

Neuropsychological Assessment of Ethnic Minorities

Patricia Pérez-Arce

**University of California, San Francisco
San Francisco Department of Public Health**

Antonio E. Puente

University of North Carolina at Wilmington

Send correspondence to:

Patricia Pérez-Arce, Ph.D.

Director

Mission Mental Health Services

111 Potrero Avenue

San Francisco, CA 94103

"In mental testing, society's preconceptions and presumptions especially resist reformulation because of the widespread use of professional authority to establish the reference groups and standards by which to categorize individual performance." John Garcia, 1984, p.44

The reality of a polyethnic, polycultural, and polyglot American society is ineluctably imposing itself upon the field of neuropsychology. However, investigators do not have a conceptual framework nor appropriate methodology to guide their research, while clinicians lack not only adequate testing tools but also a comprehensive understanding of how ethnic/cultural variables may impinge on brain processing mechanisms and neuropsychological test performance. Consequently, neuropsychologists working with people from non-majority groups find themselves improvising, adapting, translating, and/or adjusting existing neuropsychological measures and norms in order to provide a critically needed service. While, those that seek to serve the interest of institutions or are asked to evaluate individuals from unfamiliar cultures, who may speak a different language, may use untrained interpreters, invalid tests, and unrepresentative norms that severely misrepresent the actual abilities and competencies of the referred individual. Such approaches not only reflect poor science but are highly suggestive of unethical, even illegal practice. For example, Public Law 94-142 requires the uses of "nondiscriminatory" testing and the American Psychological Association guidelines for ethical practice (APA, 1990a) and for providers of services to ethnic, linguistic, and culturally diverse populations (APA, 1990b) require cultural sensitivity in assessment situations.

Puente and McCaffrey (1992), among others, have suggested that our previous approach to neuropsychological assessment has been traditionally based on the assumption that the neuropsychologist must fully appreciate both the limits and possibilities of test instruments. They argue that this approach still leaves much to be desired and, instead,

propose that neuropsychological assessment be based on the understanding not only of tests and brain function but also of the patient within a biopsychosocial context, i.e., biological predispositions, emotional development, and influential environmental/cultural factors. This approach increases what is currently being considered ecological validity and is reflective of the theme of this book.

The present chapter seeks to address some critical issues and problems that are frequently encountered by neuropsychologists who assess people from outside the majority ethnic group. The authors will take as an example the specific case of working with Hispanics. Hispanics, also known as Latinos, represent the fastest and second largest ethnic minority group in the United States. Furthermore, Hispanics share many common characteristics with other ethnic minorities such as a high proportion of low socioeconomic status individuals, limited and/or poor education, poor health care, unskilled jobs, provenance from foreign, developing countries, discrimination, English as a second language, unique cultural values, rural life experiences, and low level of acculturation to the dominant European American culture. Taking into account these variables complicates the already difficult demands of a neuropsychological evaluation.

The psychological testing literature has raised psychologists' awareness of ecological validity with the caveat, "By far the most important considerations in the testing of culturally diverse groups...pertain to the interpretation of test scores," (Anastasi, 1976, p. 58). The concept of ecological validity of neuropsychological testing emphasizes the effect that socioeconomic, cultural, language, and related factors have on the way information is processed and on the manner of

response to situational demands. In order to attain and apply this knowledge about an individual's context we as clinicians and examiners must bring to the fore and overcome various cognitive impediments. For example, Cauce and Jacobson (1980) refer to implicit and incorrect assumptions concerning the assessment of Latinos in the United States. Besides the problem of overt and covert prejudice, the authors outline several areas involving biased assumptions that include homogeneity in English language proficiency, equivalence of literal translations, population homogeneity, language uniformity, and "culture free" testing. Olmedo (1981) further emphasizes the problems of bilingualism, acculturation, and the generalizability of cognitive constructs from linguistic majorities to linguistic minorities.

