

# Neuropsychological Assessment of Culturally and Educationally Dissimilar Individuals

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## I. INTRODUCTION

Over the last quarter of the past century, clinical neuropsychology has grown to become an important area of professional psychology (Puente, 1992; Puente & Marcotte, 2000; Rabin, Barr, & Burton, 2005; Sweet, Meyer, Nelson, & Moberg, 2011). Despite its unprecedented growth and impact, both in psychology and in medicine (most notably in neurology), the field has not considered the important variable of culture in its unique approach to the measurement of humans.

The purpose of this chapter is to discuss the role of cultural variables in neuropsychological assessment. This chapter outlines objectives and the development of what is now being called cross-cultural neuropsychology. This is broadly defined as the assessment of brain function using psychometric methods to inform about the role of culture in the psychological assessment of minority group members. Traditionally, cross-cultural psychology has dealt with the comparisons of persons across distinct cultures (Willey and Herskovitz, 1927). In this chapter, the approach is to subsume the contrast and comparisons of individuals from a majority group to those of a minority group. In fact, we define ethnicity much in the same way we would define culture. Next, attention to the application of these principles to neuropsychological evaluation will be pursued. Issues such as illiteracy and adaptation will be considered. In addition, specific strategies for interviewing, testing, and interpreting results will be presented. Finally, suggestions for future training and research in the area will be considered.

This chapter will also address how cultural factors play a role in the expression of neuropsychological pathology in disorders such as Alzheimer's dementia. In addition, specific and pragmatic considerations for the evaluation of the culturally dissimilar individual will be considered. It is important to note that although we look forward to presenting a new model as a solution to a long-standing problem in neuropsychology and the understanding of diverse individuals, we realize the unique nature of our assumptions, model, and implications.

## II. OBJECTIVES AND DEVELOPMENT OF A CULTURALLY SENSITIVE CLINICAL NEUROPSYCHOLOGY

The application of clinical neuropsychology to people of diverse cultural heritage is a relatively new scientific and professional enterprise. This development was due, among other factors, to both the growth of professional neuropsychology and also to increasing societal concerns, both in the United States and abroad, of the importance of understanding individuals in a broader cultural context (Puente & McCaffrey, 1992). The application of psychometric instruments standardized on White individuals from the majority culture may result in larger than expected false-positives, both in terms of neuropsychological and psychopathological variables. As a consequence, the lack of the universality of the instrument prevented not only the use of those instruments with individuals of varied cultural backgrounds but also limited theories of human function, especially those related to the brain (Ardila, 1995; Greenfield, 1997).

The development of culturally sensitive clinical neuropsychology was a direct function of increasing interests in cultural concerns in the assessment and treatment of psychological problems (Canino & Alegria, 2005). Indeed, over the past 15 years an ever-increasing concern for these issues has been noted in the general psychological literature as well as within the American Psychological Association (APA). Thus, the 2002 APA Ethics Code specifically contemplates the needs of cultural and linguistic minorities. From these concerns, cross-cultural psychology has begun to describe the differences in performances and treatment of individuals from different cultures. The rationale for this has been that differences from the majority culture have been compared to a constant—the majority culture—assuming that other forms of behaving were not of interest or were pathological. Greenfield, among others, has suggested that appropriate comparison, therefore, can only be realized if both cultures are at least generally understood before any form of comparison can be made (Greenfield, 1997).

Assessment of diverse groups within clinical neuropsychology, as suggested earlier, will be defined as cross-cultural neuropsychology. In other words, the traditional concepts of cross-cultural psychology to address the issues of how one group, a minority group, compares and contrasts to that of

a larger group are being expanded (Jensen, 1980). The rationale for this expanded concept is that understanding ethnic minorities in the United States should subscribe to the same principles as understanding a minority group in any other national or international setting.

By expanding the scope accordingly, our understanding of brain-behavior relationships will be similarly expanded. This is essentially a search of a “neuropsychological *g*,” much like Cattell (1898) was envisioning for general intelligence. Thus, the role of culture and minority status in understanding brain function is critical.

