Clinical Neuropsychology of Spanish Speakers:

The Challenge and Pitfalls of a Neuropsychology of a Heterogeneous Population

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The fields of cross-cultural psychology and clinical neuropsychology have been active and present within psychology, yet little attention has been paid to interface between both. Ardila (1995) stated that within the specialty of neuropsychology there have been few experiments aimed at cultural variables, thus our understanding of the influences that cultural differences have on assessment is acute. The development of cross-cultural neuropsychology owes itself to the growth of neuropsychology in general as well as the concerns of society regarding those individuals who live in the United States who are culturally different (Puente & Mc Caffrey, 1992). According to Puente & Perez-Garcia (2000), cross-cultural neuropsychology describes the differences in performances and treatment of individuals in different cultures, expands the concepts of traditional cross-cultural psychology to compare and contrast the issues of how one group, a minority group, compares and contrasts to a larger group, and factors the role of culture and minority status in understanding brain function. The goal then, is to be able to assess while at the same time limiting potential bias. If we can understand the role of culture then perhaps we can be closer to understanding the role of brain function. In an example of this attention to cross-cultural psychology, Hall (1997) stated that there has been a major increase in the psychological literature over the past 10 years regarding this issue. If this statement is true, then where is the proof? PsycLit and PsycInfo have come up with relatively few articles involving the interface between culture and Neuropsychology.

Of particular interest is the interface between cultural and neuropsychological studies involving Hispanics. This sub-group of the American population represents the fastest growing ethnic minority group. In the world, Spanish-speakers represent one of the largest cohesive language groups. However, a review of the literature reveals even less when Hispanics and cross-cultural neuropsychology (or psychology for that matter) are considered. . In fact, one of the most highly regarded neuropsychological assessment books entitled *Neuropsychological Assessment* (3rd ed.)

edited by Lezak (1995) contains no references to Hispanics and the term "culture" is briefly discussed in one paragraph. The purpose of this chapter will be to address the interface of culture with Neuropsychology as it applies to Hispanic populations. However, we have chosen not only to address how this applies to Hispanics in North America but to Spanish speakers living in the Iberia peninsula. Doing so should yield some overlap for a more universal understanding of the clinical Neuropsychology of Spanish speakers.

Defining the Problem

For the purpose of addressing the issue of clinical neuropsychological assessment of Spanish-speakers the primary focus will be to take, even with all its apparent limitations, an American perspective. As a consequence, the concept of culture, majority group, and Hispanic will have an American-centric perspective. To provide a contrast, however, this approach will then be compared with how clinical neuropsychological assessment has been addressed in Spain.

Culture Defined

For the purpose of this chapter it is important to operationally define "culture." This term however, has many possible definitions. Taussig & Ponton (1996) have defined culture rather easily, stating "it is a way of the people". Others have defined culture as similar thoughts, feelings, behaviors including but not limited to traditions, customs, and ways of life (Padilla, 1999) while some define it as the way in which a group survives and adapts (Ardila, 2001). Handwerker (2002) has stated that culture is an arrangement of cognition, emotion, and behavior. Culture could easily be considered a term for any subgroup, whether it be the hippies of the 1960's or southerners living in North and South Carolina.

What does Hispanic Mean?

More specific than culture is that of Hispanic culture. However, a definition of Hispanic must first be addressed. According to Puente & Ardila (2000), Hispanic is

usually defined in the United States as a person whose primary (or, in some cases, secondary) language is Spanish. The U.S. Census (1999) reports that 63% of Hispanics living in the U.S. are of Mexican origin, 14.4% are of Central or South American origin, 10.6% are Puerto Rican, 4.2% Cuban, and 7.4% are classified as being of "Other origin."

Aren't all Hispanics the Same?