Unfortunately, clinical neuropsychology lags sorely behind other disciplines within psychology, such as school psychology, in the pace at which it is understanding, integrating, and applying multiculturalism into its research and practice. One need not look any further than one of the most seminal books in neuropsychological assessment to understand this gap. Lezak in her book, Neuropsychological Assessment (1983), gives voice to the prevalent belief that, "given reasonably normal conditions of physical and mental development, there is one intellectual performance level that best represents each person's intellectual abilities generally, " (Lezak, 1983, p. 94). Her assumption does not take into account the relative nature of what is a normal condition for development nor the various types and expressions of intellectual abilities (Gardner, 1988; Sternberg, 1985).

In Lezak's book chapter delineating history taking (Lezak, 1983, p. 103) no mention is made of the need to assess the patient's dominant

language, to delineate his/her preferential mode of processing information nor of cultural context, e.g., definitions, beliefs, values, and attitudes regarding the testing situation, achievement goals, school, and work, and to assess the potential impact of these variables on testing performance. Moreover, Lezak clusters the term "cultural deprivation" along with brain injury, poor work habits, and anxiety as variables that "can only depress intellectual functioning." There is no elucidation of what cultural deprivation means in this context. Does it allude to low socioeconomic level, to cultures dissimilar from that of European Americans? Clearly there is a significant gap between neuropsychological knowledge and evaluating the cultural relevance of cognitive assessments.

Given the present state of affairs, it is not surprising that many psychologists in the field have continued to believe that the plea for programmatic reforms that take into account cognitive differentiation and linguistic diversity have gone unanswered by the testing industry (Garcia, 1984). Some declare that this unresponsiveness has been partly due to the lack of understanding of the effect that cultural guided perceptions and actions, as well as the structure of language, have on cognition (Ardila, 1983; LeVine, 1988; Ardila, Rosselli, & Puente, 1993). Others have suggested that empirical evidence is so limited as to have little impact on practical knowledge. Kaufman, for example, suggests that our understanding of brain-behavior relationships is too recent to have had an impact on the structure and format of intelligence type of tests (1979). He and others (Ardila et al., 1993; Kaufman, 1979) do acknowledge that diverse cultural groups may emphasize different modes of processing information and that current cognitive tests may penalize specific cultural/ethnic populations.

configurations," (Spiro, 1988, p. 323) thus encompassing belief and conceptual systems. Geertz, Goodenough, and others (in D'Andrade, 1984) have argued that cultures consist not only of patterns of behavior, internalized objective and subjective structures, and ways of coping with the environment, but also of shared information or knowledge encoded in systems of verbal and nonverbal symbols. In the cognitive, as opposed to behavioral tradition, what an individual does is, in large part, a function of the his/her internal representations or schemas of the environment.

Hopefully the above definitions will clarify the confusion that many people exhibit in making inappropriate use of the term "racial group" when ethnic and/or cultural group is meant. To illustrate, there are Hispanics who are born of European descendants on both sides of the family, others of native peoples of the Americas, still others are of African ancestry, and most others have ancestors of mixed races. In addition a large segment of individuals within this cultural group identify themselves as Hispanic, i.e., of Spanish roots, and another large segment of this same population group choose to refer to themselves as Latinos/Latinas in order to anchor their ethnic identity with the merging of Latin American indigenous peoples and their Spanish colonizers. Hispanics from the "European peninsula" are quite different from those from the Americas, and Mexican Americans are quite different from Cubans. Regardless of their ancestral roots and self-identification Hispanics/Latinos(as) share overarching cultural values, dominant language, and norms. However, depending on their country of origin, they have unique vocabulary, religious traditions, music, and communication styles, and within each subculture intragroup differences of class and socioeconomic level define

This chapter will focus on two main issues. In the first part, three major variables which affect neuropsychological assessment of ethnic minority individuals will be discussed-- culture, education, and language. The effects of these variables on neuropsychological assessment will be addressed. The second section will focus on intellectual assessment since recent practice surveys (e.g., Putnam & De Luca, 1992) indicate that this is most common type of neuropsychological test and understanding the implications of its use in neuropsychological and related fields, e.g., education, is most critical.