If this approach is considered, then the literature clearly has been developing over the last years. For example, Ostrosky-Solis, Ramirez, Lozano, Picasso, and Velez (2004) attempted to compare a variety of neuropsychological tests with indigenous Mayan people. In this study, they compared illiterate indigenous subjects (Maya), control subjects with no education, indigenous subjects with 1–4 years of education, and control individuals with 1–4 years of education. The results of this study show differences in visuospatial processes in both groups of indigenous people, while not finding differences in other cognitive processes such as guidance, understanding, and executive functioning (Ostrosky-Solis et al., 2004).

Scientific evidence also shows differences in neuropsychological performance between Americans and Russians without brain damage on cognitive tasks that measure visuomotor coordination and executive function—such as the Color Trail Test and the Ruff Figural Fluency Test—in favor of the Americans group (Agranovich & Puente, 2007). It could be argued that the Russian subjects are simply slower in completing tasks, but are not worse than the American subjects as suggested on these neuropsychological measures (Agranovich & Puente, 2007).

In addition, Bakos, Denburg, Fonseca, Mattos, Pimenta, and Parente, 2010 compared decision-making of young and adult Brazilians and Americans using the Iowa Gambling Test. When the choice of the economic option was given in the task, more than half of the American participants chose alternatives that may be more beneficial in the long term, while 80% of the Brazilian participants chose the less advantageous alternative, suggesting poorer performance in decision-making.

### A. Cultural Adaptation and Educational Attainment

Without doubt, one of the most salient lines of research has been the exploration of the role of cultural adaptation and educational attainment on neuropsychological functioning. The changing demographics of American society alone beg the importance of attending to the role of adaptation. However, a review of the demographics shows an interesting pattern. During the beginning of the last century, immigration was primarily from Europe, especially Western Europe. Later, immigrants came from Asia and the Americas. More

recently, the largest immigrant group comes from Central America. Ethnic minorities, in general, will actually become the majority (Hall, 1997). There is ample evidence, however, that at present ethnic minorities do more poorly on neuropsychological tests than most (i.e., Agranovich & Puente, 2007; Razani, Burciaga, Madore, & Wong, 2007; Razani, Murcia, Tabares, & Wong, 2006). Although most of this evidence appears anecdotal and clinical in nature, there is a growing body of data suggesting differences in intelligence (Kaufman, 2009; Puente & Salazar, 1998; Razani et al., 2006; Touradji, Manly, Jacobs, & Stern, 2001), attention (Byrd, Touradji, Tang, & Manly, 2004), visuo-perceptive abilities (Manly, Jacobs, Touradji, Small, & Stern, 2002), constructive capacity (Byrd et al., 2004), cognitive flexibility (Agranovich & Puente, 2007; Razani et al., 2007), inhibition (Razani et al., 2007), memory (Manly et al., 2002; Razani et al., 2007), or fluency (Kempler, Teng, Dick, Taussig, & Davis, 1998; Manly et al., 2002; Touradji et al., 2001). More careful analysis of these findings indicates that cultural adaptation might be the salient variable that explains group differences (Boone, Victor, Wen, Razani, & Pontón, 2007; Coffey, Marmol, Schock, & Adams, 2005; Manly et al., 1998; Razani et al., 2007).

In addition to cultural adaptation (Phinney, 1996), there is growing evidence that educational attainment may help explain a significant aspect of cultural differences. Ardila, Roselli, and Puente (1994) demonstrated that non-brain-damaged illiterate patients appear highly similar to brain-damaged but literate patients. That is, education, either directly or otherwise, appears to be a prophylactic for brain injury. Conversely, illiteracy appears much like brain damage (Rosselli, 1993). After controlling for formal years of education, cultural differences persist in neuropsychological execution (Manly et al., 2002). Nevertheless, those differences are remarkably diminished when education is measured by attending to reading level; that is, when education quality is considered instead of years of education (Byrd, Sanchez, & Manly, 2005; Gasquoin, 1999; Johnson, Flicker, & Lichtenberg, 2006; Manly et al., 2002).