As the preceding information suggests, Hispanics are a heterogeneous group. Each group (e.g., Mexican, Cuban, Puerto Rican) has its own distinct cultural characteristics, heritage, and behavioral patterns. Further, Hispanics living in the United States and Canada are more likely to know some English and the American way of life. This could include an understanding of standardized testing, the importance of time and time-based productivity, and competition in academic situations (Puente & Ardila, 2000). It is also noted by these authors that Hispanics from the United States are more likely to appear similar to North Americans on standardized tests than would Hispanics from Mexico, Central or South America, etc., although there is very little data in this area. Padilla (1999) concurs and suggests that within group comparisons should be considered due to the fact that Hispanics are often considered uni-dimensional.

Acculturation

The role of acculturation provides a critical variable in the neuropsychological evaluation of Hispanics. Berry (1997) defines acculturation as the individual's ability to understand and maneuver outside of the culture they were raised and most familiar with. Berry further states that acculturation is a process in which both psychological and behavioral changes occur as a result of long-term contact with another culture. If this is the case, how can acculturation be measured? As culture can be considered dynamic in nature, this task is difficult. Zea, Asner-Self, Birman, and Buki (2003) have suggested that many individuals are affected by several cultures at once, and always changing. Although there are many tests of acculturation, one example would be to give a Hispanic a timed test. If the patient understands the value of time, then they should be able to

perform the task. However, if they do not understand that that they must respond as quickly as possible (this is the case with many Hispanics as the concept of time may be different for them), they will not perform as well and possibly present themselves as brain-damaged (Ardila, et al., 1994). According to Shorris (1992), the degree of acculturation among Hispanics varies. As time goes by, patterns of behavior, beliefs, and values become similar to those of middle-class Americans. Thus, Hispanics living in the U.S. integrate their values with American values of the middle-class. This integration can be very troublesome and difficult to endure. Knowing more about the acculturation level of a patient can provide the clinician with information necessary to add or take away tests based on cultural appropriateness.

Demographics: A Cuban-American Perspective

Since the Communist Revolution, Cubans have migrated in large numbers into the United States, primarily Miami, Florida. Cubans are an important subgroup within the Hispanic culture in the United States, primarily in Florida and New York (Puente, 2000). Of the above mentioned Census data in the United States, only 25% of Cubans live below the poverty line. This number is the lowest of any Hispanic subgroup (U.S. Census, 2001). As of the year 2000, the U.S. Census reports that Hispanics comprise about 12.5% of the entire U.S. population. This figure does not include the high number of Hispanics who are in the United States illegally. In California alone Hispanics account for 32.4% of the entire state. The Bureau of the Census (2003) has recently reported that Hispanics have surpassed African-Americans as the largest minority in the U.S. Further, by the year 2050 Hispanics will comprise 25% of the entire population in the United States (54 million).

Previous Studies

Although previous research in this area as one can imagine is very scarce, there are some studies that are noteworthy. For example, Alfredo Ardila & Sonia Moreno (2001) were interested in performing an exploratory study on an Indian tribe called the

Aruacos who live in the Sierra Nevadas in Colombia. They composed a brief neuropsychological battery to test such things as visuoperceptual ability, memory, ideomotor praxis, verbal fluency, and spatial abilities. They were able to obtain a small sample (n=20) of 12 males and 8 females between 8 and 30 years of age. Each subject was administered the battery individually. Results on some tests such as figure recognition was perfect whereas some tests such as block design were impossible to perform. Educational level (low) and cultural relevance may have been the two variables most responsible for the results, as some tests appeared meaningful and others were impossible to understand. Thus, the authors suggest that appropriateness for certain cross-cultural neuropsychological instruments be taken into consideration when testing these populations.

In a subsequent study regarding within group differences, Vivian Andrade along with other collaborators (this study in its entirety is in the process of being accepted) studied neuropsychological performance in Amazon Indians in Brazil, specifically the Guarani tribe. The first study was comprised of 20 subjects who were given a task similar to the California Verbal Learning Test (15 words) in Gauranis (their native language) and Portuguese. The Guaranis were separated into two groups: educated (formal schooling) vs. non-educated (no schooling whatsoever). The results of this study in regards to the verbal memory (or learning) test showed that both groups recalled a similar number of words on the first trial and showed similar learning curves. However, the educated Guaranis remembered more words than the non-educated group. This study was replicated with 12 subjects using the same design as performed previously. The authors added 4 tasks to the verbal learning task. They showed each person 12 figures of indigenous animals found in the jungle, administered the logical memory subtest from the WMS-R (translated), and digit span and block design from the WAIS-R. The results from this study showed almost no differences between the educated and non-educated groups. The uneducated Guaranis did significantly better in motor and visual tasks than

in verbal tasks in either language. These results could also have been indicative of the role of education in the verbal learning task.