DEFINING SOCIOCULTURAL VARIABLES

Race has been defined primarily as an anatomical differentiation between groups of people. McKechnie (1983) has suggested that "Any of the major biological divisions of mankind, distinguished by color and texture of hair, color of skin and eyes, stature, bodily proportions, etc.: Many ethnologists now consider that there are only three primary divisions, the Caucasian..., Negroid..., and Mongoloid..., each with various subdivisions." In contrast, ethnicity is more behaviorally oriented and may be defined as, "designating or of any of the basic divisions or groups of mankind, as distinguished by customs, characteristics, language, etc." (McKechnie, 1983). One example of ethnic grouping is constituted of individuals of Latin American descent living in the United States, Latinos/Hispanics. Culture is a broader concept and has been defined as designating, "a cognitive system, that is, a set of 'propositions,' both descriptive... and normative..., about nature, man, and society that are more or less embedded in interlocking higher-order networks and

influential structures that define domains of cultural knowledge and degree of exposure to various types of information (Boster, 1991).

CULTURE

Sperry (1993) asserted that, "Mental events are not the same as brain states" (p.880), as cognitive processes and their outcomes oftentimes are divergent due to mediating "subjective human values." He reasoned that cause-effect relationships in cognitive activity may go downward (higher order cognitive processes to lower level brain processes) as well as upward (bottom-up). Sampson (1994) further proposed making this model of human behavior tridirectional by adding the still higher level sociohistorical processes, "That is, the emergent properties of history, culture, and social position" (p.818). It is assumed that each of these levels follows its own specific functional processes and operate causally to influence the other order systems.

Clearly when culture (which evolves historically and encompasses the social order) is injected into the brain-behavior paradigm it behooves the neuropsychologist to understand the expectations, required knowledge, and the language-mediated (symbolic) systems of meaning imposed on the individual by his/her culture. This is needed because each individual must develop some ability to function in each of these realms, "both at the intuitive and practical level and at the level of explicit propositional knowledge," (Gardner, 1988, p.260), and because cultures emphasize the way in which cultural knowledge is encoded and expressed. Gardner illustrates this dynamic with an example: Western culture gives important emphasis to the acquisition of explicit empirical knowledge about the physical and social world while in other cultures it is not given the same

priority and instead emphasis is placed on the acquisition of knowledge about traditional cultural beliefs, social forms and roles, and the ways to maneuver through them. In each instance cultural imperatives would be expected to guide learning and advancement in the development of specific types of cognitive abilities. It is these culturally determined competencies that the neuropsychologist must also be able to assess.

The significant impact of culturally specific values and norms on behavior is evident in the differential school performance demonstrated by immigrant children from different cultures. Caplan et al. (1992) studied a sample of 536 school-age children of refugee nuclear families (the boat people) from Indochina, most of whom attended low-income inner-city American schools. In the California sample their mean overall score on the California Achievement Test was in the 54th percentile and only 4% had a GPA below a C grade. The factors most related to school achievement were a large family, daily parental involvement with homework tasks, particularly reading aloud regularly to their children. It was found that the parents' values were deeply rooted in Confucian and Buddhist traditions which emphasize the value of learning and disciplined concentration.

Hispanic children's school drop-out rate, on the other hand, is extremely high. Most studies that have focused on Mexican American and Puerto Rican child populations indicate that for them large family is associated with poorer school performance. In addition, there is little evidence that, on the average, Latino parents are highly involved in their children's homework tasks, and, instead, there is a high focus on family involvement. Explanation for these behaviors may be related to the findings of a large study of Mexican, Colombian, and U.S. American adult

samples (Diaz-Guerrero & Szalay, 1991) indicated that within the Latin American cultures the value of scholastic pursuits and/or work per se were not perceived as being particularly critical for the relative concept of having a successful life; wage earning had a clear instrumental value. For U.S. Americans work had a more intrinsic value. In the Latin American groups perceived the family as the primary teachers while U.S. Americans placed more importance on the role of schools and colleges.