## B. Ecological Validity

Another important issue is that of biopsychosocial context, referred to as ecological validity. The question of validity moves us away from what variables affect brain function to how they affect brain dysfunction. Ardila (1995) observed that “cultures dictate what is and what is not relevant situationally. What is relevant and worth learning for an Eskimo does not necessarily coincide with what is relevant and worth learning for an inhabitant of New York, Mogadishu, Manus, or Bogotá” (p. 144). Hence, the mechanism is to potentiate the development of whatever cognitive and related abilities are necessary to be successful within a given culture. Ardila (1995) believes that there are universal or common abilities and that these abilities are

molded by the specific cultural context around the person. This point is elaborated upon toward the end of this chapter.

## III. NEUROPSYCHOLOGICAL EVALUATION OF CULTURALLY AND EDUCATIONALLY DISSIMILAR INDIVIDUALS

The more pragmatic aspects of the evaluation itself are now considered. The variables that affect correct assessment of the culturally dissimilar person and how he or she can be understood and controlled are now considered.

### A. Role of Acculturation and Educational Attainment of Hispanics

The role of acculturation in neuropsychological functioning has been realized with a variety of diverse populations (Berry 1990; Betancourt and Lopez, 1993), including individuals with schizophrenia (Aguilera, López Breitborde, Kopelowicz, & Zarate, 2010; Gonidakis et al., 2013), AIDS (Saint-Jean, Devieux, Malow, Tammara, & Carney, 2011; Sanchez, Rice, Stein, Milburn, & Rotheram-Borus, 2010), traumatic brain injury (Kennepoh, Shore, Nabors, & Hanks, 2004), and dementia (Schrauf & Iris, 2011; Whyte et al., 2005). Of these, dementias probably have received the most attention and, thus, might reveal the most critical aspects of culture and educational attainment in individuals of minority status.

There are more than 50 million Hispanics (16.3% of the total population) living in the United States (US Census Bureau, 2010). Between 1979 and 1980, Spanish-speaking individuals over the age of 65 became the fastest growing group of older adults in the United States. In essence, this suggests that subpopulations that would be likely to require neuropsychological testing are increasing, but that the knowledge required to support those services is not. Initial studies tended to focus on the use of screening measures for this population (Glosser et al., 1993; Loewenstein, Arguelles, Barker, & Duara, 1993; Mahurin, Espino, & Holifield 1992; Taussig, Henderson, & Mack, 1992). A common finding across studies is that Hispanic older adults perform at a lower level on most screening measures. Further, this effect is more pronounced when the individual is either nonacculturated or of low educational attainment.

In some studies, acculturation has been statistically controlled. Other problems arise, however (Brislin, 1980). For example, sample selections have not allowed for adequate generalization. One illustration of this is the incorrect concept of Hispanics as a unified cohesive ethnic group (Buré-Reyes et al., 2013). Indeed, in attempting to establish proverbs for a Spanish translation of the WISC, a panel of experts from different countries of Latin America could not reach a consensus over a proverb that was universal to all different Hispanic groups (e.g., an early bird catches the worm). To

compensate for these problems, Jacobs and colleagues (1997) designed a study that controlled for some of these confounds. Hispanic older adults scored poorer on 5 of the 14 measures according to Jacobs et al. (1997). Surprisingly, most of these measures were nonverbal. After obtaining these findings, the authors then grouped the volunteers according to acculturation level and English language fluidity. The three groups included those that spoke good or very good English, those that did not speak English adequately, and those that were native English speakers. Groups were matched according to age and education. Whereas language did not help differentiate between the groups, acculturation levels did.

Research has studied the influence of acculturation on neuropsychological performance as measured with different variables such as number of years living in other countries. Boone et al. (2007) compared the neuropsychological performance among White patients (non-Hispanic), African Americans, Hispanics, and Asians. Comparisons revealed significant group differences on one-third of the scores. Of the measures used, group differences were observed in visuoconstruction, language, processing speed, and an executive nonverbal—verbal repetition/attention span task. These differences were not due to the clinical diagnosis, since the groups were matched on the frequency of diagnosis. Acculturation was measured according to (a) whether subjects learned English as a first language versus English learned as a second language, (b) age at which English was first learned, (c) number of years resided in the United States, and (d) number of years educated in the United States. The results revealed significantly higher performance on the Boston Naming Test, FAS, and Digit Span in the “English as a first language” group, as well as better scores in the “English as a second language” group on the Rey-Osterrieth copy trial. Boston Naming Test scores were also significantly correlated with years educated in the United States; Boston Naming Test and Digit Span scores were significantly related with age at which conversational English was first learned and number of years in the United States; and finally, FAS scores were also significantly related to number of years in the United States. These findings suggest that ethnic differences in test performance may be affected by more than simply linguistic ability and that acculturation could be more robust in mediating test performance.