These studies have been helpful in comparing within groups but a study similar to the ones mentioned above has never been performed (at least not in the published literature) on Hispanics. However, how does this situation and literature contrast to Spain, the mother country of the Spanish language? In order to better understand the situation for Spanish speakers in general an introduction to clinical neuropsychological assessment in Spain will be considered.

Clinical Neuropsychology in Spain

Although Spain has never produced studies such as Sweet, et.al (1996) or Camara, Nathan, and Puente (2000) that analyzed the practice of neuropsychology, it follows this paradigm with regard to practice and administration of test batteries. Research on appropriate administration of test batteries (Hamser, 1990) and testing with deprived populations (Bauer, 1994) has been reviewed extensively. It is important to note that this viewpoint is not necessarily Spanish in nature; it is correspondent with the current major views of neuropsychology.

At the present time, there is a great disparity between the development between academic neuropsychology and clinical neuropsychology. Although both disciplines are a large part of the curriculum and the importance of clinical neuropsychology is stressed, there are, in general a lack of neuropsychologists in hospital as well as private practice settings. Health care in Spain is universal, and is given at a reduced cost. In addition, the government has not acknowledged the new clinical specialty that is clinical neuropsychology, thus making difficult to establish a following. Despite this lack of

foresight by the government, neuropsychologists in Spain continue to work with neurosurgeons and neurologists.

Historically, the focus on neuropsychology in Spain has been limited to theoretical and academic development, with little or no attention paid to practice. The international focus, much like Spain's, needs to provide more development in this area as well as in the areas of evaluation and rehabilitation. A review of current practices in clinical Neuropsychology in Spain follows.

Neuropsychological Evaluation

As indicated earlier, in light of past research on other populations, there is not a widely recognized clinical protocol in Spain. Thus, current research dictates what would be most appropriate in a clinical evaluation.

The clinical evaluation can be broken down into three phases:

1. Clinical Interview
2. Neuropsychological Testing
3. Follow-Up interview with test results and treatment plan, if necessary

Clinical Interview

Following the Lezak's (1995) recommendations, the clinical interview should consist of the following:

1. Understanding the patients' current state
2. Understand the problem
3. Establish a hypothesis regarding the problem
4. Use the above as a guide for deciding on a test battery

The interview should be conducted if possible with the patient alone (this is sometimes difficult depending on the state of the patient). Th neuropsychologist should establish repoire with the patient in such a way to elicit as much information as possible. In order to accomplish this, Lezak (1995) suggests the following tactics:

1. Explain the objectives of the interview
2. Explain what the evaluation will consist of (citing memory, attention, etc).
3. Explain how the test results will be used, who will get copies, etc.
4. Explain that results will be kept confidential unless stated otherwise on informed consent
5. Information regarding who will get the results and when should be discussed
6. Describe neuropsychological testing in such a manner that is understandable to the patient
7. Explain that the evaluation is a partnership that can be good or bad, depending on the patients' outlook

Once repoire has been established, the interview should be conducted compiling information regarding family history, school history, job history, and any other relevant issues (medical problems) prior to the head injury.

The end result of the interview should be a thorough description of the patient and the presenting problem. This information can come from various sources: self-report, records, family members, medical charts, and/or other medical records. Cognitive affect as well as emotional state should be considered as well in addition to the **sequalae.**

Of importance is how the patients' daily life has been affected by the injury with regard to their job, social and familial life. This information will be a valuable contributor in the establishment of limitations as well as rehabilitation for the patient.