A different aspect of the influence of culture on cognition is the manner in which external institutional forces attempt to shape or change cognitive styles to fit one learning approach. This learning structure may handicap children from specific non-European derived cultures who must conform to a homogeneous framework for learning and for being tested. To illustrate, Mexican-American children and young adults show a high degree of cooperative behaviors and significantly fewer competitive behaviors across situations, regions, and socioeconomic levels, than their European-American peers (Diaz-Guerrero & Szalay, 1991; Kagan, 1984; Knight & Kagan, 1982). Yet, regardless of their cultural norms they must conform to classroom learning environments that emphasize individual achievement and advancement through time and norm-referenced competition. Kagan (1979) writes about the "structural bias hypothesis" of the classroom where children from non-majority group cultures are required to fit into the more culturally dystonic competitive work process with negative consequences on their learning and performance. One may extrapolate from these findings to how specific learning and teaching behaviors affect response patterns and performance.

Apparent cognitive deficits found in people of color with low or no education, may be related to differences in motivation, experience,

practice, and lack of perceived need (Bruner, Oliver, & Greenfield, 1966; Garcia, 1984; Greenfield, 1966; Shweder & LeVine, 1988), as well as to the cultural salience of specific type of stimuli or concepts (Brislin, 1990; Resnick, LeVine, & Teasley, 1991), and learned social motives such as cooperation and competition (Kagan, 1984).

Degree of acculturation to the dominant culture must be considered in interpreting performance on cognitive tasks by individuals from communities of color. In a large study of social motives, Anglo-American children modal response was rivalry/superiority, the modal response of second generation Mexican-American children was equality, closely followed by altruism, while third-generation Mexican-American children showed equal preference for equality and rivalry/superiority (Knight & Kagan, 1977). Thus, the more distant one is from the family's original country of origin through U.S. birth and/or high acculturation to the dominant culture, the more similar the cultural profile and cognitive adaptation will be to the latter (Szalay, Diaz-Royo, Brena, & Vilov, 1984).

LANGUAGE

Language and forms of reasoning and argumentation are considered culturally determined cognitive tools by cognitive psychologists. From the ethnolinguist perspective the symbolic communication of a cultural group, i.e., language, serves to interpret and classify external reality. Thus language embodies an specific vision of the world (Gómez de Ardila & Briñez, 1983). It is through language that we organize and make sense of the world, and it is this same language that limits or constrains our thinking (Latour, 1987). Benjamin Lee Whorf's (Shweder, 1991) analyses of language showed that meaning overrides and alters the way we interpret and react to so-called objective stimuli.

Many dilemmas are encountered in understanding and assessing the cognitive capabilities of individuals whose primary language is other than English and who are unschooled in the European-derived U.S. educational system. Neuropsychologists begin their evaluation from the time the patient is met, walks to the office, and begins to speak. Nuances of speech, from prosody to articulation, are fundamental aspects and signifiers of normal and abnormal language patterns. Yet it is not uncommon to hear that neuropsychologists rely on untrained interpreters in their evaluations of individuals for whom English is a second language (Echemendia, Harris, & Puente, 1994). For many in these situations literal translations appear to be acceptable. However, one need to not look further than the structure of English and Spanish, or any other Romance language, to realize the lack of language parity. Symbolic, phonological and syntactic differences make most literal translations inaccurate and, from a neuropsychological perspective, totally unacceptable. From this

perspective, the use of literal translation during the examination would render most test results useless.

Clinically, when a patient whose primary language is other than English is referred for a neuropsychological evaluation, if the evaluator does not speak the language he/she must obtain a trained interpreter who must have mastered the art of writing verbatim, who has been trained to discern subtle alterations in expressive and receptive language, who understands the critical importance of verbal and non-verbal communication, and who can communicate, translate back, to the examiner these myriad observations. All things being equal, it should go without saying that translators with psychological training would be the second best alternative. Once these results are obtained they must be interpreted within the context of the patient's culture. If possible, patients should be evaluated by someone trained both in the sociocultural and neuropsychological issues.

Spanish speaking psychodiagnosticians who are not of the culture have to engage in what has been described as code-switching (Wertsch, 1991). The more acculturated the examiner is to the patient's culture the more able she/he will be in communicating according to that culture's rules for establishing a common frame of reference and understanding specific interpretations of perceptual stimuli, as well in detecting abnormal speech patterns and correcting miscommunications.