In the research paradigm by Ostrosky-Solis and colleagues (1998) they have chosen not to control for but to manipulate educational attainment in neuropsychological test situations. She and her colleagues have found that educational level and acculturation have a negatively accelerated curve that eventually stabilizes or plateaus. Some neuropsychological tests, such as comprehension of language or verbal fluidity, are affected by as little as one to two years of formal education. Various hypotheses have been proposed by Ostrosky-Solis and colleagues, including the limited number of occasions that individuals who are illiterate come in contact with tests, the lack of

familiarity with test protocol and performance, and, most likely, that education affects brain organization.

An excellent example of this type of study is found with the WHO studies on AIDS (Maj, 1993; Maj, Janssen, et al., 1994; Maj, Satz, et al., 1994). One of the more interesting results is found when comparing asymptotic HIV-1 zero positive and HIV-1 zero-negative controls in Kinshasa and Sao Paulo. These two groups, as compared to individuals at the other locations, perform worse, regardless of HIV status. In another instance, Maj, Satz and colleagues (1994) reported that in Kinshasa and Nairobi, decreased functioning on neuropsychological tests was only evident in individuals with very limited (versus high) levels of education. Maj, Satz and colleagues (1994) have hypothesized those high levels of education augment to “brain reserve,” potentiating brain circuits and synaptic connections. In addition, low educational attainment appears highly correlated with the prevalence of other medical problems including, but not limited to, infectious diseases and malnutrition, as well as with morbidity. In other words, illiteracy, again, appears to equate, in one fashion or another, with brain dysfunction.

The effect that education has on neuropsychological tests seems to be based on numerous variables and cognitive abilities that are acquired during formal education (Gasquoine, 1999). Nevertheless, neuropsychological differences remain despite matching on years of formal education (Manly et al., 2002). Recent research has highlighted the importance of *quality* of education as measured by reading level (Byrd et al., 2005; Gasquoine, 1999; Manly et al., 2002). This variable reduces the neuropsychological differences between people with a different ethnic and cultural origin (Manly, Byrd, Touradji, & Stern, 2004; Manly et al., 2002).

## B. Controlling Cultural and Educational Variables in Neuropsychological Evaluations

In this section we address the review of records, then the interview, and finally the actual testing.

### 1. Review of Records

Neuropsychological evaluations begin with a review of existing records. By design, individuals with limited educational background and different cultural heritage pose significant difficulties for a number of reasons, including ascertaining the existence of such records, obtaining them, appreciating the American equivalence, and so on.

When records are available, it is important to realize that things are not equivalent simply because face validity appears evident. For example, a college education in non-North American countries usually equals to a Master’s degree in the United States. Also, educational systems of individuals from

the same culture could be different across countries (for example, the Arab World consists of 22 countries with different educational systems). Hence, mistakes will be made in estimating premorbid functioning without some understanding of the culture of origin and the educational system.

## 2. Clinical Interviews

During interviewing, the issue of translation should be carefully considered. A recent study reported on the effect of using translators in the neuropsychological assessment of English speakers without brain damage (Casas, 2010). Results showed that the use of an interpreter significantly affected the execution of verbal neuropsychological tests. Thus, it may be of value to avoid the use of interpreters and refer monolingual patients to bilingual neuropsychologists whenever possible. If this is not a possible option, we should select batteries that require neuropsychologists to collaborate minimally with the translator (Casas, 2010).

