- Weekly group supervision meetings.

Memorial University Medical Center - Center for Behavioral Medicine
Savannah, GA

Mental Health Counselor Jan., 2009 – May, 2010
Supervisor: Tom Hickey, Psy.D.

- Planned and led structured programs of counseling, recreation, social, and therapeutic activities for patients in an inpatient unit.
- Common diagnosis included affective disorders, severe depression, bipolar disorder, schizophrenia, severe substance abuse, trauma, and other psychotic disorders.
- Weekly multidisciplinary clinical meetings including psychiatry, psychology, social work, and nursing.
- Monthly seminars and didactics

Clinical Intern Aug., 08 - Dec., 08
Supervisor: Kelly Epting, LCSW

- Shadowed Licensed Clinical Social Workers, Professional Counselors, and Psychiatrists.
- Conducted group therapy and psychosocial assessments under supervision.
- Provided personal assistance, emotional support, and other personal care to patients.

PUBLICATIONS AND PRESENTATIONS

Manuscripts

Zink, D. N., Miller, J. B., Caldwell, J. Z. K., Bird, C., & Banks, S. J. (2017). The relationship between neuropsychological tests of visuospatial function and lobar cortical thickness. *The Journal of Clinical and Experimental Neuropsychology.* DOI:10.1080/13803395.2017.1384799.

Nuñez, A., **Zink, D. N.**, Barchard, K. A., San Miguel, L. E., & Allen, D. N. (in press). Factor structure of the Wechsler Intelligence Scale for Children-Fourth Edition Spanish in a clinical sample. *Archives of Clinical Neuropsychology*.

Book Chapters

Zink, D. N., Lee, B., & Allen, D. N. (2015). Structured and semistructured clinical interviews available for use among African American clients: Cultural considerations in the diagnostic interview process (pp. 19-35). In L. Benuto & B. Leany (Eds.). *Guide to psychological assessment with African Americans.* New York, NY: Springer.

Puente, A. E., Ojeda, C., **Zink, D. N.**, & Portillo Reyes, V. (2015). Neuropsychological testing of Spanish speakers (pp. 135-152). In K. F. Geisinger (Ed.). *Psychological testing of Hispanics: Clinical, cultural, and intellectual issues* (2nd ed.). Washington, DC: American Psychological Association.

Zink, D. N., Ojeda, C., Hernadez, M., & Puente, A. E. (2013). Generalized anxiety disorder and panic disorder. (pp. 243-260). In C. A. Noogle & D. S. Raymond (Eds.). *The neuropsychology of psychopathology.* New York, NY: Springer.

Puente, A. E., **Zink, D. N.**, Hernandez, M., Jackman-Venanzi, T., & Ardila, A. (2013). Bilingualism and its impact on psychological assessment (pp. 15-31). In L. T. Benuto (Ed.). *Guide to psychological assessment with Hispanics.* New York, NY: Springer Science + Business Media.

Encyclopedia Entries

Zink, D. N. & Allen, D. N. (in press). Portland Digit Recognition Test. In *The encyclopedia of clinical neuropsychology*. New York, NY: Springer.

Zink, D. N., Hernandez, M., & Puente, A E. (2013). Sampling equivalence. In K. Keith (Ed.). *The encyclopedia of cross-cultural psychology*. New York, NY: Wiley-Blackwell.

Manuscripts/Book Chapters Submitted

Donohue, B., **Zink, D. N.**, Nuñez, A., San Miguel, L. E., & Allen, D. N. (submitted). Terapia conductual familiar para abuso de sustancias y problemas asociados: Resumen de sus componentes de intervención y aplicabilidad (Family behavior therapy for substance abuse and other associated problems. A review of its intervention components and applicability). *Revista Interamericana de Psicología (Interamerican Journal of Psychology).*

Allen, D. N., Donohue, B., Nuñez, A., **Zink, D. N.**, & San Miguel, L. E. (submitted). Implementación de un sistema de evaluación estandarizado en el contexto de un tratamiento basado en evidencia empírica para abuso de sustancias y problemas asociados (Application of a standardized assessment methodology within the context of an evidence-based treatment for substance abuse and its associated problems). *Revista Interamericana de Psicología (Interamerican Journal of Psychology).*