EDUCATION

Educational experience and educational achievement level are frequently confounded with cultural and ethnic factors in the study of people from non-majority group cultures. Most neuropsychologists do not encounter adult patients who have not achieved a minimum of six years of

education. However, for those of us who are referred patients who have emigrated from rural areas of Latin American countries or who went to school in the inner cities or some rural areas of the United States, it is not such an unusual experience. Many of these adult individuals never mastered basic literacy skills such as reading and writing in their indigenous language, and, consequently, even if they speak English, they do not read it or write it. And, yet, in spite of their poor educational background they have survived and thrived admirably in a foreign and unwelcoming culture. Although these individuals never had the opportunity to learn to classify objects and to embed them in conceptual constellations through linguistic symbols, many immigrated under high risk conditions, found jobs, brought their families to the United States, and even managed to buy a house and establish a line of credit. Their conceptual abilities may be less developed due to lack of exposure, and, consequently, they may be constricted in their ability to comprehend higher order abstractions without adequate orientation and training. Their intelligence and cognitive capacity clearly cannot be measured with tests that are highly correlated with school and dominant culture-based standards of achievement. They will score poorly on most neuropsychological measures not because of a cognitive disorder but because of lack of formal schooling.

These individuals' appreciation of and experience with standardized testing tends to be highly limited. Most frequently to them testing is a foreign experience, and it is unclear to them its usefulness and their role in the process. In showing up for their appointments they are simply following their physician's or their attorney's instructions. These patients require more preparation and orientation regarding what is

expected of them, what the evaluation will provide, and what is expected of the examiner.

The results of recent studies that have produced norms for the Spanish speaker (Ardila et al., 1993) and our individual observations suggest that little educational experience coupled with rural upbringing in Latin America is frequently associated with impaired performance on a range of neuropsychological measures, including tests that are not language based and considered to be of higher-order in nature. The interpretation of neuropsychological results of this type of patients necessitates a different type of analysis because, besides the presenting problem related to possible brain trauma, one must take into account the possible mitigating effects of language dominance, culturally determined perceptual interpretations, the variability of educational experience related to where it was obtained, health and substance use factors, a social environment that may not appreciate nor has the opportunity support the pragmatic value of school education, the enduring effects of discrimination and trauma, and/or an occupational work history that has precluded cognitive stimulation and practice.

The work on Hispanics by Ardila and colleagues (1993) buttresses and extends the issues raised regarding the influence of formal education. For example, Rosselli, Ardila, and Rosas (1990) reported that Hispanic illiterates differed from matched controls in standard language assessment including phonological discrimination. It was unexpected that illiterates further differed from controls on tests of naming, praxis, coordinated movements, and cancellation. This line of research points to the importance of understanding the role of education and related

sociocultural variables in neuropsychological assessment (see Ardila, Rosselli, & Ostrosky-Solis, 1992, for further information).

A number of other factors are involved in demonstrating motivation to do well on intelligence and neuropsychological tests. These include speed of response under timed conditions and applying oneself to the task without needing support from the examiner, both very U.S. North American and European concepts. The structural and process components of cognitive tests are consistent with culturally reinforced individualistic and competitive American behavior, and for those who are unacculturated to American values, and/or have not been educated in the United States, and behaviors or are recent immigrants from non-European countries, measuring these types of behaviors might be meaningless. Neuropsychological results of individuals whose primary language is other than English and/or who may belong to a non-Western European-derived culture, and with little formal education, would reflect level of neuropsychological acculturation but not necessarily deficiency.

INTELLECTUAL ABILITIES

Intellectual assessment of non-majority people is important, challenging, and controversial, because the most developed body of literature exploring the relationship between ethnicity and cognition is in the assessment of "intelligence," using primarily the Wechsler scales, because interpretation of neuropsychological results must have at its basis an estimate of the individual's previous and current general cognitive capacity, i.e., the ability to attend, perceive, analyze, problem solve, communicate, and understand various levels of symbolic meaning (Lezak, 1983), and because of the differential patterns of performance on IQ tests across ethnic/cultural groups in the United States (Herrstein & Murray, 1994;

Kaufman, 1990). In a common syllogistic analysis the assumption is made that people who hold unskilled occupations are less intelligent than the general population, and, since a sizable majority of Hispanics and African-Americans work in unskilled jobs, they, as an ethnic/cultural group must be less intelligent than European Americans. Unfortunately, this premise can be traced to early work of Terman (1916) and subsequent others (Jensen, 1980; Herrnstein & Murray, 1994). A brief overview of the research in this area will be presented because it elucidates the failures in the current neuropsychological framework and highlights how essential it is to consider the effects of sociocultural variables on test performance.