The information obtained during the interview should be used as a basis for a hypothesis regarding the patients' current neuropsychological deficits. Inasmuch, the information should also guide the clinician in the selection of appropriate testing instruments. Consideration when choosing a test battery should not be limited to instruments that show impairment, however.

Neuropsychological Testing

As noted previously, testing follows the interview. It is important to note that information obtained in the interview may be tainted, so it is wise to choose a thorough test battery consisting of instruments that will paint a complete picture of the individual's strengths and weaknesses.

When choosing the tests, it is noteworthy to include tests specific to the individuals suspected deficiencies as well as strengths. For example, a patient with hemiplegia of the dominant hemisphere would be administered the Benton Visual Retention Test (BVRT), while a patient who has suffered a transient ischemic attack without motor difficulty would be given the RCFT. In both cases, visual memory is explored but through different methods.

Test selection according to Vanderploeg (1994) should be as follows: 1) The tests chosen should reflect the referral question as well as the hypothesis; 2) High level tests such as memory and low-level tests such as sensory-perceptual tests should both be administered; 3) If quantitative tests are to be used, make sure they are normed

appropriately; 4) Utilize tests that can be adjusted to the patients level of ability; 5) Avoid tests that are not neuropsychologically-based. "Tests for brain injury almost always measure cognitive ability, but tests of cognitive ability hardly measure brain injury." (Vanderploeg, 1994, p.18); and 6) If multiple tests measuring a similar dimension (i.e., memory) are to be used, try not to administer tests in that area that would produce redundancy.

Lezak (1995) offers the following suggestions regarding the order in which the tests should be administered: 1) Administer difficult tests at the beginning while the patient is fresh. Be careful not to give a test that may be too hard and demoralize the patient; 2) Combine difficult and easy tests; 3) Combine verbal and non-verbal tests; and finally, 4) Take into account how long each test may last, and administer appropriately. The average session is about 50 minute. White and Rose (1997) have suggested that patients should be taken to their limit in order to analyze their capacity. The clinician should also be aware of the types of errors the patient is making.

Compared to other countries such as the United States, Spain has not addressed the issue regarding the use of technicians in neuropsychology, although as the discipline grows it may too become a topic of much discussion. Once testing has been accomplished, it is necessary to confirm the hypothesis and rule out any differential diagnosis. The next step is sharing the results with the patient.

Follow-Up Interview with Test Results

The follow-up interview is the final phase of the evaluation and should never be omitted, (Walsh, 1999) even if the evaluation has been ordered by another professional. The follow-up can be divided into two parts: the final interview and written report.

The follow-up interview is conducted after all testing, scoring, and interpretation have been done. The information presented to the patient should reflect strengths and weaknesses; and how these strengths and weaknesses will affect their functioning and/or their rehabilitation. All of the information discussed with the patient should also be conveyed in the written report.

The written report is fundamental not only in communicating results to the patient but also to the relevant individuals with whom this patient is working with (Walsh, 1999). Although there are a variety of ways this information can be conveyed, it is important to be succinct yet thorough. The report should be well-written and able to read by other professionals. At the minimum, the written report should consist of: the referral question, family, social, work, and medical histories. Any neuropsychological damage should be noted regarding the clinical process (testing, results, and interpretation).

In sum, the typical neuropsychological evaluation in Spain consists of interviews to determine pre and post injury functions, decide on a test battery, and to establish a hypothesis regarding neuropsychological sequelae. The battery given will surely depend on the background of the clinician, and the results of the testing should be conveyed through a written report both to the patient and those who are involved in the case. With testing being such a fundamental part of the clinical process, it is necessary to include a list of instruments at the disposal of the neuropsychologist.

Neuropsychological Instruments

In comparison with the Anglo population, the quantity of tests available to Spanish neuropsychologists is quite limited. Two companies, TEA and PSYMTEC, offer neuropsychological tests. Of those tests, most of those are in English. In addition, some

(most?) of these tests do not include Spanish norms, therefore it is difficult to interpret them without caution.