Manuscripts/Book Chapters in Preparation

Zink, D. N., Nuñez, A., & Allen, D. N. *Wechsler Intelligence Scale for Children Fourth Edition profiles in Spanish speaking children with attention deficit hyperactivity disorder and/or learning disorders.*

Zink, D. N., Mayfield, J. & Allen, D. N. *Validity of the Reynolds Intellectual Assessment Scales Memory Index Scores in a Sample of Children with Brain Injuries.*

Neblina, C., **Zink, D. N.,** Nuñez, A., San Miguel, L. E. & Allen, D. N. *Construct and criterion validity of the Rey Auditory Verbal Learning Test-Spanish version in adults with traumatic brain injury.*

Zink, D. N., Meija, A., Hernadez, M., & Puente, A. E. *A compendium of neuropsychological assessment batteries in Spanish.*

Presentations and Published Abstracts

* Denotes presentation has a corresponding published abstract.

*Favela, S., **Zink, D. N.**, Lee, B. G., & Allen, D. N. (2017). *Sensitivity and specificity of the Trail Making Test (TMT) to traumatic brain injury (TBI) in Spanish speaking individuals.* Poster presented at the National Academy of Neuropsychology 37th Annual Meeting, Boston, Massachusetts.

*Beckman, L., **Zink, D. N.,** San Miguel, L. E. & Allen, D. N. (2017). *ROC analysis of the Trail Making Test (TMT) with Spanish speaker individuals.* Poster presented at the National Academy of Neuropsychology 37th Annual Meeting, Boston, Massachusetts.

***Zink, D. N.,** Bird, C., Caldwell, J. Z. K., Miller, J. B., & Banks, S. J. (2017). *The relationship between parietal lobe integrity and neuropsychological tests of visuospatial function.* Poster presented at the 45th Annual Meeting of the International Neuropsychological Society, New Orleans, Louisiana.

***Zink, D. N.,** Nuñez, A., Gladys A., San Miguel, L. E. & Allen, D. N. (2016). *Wechsler Intelligence Scale for Children Fourth Edition profiles in Spanish speaking children with attention deficit hyperactivity disorder and/or learning disorders.* Poster presented at the National Academy of Neuropsychology 36th Annual Meeting, Seattle, Washington.

*Nuñez, A., **Zink, D. N.,** Barchard, K., San Miguel, L. E. & Allen, D. N. (2016). *Factor structure of the Wechsler Intelligence Scale for Children–Fourth Edition (WISC-IV) Spanish in a clinical sample of Puerto Rican Children.* Poster presented at the National Academy of Neuropsychology 36th Annual Meeting, Seattle, Washington.

***Zink, D. N.,** & Allen, D. N. (2016). *Convergent validity of the Search Identification Task (SIT): A novel measure of attention and working memory.* Poster presented at the American Psychological Association 124th Annual Convention, Denver, Colorado.

***Zink, D. N.,** Mayfield, J. & Allen, D. N. (2015). *Validity of the Reynolds Intellectual Assessment Scales memory index scores in a sample of children with brain injuries*. Poster presented at the National Academy of Neuropsychology 35th Annual Meeting, Austin, Texas.

Loughran, T., Lee, B., **Zink, D. N.**, & Barchard, K. A. (2015). *A psychometric evaluation of the emotion-based decision making scale*. Poster presented at the Western Psychological Association 96th Annual Convention, Las Vegas, NV.

Zink, D. N., San Miguel, L. E., & Allen, D. N. (2014). *Sensory and motor deficits in Spanish speaking individuals with schizophrenia*. Presentation conducted at the University of Nevada Las Vegas Graduate & Professional Student Association Research conference.

Zink, D. N. (2014). *Development of the Emotional Verbal Learning Test – Spanish*. Presentation conducted at the University of Nevada Las Vegas psychology graduate research data blitz symposium.

