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Diagnosing Learning Disabilities in Nonmajority Groups: The Challenges and Problems of Applying Nonneuropsychological Approaches

Javier Gontier and Antonio E. Puente

WHAT ROLE DOES NEUROPSYCHOLOGY HAVE TO PLAY IN THE DIAGNOSIS OF LEARNING DISABILITIES?

There are well-known federal statutes that bar discrimination against persons with any kinds of disabilities, including those in learning (Pullin, 2002). Thus, individuals with learning disabilities have the right to access education and its derived services. They also have equal opportunity to obtain similar results as and reach the same level of academic achievement as individuals with no or limited disabilities. To assure individuals with disabilities equal opportunity of academic success, appropriate intervention, rehabilitation programs, and accommodations need to be determined. These strategies seek to assure the right to access opportunities to achieve skills, knowledge, and socialization by being integrated at school and, subsequently, in vocational and personal endeavors. The level of academic achievement will determine also the quantity and quality of job opportunities, income, and finally their quality of life. As a result, the early selection of the appropriate rehabilitation processes, interventions, and accommodations for any learning disability is crucial in facilitating students with learning disabilities to get equal opportunity. The strategies selected for each individual must be based on scientific,

reliable, and accurate assessment procedures addressing all the issues that are related to the disability in its origin, daily functioning manifestation, the future expected performance, and contextual and idiosyncratic expression. To do otherwise increases the possibility of bias and discrimination, both of certain types of disabilities and of groups who historically have been overrepresented within learning disabled groups.

The Individuals with Disabilities Education Improvement Act (IDEIA) defines *learning disability* as a disorder in which one or more imperfections are manifested in psychological processes of using language or doing mathematical calculations (IDEA, 2004). As a consequence, the measurement of psychological processes should be measured with appropriate instruments. The psychological processes related to using language and performing mathematical calculations are regulated by brain functions that have been studied for decades within the specialty of clinical psychology. For example, Spreen (2000) offers a review in which identified areas of the brain are involved as components of processes of reading and arithmetic. The article also discusses the evolution of learning disabilities and the persistence of different subtypes from childhood to adulthood. Measurements and, hence, understanding of the relationship between cognitive and language processes and brain functioning are possible by using neuropsychological assessment procedures. The quality and reliability of these procedures have been evidenced by the extended research available in studies of validity, reliability, and fairness in scientific literature (Mitrushina, Boone, & D'Elia, 1999; Goldstein & Beers, 2004) and in databases such as PsycINFO. These studies are presented in a variety of scientific forums such as the National Academy of Neuropsychology, International Neuropsychological Society, and the Division of Clinical Neuropsychology of the American Psychological Association. These studies are published in journals such as *Archives of Clinical Neuropsychology, Applied Neuropsychology, Child Neuropsychology, International Journal of Neuropsychology, Journal of Experimental and Clinical Neuropsychology, Neuropsychology, Neuropsychology Review,* and *The Clinical Neuropsychologist.*

The provision of reliable and valid instruments to assess individuals with learning disabilities is one of the most important contributions of clinical neuropsychology in the assessment of learning disabilities. Clinical neuropsychology is both a science and a profession centrally involved in providing legal and professional regulations associated with the assessment process of learning disabilities. Regulations state standards of competence for technicians that perform the testing, for the testing situation and context, and for the interpretation of expected results of the assessment process (Puente et al., 2006). Protection for the public and their rights are also provided by the American Psychological Association (APA) and the ethical principles that

state that any testing service provided must be guided by nonmaleficence and be based in the best available scientific evidence (American Psychological Association, 2002). Additional direction for the use of tests, assessments, and their outcomes is also provided by the testing guidelines developed by the APA in conjunction with related professional organizations (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 1985). In summary, neuropsychology provides the best and most robust foundation to date for scientifically developed and, hence unbiased, approaches for the determination of deficits in the acquisition of information and knowledge.