"Intelligence" has been placed in quotation marks because it is a construct defined by a set of test scores that are heavily correlated with American educators-defined measures of scholastic success. Garcia (1984) writes that "IQ testers postulated a model [child/adult] whose intelligence was congruent with the socioeconomic status and political power of its parents," (p.48). His point is that those in any society that are in positions of power and who control resources, whether economic or intellectual, are the determinants of what is "normal" and desirable in the "average" individual, the average being one's own kind. Given these natural inclinations, it would be expected that, in the United States, the field of psychology and neuropsychology has been and continues to be defined and led predominantly by researchers and clinicians of European-American descent. Not surprisingly, a review of the literature over the last twenty five years on intelligence assessment of Hispanics reveals that over the vast majority of researchers do not have an Hispanic surname (Santos de Barona, 1993). Moreover, most research on non-majority group cultures

have focused on African- Americans and Hispanics have typically been another variable when studying "minority" issues.

Further, when Hispanics are considered most studies tend to ignore their heterogeneity; the majority of studies involve Mexican-Americans who although they comprise a large segment of Hispanics/Latinos by no means represent the only segment of this culture. The reality of the heterogeneous population of the United States and its diverse needs is inexorable. American society is beginning to wake up from the dream that Americans, and its ethnic minorities, are a homogenous group in which any individual's cognitive capacities can be measured in the same way and compared to the "norm."

The literature on the intellectual assessment of children and adults shows thus far that traditional measures of intelligence such as Wechsler intelligence scales and the Stanford Binet test may not be interpreted in the standardized manner when administered to people from developing countries (Smith, 1974), as well as to African-Americans (Jensen, 1980; Reynolds, Chastain, Kaufman, & McLean, 1987), Hispanics (Kaufman, 1979; McShane & Cook, 1985; Whitworth & Gibbons, 1986), and Native Americans (McCullough, Walker, & Diessner, 1985; Teeter, Moore and Petersen, 1982). One of the primary findings of intelligence testing research in the United States is that Latinos and Native American children score substantially higher in the Wechsler Performance subscales than in the Verbal ones, and that this discrepancy is maintained through adulthood although it decreases with increasing age on either the WAIS or WAIS-R (Kaufman, 1990; McShane & Cook, 1985; Whitworth & Gibbons, 1986). Taylor and Richards (1991) reported that when IQ is held constant, Hispanic children tend to perform better on visuo-spatial tasks. African-Americans also

show a differential pattern of results. Additionally, Sandoval, Zimmerman and Woo-Sam (1981) suggested that careful analysis on WISC-R Verbal subtests identified only a small number of items differentially difficult for one group of children or another. On the WAIS-R subtest, Picture Arrangement appears to be an "excellent" measure of general intelligence for African Americans while the Vocabulary and Block Design subtests are considered only "fair" measures of this variable (Kaiser, see Kaufman, 1991, p. 162). For European-Americans, on the other hand, the latter two subtests are considered the most solid measures of crystallized and fluid intelligence respectively (Kaufman, 1991; Lezak, 1983).

When examining the issue of measuring adult intelligence with the WAIS and WAIS-R, interesting patterns have been reported by Whitworth and Gibbons (1986). Anglos scored higher than Mexican-Americans and Blacks. The differences that had been previously reported with the WAIS were found once again, and such differences carried over into the revised version of the test. Verbal test scores on the WAIS and WAIS-R were similar and lower for both ethnic minority groups. However, as reported earlier Hispanics tended to do better on the Performance tests. Finally, the largest difference between Verbal and Performance IQ was reported with the Hispanic group.