***Zink, D. N.**, San Miguel, L. E., & Allen, D. N. (2014). *Sensory and motor deficits in Spanish speaking individuals with schizophrenia*. Poster presented at the National Academy of Neuropsychology 34th Annual Meeting, Fajardo, Puerto Rico.

***Zink, D. N.**, Vogel, S., Gilbert, G., & Allen, D. N. (2013). *Factor structure of the Search Identification Task (SIT): A novel measure of attention and working memory.* Poster presented at the National Academy of Neuropsychology 33rd Annual Meeting, San Diego, California.

*Fasfous, A, **Zink D. N.**, & Puente, A.E. (2012). *Gender and performance differences in the Stroop Test among Arab children: A cross cultural study.* Poster presented at the National Academy of Neuropsychology 32nd Annual Meeting. Nashville, Tennessee.

Zink, D. N., Withers, K., Dedmon, Hernandez, M., Jackman Venanzi, T., Lindsey, H., Wiegand, L., Hughes, H., Fasfous, A., & Puente, A. E. (2012). *A novel collaborative practice model (CPM) for the treatment of mental illness of the indigent and uninsured.* Poster presented at the North Carolina Psychological Association Spring Conference, Charlotte, NC.

***Zink, D. N.**, & Puente, A. E. (2011). *The development of a neuropsychological test battery for the evaluation of Spanish speakers.* Poster presented at the National Academy of Neuropsychology 31st Annual Meeting, Marco Island, Florida.

*Lindsey, H. M., **Zink, D. N.**, & Puente, A. E., (2011). *Cortisol levels, self-reported anxiety and neuropsychological test performance in coronary artery bypass patients.* Poster presented at the International Neuropsychological Society 39th Annual Meeting, Boston, Massachusetts.

Zink, D. N., Hernandez, M. I., Buxton, J., Altendorf, A., & Puente, A. E. (2011). *A multidisciplinary mental health model for Spanish speakers in southeastern NC*. Paper presented at the Southeastern Council of Latin American Studies, 58th Annual Conference, Wilmington, NC.

***Zink, D. N.**, Wolfe, W. L., Scott, V. B., Jr., & Stevens, A. (2009). *to reflect or distract? A comparison of self-distanced, self-immersed, and distraction strategies for processing anger-eliciting memories*. Poster presented at the 43rd Association for Behavioral and Cognitive Therapies (ABCT) Annual Convention, New York City, NY.

Zink, D. N., Hunt, S., & Scott, V. B., Jr. (2008). *Body Image Questionnaire development.* Paper presented at the 33rd Annual Carolinas Psychology Conference, Raleigh, NC.

RESEARCH EXPERIENCE

Neuropsychology Research Program Aug. 2012 - June 2017
University of Nevada, Las Vegas Advisor: Daniel N. Allen, Ph.D.

Lab Coordinator May 2016 – June 2017

- Supervise overall lab projects as well as 10 to 15 undergraduate research assistants.
- Weekly RA lab meetings with journal club and professional development components.

- Organize recruitment for research participants.
- Organize and delegate tasks for students in the lab.

Graduate Research Assistant Aug., 2012 – June 2017

- Collaborate in research related to neuropsychology.
- Conduct research related to cross cultural neuropsychology.
- Conduct literature reviews, write, and review manuscripts.
- Assist in training of other students with IRB, statistics, etc.
- Conduct psychological assessments.
- Grant funded (2012 - 2015, National Institute on Drug Abuse).

Relevant Projects

- Study (dissertation): Development of the Emotional Verbal Learning Test – Spanish**.**
    - Responsibilities include project development, including translation, selection of test battery, proposal presentation, IRB approval preparation, and database creation. Additional responsibilities will include conducting phone screening of potential participants and assessing participants using an extensive neuropsychological battery.

- Study: Standardization of the Wechsler Intelligence Scale for Children, Fifth Edition (WISC-V).
    - Responsibilities included recruiting, screening, and assessing children with traumatic brain injury, intellectual disability, and attention-deficit/hyperactivity disorder with the standardization version of the WISC-V to assist Pearson in establishing normative data.