One important issue in the application of neuropsychology in the diagnosis of learning disabilities is the scarce availability of neuropsychologists. According to Puente (2006), there are probably less than 5,000 neuropsychologists in the United States and only a small part of them work in the school systems or provide learning disabilities services as part of their clinical protocols. In contrast, the number of school-aged children with learning disabilities appears to exceed 5% of the total school-aged child population (D'Amato et al., 2005). With this critical discrepancy in mind, one alternative is what D'Amato et al. (2005) consider an *evolving model.* They suggest that more standard psychological evaluations are typically carried out by school psychologists within the school system, whereas the more difficult or severe cases tend to be evaluated by neuropsychologists. One possible solution, such as the one implied with the RTI system, is that, to reach a greater number of children and to do so more quickly, a system focused on assessment by teachers using observational strategies will increase, and do so quickly, the number of children that would be evaluated. Thus, the majority of the students who have some type of learning disability or who are suspected of having some type of learning disability will probably be assessed using curriculum-based assessment, and in more difficult cases the child will be evaluated by a school psychologist.

The possibility exists that a reduction of scientifically based assessment practices completed by trained personnel will correlate with an increase of nonscientifically based assessment completed primarily by bachelor's-level educators untrained and unappreciative of the complexities associated with brain dysfunction and the acquisition, retention, and retrieval of information and knowledge. This situation will be particularly problematic with children associated with nonmajority groups resulting in an increase of false positives in children of ethnic-minority groups and false negatives in children affiliated with majority groups. Hence, the crisis facing this particular situation is how to integrate neuropsychological assessment more readily and quickly, and not in the integration of responsive and dynamic yet nonscientifically based approaches to assessment.

WHAT ROLE DOES NEUROPSYCHOLOGY HAVE TO PLAY IN DESIGNING INTERVENTIONS IN THE CONTEXT OF RTI?

RTI has been defined as a preventive model based on the fact that response to intervention is introduced to children during the early stages of learning such as the stages of reading development (Justice, 2006). This approach has several strengths that can be extracted from the review that Justice published. First, RTI is a model that is applied in the earliest stages that children start formal education. Early reading instructions are used as examples and they are given to children in preschool to assess skills that are supposed to be related to the development of reading skills. The way in which children respond to these instructions and their performance in the tasks are observed and measured by their teachers. According to their behavior and performance, children may be classified as having a learning disability and they are assigned to receive some compensatory training or rehabilitation. However, what is causing this behavior or performance in each task will be very different from one child to another. Motivation or low tolerance to frustration might produce the same behavior that a learning disability is causally related to, such as any disability to process numbers and to answer mathematical problems. Hence, no matter which issues surfaces first (i.e., disability or motivational problem), the eventual outcome or behavior needs to be addressed.

Second, RTI is a group of actions that runs in a continuum process during a period of time in which reading is expected to be developing. This methodology with a process approach allows a continued monitoring of changes that are happening in children during different ages. Monitoring and assessment are provided not only in one single event, but in a fluid and evolving situation. This continuity in an assessment-intervention process makes possible the development of a potentially more reliable picture of how change happens, and also what are the possible factors intervening in change: family, social environment, nutrition, education, social interaction, and learning methods issues.

Third, there is an important variability in speed and strategies that children use to learn. A continued process of monitoring facilitates detection of reading difficulties that are expected but are part of the normal process of learning and that do not require any special intervention to get the expected reading achievements levels.

In contrast, RTI has several features that can be addressed from a neuropsychological view. First, genetically caused learning disabilities have been identified in school-aged children such as Velo-Cardio-Facial syndrome (De Smedt et al., 2007). These children do not need to undergo the difficult and long process of assessments, interventions, and monitoring to be identi-

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fied and *only then* receive the appropriate treatments or rehabilitation. These children would benefit from early educative assessments and monitoring that the RTI process provides. There are some unusual caveats that come with this approach, however. Measurements of intellectual ability are rejected by the RTI model as sources of information for the decision-making process.

Nevertheless, the rights of individuals with disabilities, by design, allow and encourage the right to access all resources that make it possible to have equal opportunities to be academically successful. The RTI process may inherently be incomplete and provide little, if any information about its etiology, development, and trajectory. Knowledge about cognitive, genetic, and neurological issues must be gathered to develop a more complete and scientifically based educative and rehabilitation plan. It is at this point in which neuropsychology has an important role to play in gathering available updated scientific data of the relation between cognition, behavior, and brain function for a particular type of syndrome. Neuropsychological functioning measures have an extended scientific base and they are able to provide comparative data that help to clarify the relation between individual psychological functioning and the expected functioning for age groups. In summary, neuropsychology provides a scientifically based understanding of the problems at hand and, as a consequence, provides a more solid foundation to a responsive intervention program.