In Spain, there has been a trend in utilizing tests that were made for other activities, ranging from personnel selection to clinical psychology. As in most countries, there are many tests oriented towards deficits in general but not very many regarding verbal deficits, (Perez, Goody, Laserna, & Puente, 1998) although more functional tests have demonstrated the same utility as ones used for deficits in general.

Table 1 presents a list, (though not-exhaustive) of neuropsychological tests commonly used in Spain. There is no frequency distribution for their usage, as that exceeds the scope of this chapter. It is also important to note that this table presents a general idea; it does not offer the actual purpose of each test, nor does it include all areas of neuropsychological testing for each test. Any given test may represent more than one area.

AREAS	**PRUEBAS**	**POBLACIÓN**	**LOCALIZACIÓN**
Generales	Batería Barcelona	Adultos	TEA
	Batería Luria-DNA	Adultos	TEA
	Batería Neuropsicológica Luria-Nebraska	Adultos	Antonio E. Puente
	CANTAB	Adultos	SYMTEC
Lateralidad	Dominancia Lateral HARRIS	Infantil y adultos	TEA
	Homogeneidad y preferencia lateral	Infantil y adultos	TEA
Viso-motor	Test de Aptitudes Mecánicas McQuarrie	Adultos	TEA
	Coordinación Visomotora de Yela	Adultos	TEA
	Test Gestaltico Visomotor de Bender	Infantil y adultos	TEA

Perceptivo	VOSP	Puntos de corte	TEA
Atención	Oral Trails	Infantil y algunos adultos	Sedo (2000a)
	Dígitos del WAIS-III	Adultos	TEA
	Atención Visual usando Spatial Span Board	Adultos	Artiola, Hermosillo, Heaton y Pardee (1998)
	Five Digits Test	Infantil y algunos adultos	Sedo (2000b)
	Batería Neuropsicológica Sevilla	Adultos	TEA
Memoria	Test Auditivo-Verbal España-Complutense (TAVEC)	Adultos	TEA
	Test Conductual de Memoria Rivermead (RBMT)	Adultos	TEA
	Test de la Figura Compleja de Rey	Infantil y adultos	TEA
	Test de Retención Visual de Benton (TRVB)	Adultos	TEA
	Indice de Memoria de Trabajo del WAIS-III	Adultos	TEA
	Memoria Lógica	Adultos	Artiola, Hermosillo, Heaton y Pardee (1998)
	Reproducción Visual	Adultos	Artiola, Hermosillo, Heaton y Pardee (1998)
	Test de Recuerdo Selectivo	19-31 años	Campo, Morales y Juan-Malpartida (2000)
Lenguaje	Examen de Afasias de Boston	Adultos	TEA
	Test para el Examen de la Afasia	Infantil y adultos	TEA
	Fluidez fonética PMR	Adultos	Artiola, Hermosillo, Heaton y Pardee (1998)
	Fluidez fonética FAS	20-30 años	Valencia et al. (2000)

	Fluidez semántica Animales+Frutas	20-30 años	Valencia et al. (2000)
Función ejecutiva	Test de Clasificación de Tarjetas de Wisconsin	Adultos	Artiola, Hermosillo, Heaton y Pardee (1998)
	Cambios	Adultos	TEA
	Five Digits Test	Infantil y algunos adultos	Sedo (2000b)
	Test de Colores y Palabras STROOP	Adultos	TEA
	Batería Neuropsicológica Sevilla	Adultos	TEA
Inteligencia	WAIS-III	Adultos	TEA
	K BIT	Infantil y adultos	TEA
	TONI-2	Infantil y adultos	TEA
Estimación Premórbida de IQ	Test de Acentuación de Palabras (TAP)		González-Montalvo (1991)
Personalidad/ Emocional	MMPI-II	Adultos	TEA
	MCMI-II	Adultos	TEA
	Neurobehavioral Rating Scale-Revised	Adultos	Muñoz-Cespedes, Tobal y Cano (2000)

Thus, it is apparent that there are a number of tests available to Spanish Psychologists; however more tests are needed in order to be able to effectively evaluate those with neuropsychological deficits.