- Study: Family Behavior Therapy for Collegiate Athletes (1R01DA031828)
    - Responsibilities included developing assessment protocols, coordinating assessments, and conducting assessments with student athletes with substance abuse problems, using a psychodiagnostic battery (Pre-treatment, post-treatment, and follow up). Measures included the SCID, Timeline Follow Back, and collection of hair and urine samples, along with other psychological inventories.

- Study: Standardization of Halstead Category Test, Computer Version.
    - Responsibilities included training undergraduates and coordinating assessments of individuals from the UNLV Psychology subject pool in a 2-part neuropsychological battery. Measures included the Halstead Category Test (computer and original version), and measures of intellectual functioning, executive functioning, motor functioning, and attention.

UNCW Neuropsychology Lab Aug., 2010 - July, 2012
University of North Carolina Wilmington Supervisor: Antonio Puente, Ph. D.
Wilmington, NC

Lab Coordinator Aug., 2011 – Jul., 2012

- Organized and delegated tasks for research assistants in the lab.

- Conducted weekly research meetings.
- Assisted in training of other students with IRB, statistics, etc.

Graduate Research Assistant Aug., 2010 - July, 2012

- Collaborated in research related to neuropsychology.
- Conducted research related to cross cultural neuropsychology.
- Conducted literature reviews, write, and review manuscripts.
- Grant Funded

Relevant Projects

- Study (Thesis): Development of a Neuropsychological Test Battery for the Evaluation of Spanish Speakers.
    - Responsibilities included project development, creation and translation of neuropsychological measures, selection of test battery, IRB approval preparation, proposal and defense presentations, and data collection and analysis.

Reviewer (with advisor's supervision)

- Journal of Experimental and Clinical Psychology
- Teaching of Psychology
- Applied Neuropsychology

Armstrong Atlantic State University Aug., 2008 – Dec., 2010
Savannah, GA Supervisors: Wendy Wolfe, Ph. D.
Van Scott, Ph. D.

Research Assistant

- Discussed and developed the theoretical rationale of the studies.
- Developed methodology, set up experimental room, collected, input, and analyzed data.
- Demonstrated use of laboratory equipment, and enforced laboratory rules.
- Used psychophysiological equipment with participants.

Relevant Projects

- Original study: To Reflect or Distract? A Comparison of Self-Distanced, Self-Immersed, and Distraction Strategies for Processing Anger-Eliciting Memories.
    - Responsibilities included project development, and data collection including use of psychophysiological equipment with participants (heart rate, respiration rate, galvanic skin response).

GRANT INVOLVEMENT

Family Behavior Therapy for Collegiate Athletes (1R01DA031828) Aug. 2012 – Aug. 2015
Assessments Coordinator and Assessor
Funding Agency: National Institutes on Drug Abuse.
Principal Investigator: Bradley Donohue, Ph.D.
$1,998, 000

TEACHING EXPERIENCE

University of Nevada Las Vegas Aug., 2015 – May 2017
Las Vegas, NV

Instructor

- Design and teach two sections of PSY 101 General Psychology course per semester.
- Prepare all course material, lecturing, assigning class grades, and advisement of students.

University of North Carolina Wilmington Aug., 2010 - July, 2012
Wilmington, NC Supervisor: Antonio Puente, Ph. D.

Teaching Assistant

- Introduction to Psychology
- History and Systems in Psychology
- Health Psychology/Clinical Neuropsychology

SERVICE

UNLV Psychology Diversity and Inclusion Committee Jan 2016 – June 2017

- Participate in monthly meetings and discussions regarding diversity and how to better serve minorities at UNLV and in the Las Vegas community.
- Promoting diversity within the psychology department and assessing its cultural climate.

UNLV Outreach Undergraduate Mentorship Program Aug 2014 – June 2017

- Provide mentorship of undergraduate students from underrepresented populations to prepare them for a career in psychology or a related field.