The Ecological Neuropsychological Model, as described by D'Amato, Crepeau-Hobson, Huang, and Geil (2005), provides an interesting approach to integrate in a comprehensive and dynamic way information from the different systems in which an individual with a learning disability is involved and interacting. This approach not only develops a method to gather the information related to an individual with learning disability but also it gives guidelines of how compensatory resources, rehabilitation, or interventions must be planned. This approach captures the dynamic, early, and integrated approach associated with RTI while encapsulating the scientific, reliable, and valid measurement of neuropsychological assessment.

The RTI approach appears silent on issues of diversity and cultural dissimilarity. The validity of RTI is based on its specificity in detecting children who have a learning disability and by avoiding that diagnosis in children and do not (Geisinger, Boodoo, & Noble, 2002). The assumption is that RTI is silent on cultural issues largely because they avoid this *confound* by addressing the fundamental issue in question—whether a child has a learning disability. However, in the United States, there are a disproportionate number of culturally diverse students in special education (Harris-Murri, King, & Rostenberg, 2006). Further, the U.S. Census Bureau statistics suggest that specific groups, such as Hispanics, are now the fastest growing segments of the school-aged population (2000). At the same time, they are becoming the fastest growing segment of the special education population as well. This

potential crossing of silence on addressing diversity combined with increased number of actual students from diverse backgrounds and diverse students who have learning disabilities poses major complications for the RTI process. Thus, a larger number of incorrectly placed students and inappropriately developed intervention programs would ensue.

Crosscultural neuropsychology has been scientifically addressing the problem of assessing culturally diverse populations (Ardila, 2005; Evans et al., 2000; Nell, 2000; Perez-Arce & Puente, 1996; Puente & Perez-Garcia, 2000; Puente & Agranovich, 2003; Puente & Ardila, 2000; Wong et al., 2000). Many issues related to the assessment in culturally diverse populations in learning disabled individuals can be extracted from that literature. For instance, as Harris-Murri, King, and Rostenberg point out, instructions given to students during an RTI procedure can be perceived differently depending on the ethnicity of students. Relationships between students and protective figures or authorities in classrooms are different depending on the culture and ethnicity of students. Latino children have family in which values of respecting authority and adults are predominant and the transgressions of those rules are severely punished. Furthermore, there are special and culturally specific ways to perceive relationships that are named with Spanish words that cannot be translated to English, such as *simpatía*. Simpatía is related to the social ability to share feelings, to maintain a certain level of conformity, and to behave with dignity, emphasizing positive aspects and avoiding negative aspects in one situation (Triandis et al., 1984). Simpatía has high social worth among Latin Americans and it might result in avoidance of conflict and confrontation. Triandis et al. (1984) explored the perceived value of social behaviors in Hispanics and non-Hispanics. They found that Hispanics tend to expect more associative positive behaviors from others than non-Hispanics in social interactions. Hispanics expect to find more *simpatía* and to behave with more *simpatía* in social contexts and they tend to reject criticizing and competing behaviors. This expectation changes when there is a higher status individual in that social context. For high-status individuals, Hispanics do not reject and they tend to expect them to perform nonsympathetic behaviors, such as giving orders and disciplining. Consequently, in that context Hispanics are less likely to expect a high-status person to reveal intimate thoughts or personal problems. In the same way, Hispanics are more likely to talk with friends even if that makes them late for another engagement. Also, Latinos are more easily offended than White Americans and Black Americans by comments that carry a personal meaning. Furthermore, they prefer a service that a friend provides no matter if there are other professionals providing the same service with higher quality. These characteristics make Latin Americans more collective oriented and more centered in others' values, needs, goals, and points of view. Traditional Anglo-American culture is more individualistic oriented, emphasizing values

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Individual and cultural differences need to be considered when an assessment and/or an intervention is planned. Specifically, neuropsychology needs to integrate and to compare findings of studies from other countries and cultures as a foundation for addressing the increasing diversity of the American population as well as the generalizability of the application of neuropsychological principles of learning disabilities in a globlalization context. The database PsycINFO is able to provide 11,359 articles from journals written in English and that have the words *neuropsychology* or *neurosciences* in their names. However, the same database is capable of finding only 46 articles that are published in journals that have the word *neuropsicologia*—the Spanish and French word for neuropsychology—in their names. This is a very restricted knowledge base as it applies to Hispanic populations. In contrast, there are a wide range of journals publishing neuropsychology in Latin America: *Revista Brasileira de Neuropsicologia, Revista Chilena de Neuropsicología, Revista Española de Psicología, Revista Argentina de Neuropsicología, y Revista Neuropsicología, Neuropsiquiatría y Neurociencias de Colombia*. However, review of that literature still indicates a critical paucity of information relative to the application of neuropsychological assessment in general and, specifically, to Spanish-speaking populations.