Commentary on the difference between the WAIS and the *Escala de Intelligencia Wechsler Para Adultos (EIWA)* is also warranted (Davis and Rodriguez, 1978; Melendez, in press). Lopez and Romero (1986) reported that most significant difference between the two tests was the conversion of raw to scale scores. In some cases the scores were "very different". Considering the standardization sample, the age of the test, and other related variables, extreme caution is suggested by Lopez

and Romero. A more recent and detailed analysis by Melendez (in press) suggests that the two forms are not comparable. Indeed, the overestimation of IQs and the poor standardization sample led Melendez to suggest that the EIWA should be used only under unusual circumstances.

Explanations for the disparity between the performance on intellectual measures between Hispanics, other ethnic minorities and their European-American counterparts include differences in intellectual abilities due to genetic factors (Hermstein & Murray, 1994; Jensen, 1980), linguistic factors (Padilla & Lindholm, 1984), cross-cultural cognitive styles (Duran, 1984; Gonzales & Roll, 1985), the cultural specificity of psychometric measures and norms (Adler, 1970; Palmer, Olivarez, Wilson, & Fordyce, 1989; Smith, 1974; Valencia, Henderson, & Rankin, 1985), socioeconomic level (Laosa, 1984; Padilla & Lindholm, 1984), language spoken at home (Laosa, 1984) and/or to verbal ability and reading proficiency (Duran, 1984; Kaufman & Kaufman, 1983). Unfortunately there is a glaring lack of well controlled studies that would help determine which of these factors make the greatest contribution to the above mentioned pattern of differential performance. Inadequate methodology confounds most studies relating cognitive abilities and ethnicity in that they usually do not control for environmentally related variables such as cultural norms, language, socioeconomic level, prenatal, and postnatal medical care, nutrition, environmental stimulation, occupational health hazards, substance abuse history, level of stress due to lower status in society, etc. (Amante, VanHouten, Grieve, Bader & Margules, 1977; Caplan, Choy, & Whitmore, 1992; Padilla & Lindholm, 1984).

While critical questions regarding the validity and applicability of current intelligence tests for ethnic-minorities are being actively

such as cognitive psychology and its off-shoot, social cognition, may provide possible explanations to understand the role of education and related variables in neuropsychological performance.

A growing awareness and concern about the effects of environmental circumstances on cognition has been partly impelled by the intelligence testing literature. Recently a number of articles and books have been presented and published that have begun to explore the relationship between intellectual abilities and performance on a variety of neuropsychological tests and on the influence of subject variables, such as education, culture, gender, and race, on the interpretation of conventional cut-off scores of neuropsychological measures (Aboudarham & Zalewski, 1994; Ardila et al. 1994; Heaton, Grant, & Matthews, 1986). Nevertheless, we do not have enough of a knowledge base to adequately answer questions such as, "Do current neuropsychological tests measure what they are supposed to measure when administered to ethnic-minorities?" and "May one use the common interpretation paradigm of level-of-performance, pattern of results, pathognomonic signs, and lateralizing indicators with sociocultural groups that may speak a different language, have a unique learning style, and employ distinct communication, educational, and socialization practices (Martinez Jr. & Mendoza, 1984)?"

When evaluating intellectual abilities it is the unique set of culturally-defined intellectual competencies that one needs to evaluate, not those imposed by an external cultural group regardless of its dominant position in a multicultural society. This perspective naturally leads to an imperative to develop culturally encompassing measures of intellectual functioning. Sternberg (1985) introduced a triarchic theory of intelligence

explored, the importance of taking into account specific cultural and linguistic differences continues to be ignored in much of the neuropsychological literature. Most formula estimates of pre-morbid intelligence give weights to race based on whether a person is 'white,' 'black,' or 'other,' (Barona, Reynolds, & Chastain, 1984). Thus race is collapsed into generic categories that give no consideration to ethnicity-specific and language factors. The advantage of utilizing demographic methods to estimate premorbid intelligence is touched on in Spreen & Strauss's Compendium of Neuropsychological Tests: Administration, Norms, and Commentary (1991), however, no mention is made of the inadvisability of using with ethnic-minorities "the best indicators of premorbid intelligence," the Vocabulary and Information subtests of the WAIS-R. Furthermore, no recommendations are made as to how to evaluate intellectual level, pre-morbid intelligence, and/or neuropsychological functioning of ethnic minority patients.