National Academy of Neuropsychology

- Student Volunteer at 36th Annual Conference, Seattle, WA. October, 2016

Chair, UNLV Clinical Student Committee Fall 2013 – Spring 2014

- Responsibilities included attending faculty meetings, assisting with interview weekend activities, organizing student focused events, and serving as a liaison between clinical faculty and graduate students.

Psi Chi National Honor Society in Psychology Spring 2008 - Fall 2008

- President, Armstrong Atlantic State University Chapter, Savannah, GA

FURTHER TRAINING & CERTIFICATIONS

Nevada Psychological Association 10-Day Comprehensive Training in Dialectical Behavior Therapy (DBT), Las Vegas, NV Presenter/Instructor: Alan Fruzzetti, Ph.D.

- Completed Part I: Theory, Structure, Targets, and Treatment Strategies, Feb. 5th – 7th, 2015
- Completed Part II: DBT Skills, Skill Training & Skill Coaching, Apr. 16th – 18th, 2015

SCID Training Program Fall 2012-Spring 2013
University of Nevada, Las Vegas Training Supervisor: Daniel N. Allen, Ph.D.

- Completed a 40-hour training program for administration of the Structured Clinical Interview of the DSM-IV-TR Axis I Disorders (SCID-IV).

Symptoms Rating Training Program Fall 2013 – Spring 2016
University of Nevada, Las Vegas Training Supervisor: Daniel N. Allen, Ph.D.

- Completed a 30-hour training program for the administration of a number of clinician administered symptom scales associated with symptoms of schizophrenia and bipolar disorder.

The Collaborative IRB Training Initiative (CITI) Program Fall 2010 - Present

- Certified to work with human participants through The Protection of Human Research Subjects online course, sponsored by The Collaborative IRB Training Initiative (CITI) Program (http://www.citiprogram.org).

HONORS & AWARDS

Awarded, UNLV Summer Doctoral Research Fellowship (7,000) 2017

Awarded, UNLV Patricia Sastaunik Scholarship (2,500) 2017

Diversity Award for poster presentation, National Academy of Neuropsychology 36th Annual Convention, Seattle, WA. 2016
Factor structure of the Wechsler Intelligence Scale for Children–Fourth Edition (WISC-IV) Spanish in a clinical sample of Puerto Rican children.

First Place, Poster Awards, National Academy of Neuropsychology 36th Annual Convention, Seattle, WA. 2016
Factor structure of the Wechsler Intelligence Scale for Children–Fourth Edition (WISC-IV) Spanish in a clinical sample of Puerto Rican children.

Awarded, UNLV Graduate & Professional Student Association travel funding to attend and present at The National Academy of Neuropsychology 36th Annual Convention, Seattle, WA ($350) 2016

Awarded, UNLV Graduate & Professional Student Association travel funding to attend and present at the 124th American Psychological Association Convention ($600) 2016

Finalist for consideration, UNLV President's Graduate Research Fellowship ($25,000) 2015 - 2016

Awarded, UNLV Graduate & Professional Student Association travel funding 2014

to attend The National Academy of Neuropsychology
34th Annual Convention in Fajardo, Puerto Rico ($900)

Member, The Honor Society of Phi Kappa Phi 2008 – present

Member, Psi Chi the National Honor Society in Psychology 2007 – present

Awarded, AASU President's Cup Award 2008
Best GPA among all male student athletes

Awarded, Men's Tennis Team Academic Award 2006, 2007, and 2008

Awarded, Men's Tennis NCAA Division II National Championship 2008

Awarded, Men's Tennis Team Most Valuable Player 2006 and 2008

Awarded, First Place in AASU Writing Showcase 2006

Recipient, Men's Tennis NCAA Division II ITA All-America Team 2006

Recipient, Men's Tennis NCAA Division II Player to Watch National Award 2006

AFFILIATIONS & ACTIVITIES

Member, American Psychological Association 2008 - present

Member, National Academy of Neuropsychology 2010 - present

Member, Hispanic Neuropsychological Society 2010 - present

Member, Nevada Psychological Association 2012 - present

Member, International Neuropsychological Society 2016 - present

ADDITIONAL SKILLS

Fluent: Spanish, German, and English.