Thus, in order of preference, we propose that, all things being equal (and they often are not), the evaluation be done by a culturally similar individual (e.g., Mexican patient and Mexican evaluator) in the native tongue of the patient. Next best would be using a translator. Care, however, must be taken to avoid two common errors: (1) the translator, though qualified, could be literal and miss the cognitive equivalence of the intended question, and (2) it is often easier to use available family members, but such individuals are apt to provide their own interpretation as they are not entirely objective. We conceivably could argue that it would be better to attempt the neuropsychological evaluation without any understanding of the culture or language of the person rather than not do an evaluation at all. In this case, extreme caution should be taken and any final report should address these concerns explicitly.

As Velasquez and colleagues (1997) have suggested, however, a lack of understanding of language and culture invariably produces errors in the interview process. These errors could include specific terms or concepts, cognitive issues, and subtle meanings only deciphered with equivalence to fluid understanding of the language and culture. If at all possible, the major cultural issues should be understood. Greenfield (1997) has suggested that the following issues should be considered in an interview: (a) the value and significance of cultural specific concepts, (b) modes of knowledge, and (c) modes of communication.

In addition to these considerations, the following information should be obtained, since it may help in appreciating the role of acculturation and education in neuropsychological functioning:

1. *Prior testing history.* Considering that individuals with either cultural or educational differences are often not exposed to standardize testing, it would be valuable to determine prior exposure with these modes of understanding (Ardila, 2005).

2. *Level of education.* Clearly, educational attainment affects neuropsychological functioning. It is imperative that the level and type of education be obtained and understood. Care must be taken, however, not to translate the number of years of schooling equally (Manly et al., 2002). Further, years of schooling overestimates educational quality in minority groups, with standard norms inflating impairment rates among minorities (Ryan et al., 2005).
3. *Acculturation.* Though sometimes understood in counseling, acculturation is rarely appreciated by neuropsychologists. Whereas we might be able to use acculturation measures (see Magana et al., 1996), some variables that could easily be obtained in an interview include number of years exposed to US culture, knowledge of English, employment records, and language spoken at home. It is the role of the clinician to identify the types of tests that are necessary and most appropriate. For example, if a person does not speak English (e.g., Vietnamese), the use of some portions of the Halstead-Reitan Neuropsychological Battery (e.g., Speech-sounds Perception Test) would be totally inappropriate, because some items are nothing more than tests for understanding phonetics.

## 3. Neuropsychological Testing

The lengthiest portion of any neuropsychological evaluation is the testing. Suggestions for the selection of appropriate neuropsychological tests include:

1. *Address the variables that need to be measured, and then select the tests that measure that variable.* Sometimes the abilities that need to be measured do not have a cultural equivalence (Helms, 1992). For example, time is often an important variable in determining intelligence in North American cultures. If the issue is intelligence, time might not be as valuable among people of certain ethnic groups. With this in mind, recent studies examined the effect of time on timed neuropsychological tests and they found that Russians scored lower than Americans despite similar performances on accuracy (Agranovich, Panter, Puente, & Touradji, 2011; Agranovich & Puente 2007).
2. *Select measures that have been adequately translated.* By this, we mean measures for which the cognitive equivalence, and not the literal equivalence, is being measured. This should include an understanding of the underlying factors that the test measures and a point-to-point correspondence with the translation. For example, the recall of digits is an integral part of several tests of attention, memory, and intelligence. However, if the issue is memory, then the number “eight” is monosyllabic in English, whereas *ocho* (Spanish for eight) is two syllables and *thamanyah* (Arabic for eight) is four syllables.
3. *Use tests that have appropriate norms.* For example, Camara, Nathan, and Puente (2000) revealed that the most common test used by neuropsychologists is the MMPI. The MMPI has been translated into various