A related issue for ethnic-minorities is how IQ scores relate to academic achievement. Ecological factors play a role here as well as mentioned earlier. In the numerous studies that have explored this relationship there is a consensus that IQ scores and school achievement are highly correlated (Matarazzo, 1972). Matarazzo and Herman (1991) have reported that Full Scale IQ increases progressively with education (after 8 years of schooling). However, the overall correlation of .50 (although Matarazzo and Herman calculated it to be as high as .63) still leaves 75% of the variance in school performance unaccounted for (Kaufman, 1990).

Neuropsychologists are best equipped through their knowledge of brain-behavior relationships to assess the contribution of demographic variables to performance on cognitive testing. However, other disciplines

to encompass three types of intelligence "componential" (traditional concept of intelligence), experiential (insight and creative problem solving evolved from experience), and "contextual" (street and basic survival smarts). Gardner (1988) proposed as a heuristic on which to base comprehensive assessments seven basic areas of cognitive functioning that include linguistic, visual-spatial, logical-mathematical, bodily kinesthetic (psychomotor), musical, interpersonal, and intrapersonal. Each individual attains various levels of these competencies based on innate capacity and how much they are needed to negotiate and succeed in their delimited life. The question he would pose is, How is she smart? and not, How smart is she? (Brislin, 1990).

These questions and related issues raised by neuropsychologists working in the field with people from non-majority group cultures need to be answered for a number of reasons. Foremost is the accuracy of neuropsychological test results when applied to people outside the mainstream culture, as inaccurate results lead to faulty conclusions as well as misguided diagnosis and prognosis.

CONCLUSION

It is hoped that neuropsychology will profit from the experience in the field of psychological testing and that greater strides will be achieved in integrating cultural diversity and all that it entails into the methodology of neuropsychological assessment. Over half a century ago Sanchez emphasized the importance of understanding bilingualism in mental measurement. The question of whether such a concern has been transferred to clinical neuropsychology is at issue here. Unfortunately, the literature does not appear to support a positive prognosis for this situation. For example, Santos de Barona (1993)

recently reported that a "significant decline" in the number of articles containing ethnic minorities issues occurred between 1970 and 1989.

Nevertheless, knowledge of the relationship between cognition and culture can only come about through investigations that focus specifically on the effects of non-European cultural variables and of non-Anglo-Saxon languages on performance on the currently used neuropsychological tests. These efforts must include appropriate, culturally relevant, measures of concurrent validity, e.g., achievement, adaptability, survival. It may be that new neuropsychological measures must be developed for specific ethnic groups. Or we might discover that current measures do apply to various non-European-American cultural groups, but that the norms are different, and, thus, to obtain an accurate, culturally sensitive interpretation of test scores one must use ethnicity-specific norms. Betancourt and López (1993) point out that while researchers and clinicians tend to assume that cultural factors underlie ethnic group differences, there is no attempt to actually measure or assess cultural elements that may directly influence the expression of cognitive processes. What we do, instead, presume that one can control for cultural differences by using so called "culture fair" tests. We need to achieve an understanding of individuals' intellectual capacities and neuropsychological deficits taking into account the nature of their learning and emotional life experience, how they are embedded in the immediate environment, and the cultural traditions or ways of thinking and acting in the world that inform their interpretation of the world and allow survival in spite of adversity.

A final comment should be made with regards to the concept of "neuropsychological acculturation". If the question involves the

appreciation of a person's ability to integrate into a particular society as measured by an specific level of performance on tasks, demanding that information be processed in "standard" ways, and that specific learning styles be utilized. to problem solve or recall information, then the issue of culturally sensitive measures is at best academic. One might argue like Clarizio did in 1982 that "if the goal is achieving a desegregated society is still as worth pursuing (a value judgment), then the minority child should be compared against a national reference group, for this is the group with which the minority child must compete" (p. 62). However, the final criterion is not competition but understanding, and the process needs to facilitate each individual's potential through an assessment that is conducted in a culturally syntonic manner. Clearly, both the question of cultural sensitivity and understanding coupled with the ultimate criterion for testing remains open to scrutiny.

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