Neuropsychological Rehabilitation

As noted earlier, the area on neuropsychological rehabilitation is much less developed than the evaluation area; however there is a growing interest in this field. Rehabilitation services for the government offer the majority of clinical opportunities in Spain. It is a public system consisting of medical doctors, occupational and physical

therapists, and very rarely, neuropsychologists and psychologists. A brain injury center named el Centro Estatal de Atencion al Dano Cerebral (loosely translated means Center for Brain Damage) has been recently established. For this reason, a rise in neuropsychological rehabilitation has come from private hospitals such as the Aitamenni Hospital, who contract psychiatrists, psychologists, neuropsychologists, and rehabilitation doctors in order to treat individuals with brain injury.

Although there is some debate, most of the neuropsychological rehabilitation done in Spain is holistic and multi-disciplinary (Fernandez-Guinea, 2001; Leon-Carrion, Machuca, Murga, and Dominguez, 2001; Munoz-Cespedes & Tirapu, 2001; Junque, Bruna, Mataro & Puyuelo, 1998). A therapeutic environment is then created in order for the patient to feel comfortable. Also typical of these programs is the contact they maintain with the patients' families. This is done in order to provide support for the patient as well as for facilitation of rehabilitation.

As with most of the world, cognitive rehabilitation is an important part of the rehabilitation process. The principle areas focused on during this process are memory, attention, and executive function (Munoz-Cespedes & Tirapu, 2001). Wilson (1997) defines "cognitive rehabilitation" as a combination of learning, cognitive psychology, and neuropsychology. Using this paradigm, the patients' deficiency, intervention strategies, and the efficacy of treatment are explored. These principles underlie cognitive psychology and neuropsychology. The principles of learning used in cognitive rehabilitation include memory tests, problem solving, and attention. It is important to note that patients' functioning as a result of this treatment may or may not improve over the course of rehabilitation (Wilson, 1997).

In order to facilitate cognitive rehabilitation, programs such as Rehacom (TEA) and Gradior (INTRAS foundation) have been established. Rehacon consists of a module type rehabilitation that taps into attention, memory, visual-perceptual, motor, and spatial abilities. Gradior contains modules regarding attention, orientation, calculating, psychomotor, memory, perception, and verbal learning abilities. Both companies offer the modules as programs or independently.

In addition to rehabilitation there are programs designed for modification of behavior, specifically behavior that is considered maladaptive (i.e. aggression). These programs are often combined with programs used to assist the individual in gaining more autonomy. This could include making shopping lists, etc. In reality, there is little known about the effectiveness of these programs (Leon-Carrion et al., 2001).

In sum, neuropsychological rehabilitation in Spain is a holistic and multi-disciplinary enterprise. Although not quite on par with evaluation, it is garnering more attention, and is a topic worthy of future consideration.

Summary

Hispanics continue to represent an ever-growing segment of the American population as well as an important segment of the world's population. As clinical Neuropsychology continues expanding, it would appear that simultaneous expansion of knowledge and clinical services in our field should occur. Unfortunately, intellectual and clinical growth, in both North America and Spain, has been slow, and, at times, uneven.

A major problem is determining the concept of culture, acculturation, and the criterion validity in clinical Neuropsychology. Puente & Agranovich (2002) have recently proposed that clinical Neuropsychology may actually be a reflection of cultural

knowledge. In other words, our field may be measuring no more than culture knowledge and, hence, neuropsychological performance, maybe nothing more than execution of cultural competence.

Even if this was true, the problem lies in the availability of adequate instruments, services, and personnel to carry out this critical task. At present, there are few tests currently available, on either side of the Atlantic. Often, tests are simply translated or adapted as best as possible. And, more frequently than that, is the difficulty associated with normative information. If normative problems could be resolved (e.g., is there subgroup heterogeneity?), the problems still persist that adequate comparison samples rarely exist.

We find ourselves with a major task of understanding and serving large segments of both the population of North American and the world but we are not in a position, with information, theory, and/or personnel to address this formidable situation. The decade of the brain has come and gone and, unfortunately, Spanish speakers have been left behind.

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