- languages, although no formal norms are available in most instances for groups other than the mainstream US population.
4. *Use tests that have specific instructions and protocols.* Greater errors are made when the degrees of freedom are larger in circumstances where culture and language become intervening variables.
  5. *Select tests that reflect the language ability and culture of the patient.* Tests such as the Mini-Mental Status Exam (MMSE) are relatively easy and brief. However, even with such a test, education can have significant effects. Bertolucci, Brucki, Campacci, and Juliano (1994) reported that a cutoff of 13 should be used to detect pathology in patients who are illiterate. Of particular concern is the use of intellectual tests, especially in educational settings. Since the likelihood of false-positives is greater with ethnic minorities, care must be taken not to make educational placement decisions in specific programs (e.g., brain injury programs) using these tests alone (Puente & Salazar, 1998). Another example comes from the work of Loewenstein and Rubert (1992), who reported that differences between Hispanic and White European American older adults on dementia screening was due to performance on tests involving fluency with the letters F, A, and S. These letters occur with greater frequency in the English than in the Spanish language.
  6. *Nonverbal tests mean tests are not unbiased culturally.* Mahurin and colleagues (1992) have found that some nonverbal tests yield differences in different cultural groups. Sometimes nonverbal tests are affected by cultural issues more than verbal tests (Ardila & Moreno, 2001; Agranovich & Puente, 2007).
  7. *If available, use ecologically valid tests of function, especially of activities of daily living.* For example, our unpublished results in Spain point to the utility of the *Multiple Errands Test* to assess dysexecutive problems in everyday activities (Cuberos-Urbano, Caracuel, Vilar-Lopez, Valls-Serrano, Bateman, & Verdejo-Garcia, in press).

### C. Interpretation of Neuropsychological Test Results

The task of interpreting test results is difficult in and of itself without adding cultural and educational confounds. Considering that it is almost impossible to find a perfect evaluation situation (i.e., similar culture and language between tester and patient, adequate tests and norms, etc.), it is imperative to be extremely careful with the integration of various data to address the presence and impact of brain injury. Several suggestions in attempting this difficult task include:

1. *Interpret the results in a biopsychosocial and historical context.* Whenever possible, understand the biological, psychological, and social as well as historical context of the patient, including, but not limited to,

- language and culture. In addition, when you use tests constructed for one group for a patient from another cultural group, interpret and present the results as hypotheses.
2. *Appreciate what the construct targets and therefore decrease construct irrelevance.* In essence, we ought to have a clear understanding of what question is to be answered and whether the instrument (or its derivation) used is measuring the construct in question. If the question is whether a patient is brain-injured, extremely careful attention must be paid to all the issues addressed in this chapter. If the question is whether the patient has the capacity to adapt to the culture where the patient is residing, then it might be reasonable not to accommodate accordingly. In other words, the question might be more of acculturation than brain function. Of course, it could very well be that both questions bear being asked, and the evaluation strategies might actually be mutually exclusive.
  3. *Use a variety of sources of information.* Traditionally, neuropsychologists rely heavily on test results, interview, and, typically, existing records. Such sources of information, though valuable, may be insufficient and not available. The clinician might consider alternative strategies, including collateral interviews, thorough histories, assessment of social abilities, and so on.
  4. *Avoid stereotypical interpretations.* Although it is imperative to guide interpretation with existing literature, most of that literature does not exist for culturally dissimilar patients. Although intuition would suggest something to be true (e.g., whenever possible, use nonverbal tests), existing studies sometimes provide differing conclusions. An interesting example comes from the study by Kamo and Jenkins (1993), who suggested that schizophrenia has a better prognosis in less developed countries relative to more developed ones. In essence, the context of the situation may be as important, if not more so, than the situation itself. Thus, placing a cautionary statement at the end of a neuropsychological report simply warning the reader that the report may have inappropriate conclusions due to lack of understanding of the context of the individual is tantamount to simply shifting the responsibility of that issue from the author to the reader of the report.
  5. *If follow-up with the patient is possible, explain the results in a manner understood by the patient and family.* Avoidance of scientific, technical, and medical terms and explaining the results in practical, day-to-day, colloquial language will increase an understanding of the situation.

### IV. FUTURE PERSPECTIVES ON THE ASSESSMENT OF CULTURALLY DISSIMILAR PATIENTS

In the first section, more theoretical aspects of the neuropsychological assessment of culturally and educationally dissimilar patients were presented.

In the second section, the focus was more on the pragmatic aspects of the assessment. In this third and final section, the issues of future directions for both theory and practice are considered.