Differences in social interaction and social perceptions among cultures will impact the answers that children with diverse cultural backgrounds and ethnicities will give to assessment procedures such as RTI (Harris-Murri et al., 2006). Questions about studies of validity and fairness of the instruments used in RTI in culturally diverse populations arise because there is some evidence of students who are misplaced either in special or in normal academic programs. Psychology, knowledge of psychometrics, and crosscultural neuropsychology would contribute to the study of reliability, validity, and fairness of instruments in culturally and ethnically diverse populations that are been using in RTI procedures. In response, valid and correct assessments would then provide for appropriate and responsive intervention programs for learning disabled children of all types.

HOW WILL FUTURE DEVELOPMENTS IN NEUROSCIENCES AFFECT HOW WE CLASSIFY AND INTERVENE WITH LEARNING DISABILITIES?

An historical definition of learning disabilities was made a by the National Joint Committee for Learning Disabilities (NJCLD) in 1981 (Hynd et al., 1986). This definition states that learning disabilities have a presumed cause in a central nervous system dysfunction. Later definitions have become more focused in the academic impairments that are not due to sensorial,

motor emotional, environmental, or economical factors (Zillmer, Spiers, & Culbertson, 2008). Common subtypes of identified learning disabilities are dyslexia, dyscalculia, and dysgraphia. Even tough definitions of learning disabilities will change; there is a large amount of research and evidence of brain dysfunctions for variations of the theme. Although theories about what specific neural substrates of each subtype are not yet fully tested, the initial applications appear fruitful and robust. Future developments in neurosciences should address this issue by using the contributions of advanced technological devices. Technology such as magnetic resonance scanner, positron emission tomography, and advanced genetic assessment and their integration with neuropsychology appear to be the wave of the future. Complexity, interregional activity in the brain, and relationships between each subtype and other emotional and behavioral disorders challenge theories and definitions in neurosciences. However, there are findings that have well-established important improvements in defining neural function and localization and evolving changes of one specific skill as well as the correct testing procedure to assess it (Wolf, Bowers, & Biddle, 2000). These findings also have implications for any educational intervention. Clinical and educational research must address topics not only related to neuropsychological assessment but also to the correct and specific rehabilitation techniques and educational interventions for each subtype of learning disability.

WHAT DO YOU THINK NEUROSCIENCE HAS TO OFFER THE ASSESSMENT AND IDENTIFICATION OF LEARNING DISABILITIES?

The neurosciences have progressed enormously during the last 20 years due to the use of neuroimaging techniques such as magnetic resonance imaging, positron emission tomography, and advanced genetic testing. Since the definition of learning disabilities includes the idea that learning disabilities should be related to some anatomically identified brain dysfunction, it has increased the importance of all the evidence showing how the functioning of different systems in the brain is related to a particular learning disability and is not present in a child with no learning disabilities. Dmitrova, Dubrovinskaya, Lukashevich, Machinskaya, and Shklovskii (2005) analyzed neuropsychological performance and electroencephalographic activity (EEG) of "normal" children and children with dysgraphia and dyslexia. They found that, in comparison with children with no learning disabilities, children with dysgraphia and dyslexia have a brain intercentral interaction with predominant low-frequency EEG components. As in children with no learning disabilities, this intercentral brain interaction is predominantly high-frequency rhythms. A review of neuroimaging studies by Semrud-Clikeman and Pliszka (2005) summarized findings showing that several brain areas are related to

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learning disabilities. For instance, the Perisylvian region was found to be associated in children with a language disability other than dyslexia and several publications noticed changes in structural and functional brain activity after intervention in language processing in children with difficulties in auditory processing. Findings such as these as well as evidence from other areas of neurosciences provide critical foundation for the understanding of learning disabilities. There are evidence that come from the genetic field identifying chromosomes 6, 15, 16, 18, and 19 to be associated with learning disabilities using linkage analysis (Plomin & Walker, 2003). However, additional work is necessary to develop a theory of how these genes mutate and how they affect the development of the central nervous system.

Neuropsychology without neuroscience is like learning disability without neuropsychology.

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