The investigation of the existence of a neuropsychological *g* is at the foundation of what could be called cross-cultural or even cultural neuropsychology. The assumption is that, at birth, all humans possess an equal cognitive capacity (barring a neurological insult that would result in disability). Evidence for this type of thinking has been found in studies on language. Furthermore, as cognitive, emotional, and personality capacity expands, it becomes more susceptible to environmental effects. In such a manner, the existing *g* becomes slowly molded to adapt to the specific tasks, cognitive or otherwise, that are demanded from the environmental cultural situation. As Ardila (1995) has suggested, we appear to have the same cognitive capacity to avoid danger, especially physical danger. However, a more neo-Darwinian or sociobiological perspective might provide a theoretical perspective on how a common neuropsychological *g* becomes culturally sensitive and globally fragmented. Thus, issues of what is good cognitively, such as *faster is better*, become incorrectly synonymous with a majority culture, as in the case of American culture where everything fast, from food to thinking, is desirable. Thus, an individual that does not understand and possess this important grain of knowledge is then considered as brain-impaired. Whereas some minority group members are certain to be brain-injured, if nothing else due to statistical probabilities, not all culturally dissimilar or educationally disadvantaged individuals possess dysfunctional brains. It almost seems that in attempting to avoid Type I error in measurement, neuropsychologists are willing, maybe unknowingly, to make just as serious Type II errors. The end result is both mistaken identity and diagnosing in the short run, and nongeneralized theories about brain function and dysfunction in the long run.

In terms of the application of cultural concerns to clinical neuropsychology, several issues should be considered. Few training programs contain courses on cross-cultural psychology, though a larger number purport to address ethnic diversity. In clinical neuropsychology, one study (Echemendia, Harris, Congett, Diaz, & Puente, 1997) reported that neuropsychologists were indeed concerned with issues of sociocultural context. The authors, however, indicate that most neuropsychologists not only have limited training in dealing with these concerns, but similarly have not changed practice parameters to address these concerns. This paradoxical situation, of concern but warranting no action, provides an avenue from which to pursue a minimizing of the reported gap. The following are proposed as potential solutions to this problem:

1. *Increase the ethnic diversity in neuropsychology.* Puente and Marcotte (2000) reported that in Division 40 (Clinical Neuropsychology) of the American Psychological Association, persons of underrepresented ethnic groups represent a disproportionately smaller number of members, fellows,

and officers of the division relative to other divisions. This is particularly problematic in light of the relatively small presence of culturally dissimilar persons within APA.

2. *Increase the number of tests and norms currently available.* Using Hispanics as an example, a plethora of tests are reportedly available. Only a very small number appears to meet the *Standards for Educational and Psychological Tests*.
3. *Encourage publishing companies to support these efforts.* The senior author led a decade-long project involving the translation and standardization of the *Wechsler Intelligence Scale for Children III* from English to Spanish.
4. *Support research that provides the foundation for the development of these tests.* An analysis of convention and published papers in neuropsychology between 1980 and 2000 (Puente & Perez-Garcia, 2000) does not provide much hope for this to be resolved. Unfortunately, newer information has yet to be published.
5. *Teach students about the importance of cultural and educational issues in understanding brain function and dysfunction.* In most neuropsychological textbooks, education, though not illiteracy, is given serious concern. In contrast, culture is rarely, if ever, mentioned.
6. *Make practitioners aware that being "aware" is simply not enough.* Increasing the understanding of these variables, as APA has done in its current ethical guidelines as well as the testing standards, would appear an excellent start.

## V. CONCLUSION

Consideration of issues surrounding the assessment of educationally, linguistically, and culturally dissimilar individuals is a relatively new enterprise within clinical neuropsychology. Although education has often been factored into the equation of neuropsychological knowledge, culture and related variables such as illiteracy has not. Furthermore, ethnic minorities and culturally dissimilar groups have not been well understood despite the unprecedented growth within the field. This chapter presented both theoretical and pragmatic issues. Although clearly these efforts should be considered as a work in progress, the eventual inclusion of these concerns will increase not only the understanding of all people with brain injury, but will expand the horizons of our understanding of brain function and dysfunction as well.

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