

Neuropsychological Assessment from Traditional to ICT-Based Instruments

Isabel Almeida

Centro de Reabilitação Profissional de Gaia, Portugal

Artemisa Rocha Does

Polytechnic Institute of Porto, Portugal

Paula Pinto

Centro de Reabilitação Profissional de Gaia, Portugal

Sandra Guerreiro

Centro de Reabilitação Profissional de Gaia, Portugal

Fernando Barbosa

Universidade do Porto, Portugal

INTRODUCTION

Achieving effective neuropsychological assessment is a major challenge for professionals in the field. The objective is to understand the interaction of cognitive, emotional and behavioral changes experienced by people who have sustained brain injuries. After acquired brain injury, neuropsychological assessment may be needed to determine the extent of their losses due to injury, if the person can benefit from rehabilitation and for planning interventions addressed to address individual needs. It is thought that improved focus of interventions will improve rehabilitation outcomes. Therefore, it assists clinicians to understand their patients' cognitive weaknesses and strengths. Nevertheless assessment of some cognitive functions, such as executive functions, is particularly demanding and difficult. Not only due to the complexity of the functions themselves but also due to the limitations of the available tools. A growing number of studies provide evidence that patients with executive dysfunctions can show good performances in conventional neuropsychological testing but at the same time, have problems successfully achieving simple daily activities. This questions the reliability of using only psychometric instruments for evaluation. Some limitations of psychometric tests documented in literature can clarify this phenomenon: situations are not really presented, but merely verbally described; decisions are only invoked, not performed; exercises fail in event sequencing (action-reaction); action is temporally concentrated; and evaluation procedures often occur in highly structured situations and therefore distant to the real life scenario of daily life activities. In order to overcome the limitations of traditional tools, information and communication technologies (ICT) tools are increasingly used in this area. A growing number of scientific publications evidence the role of ICT in the development of more ecological instruments for neuropsychological assessment. This literature review presents advantages and disadvantages of traditional and ICT based neuropsychological assessment instruments for evaluating cognitive functions.

BACKGROUND

E

Historical Perspective on Neuropsychological Assessment

Clinical Neuropsychology can be defined as the field of knowledge dedicated to the study of brain (dys) function in its relations to cognition, emotion and behavior. The development of this applied field is associated with the recognition, from several areas of knowledge, that people's behaviors and reactions are dependent on brain structures (Stringer, Cooley, & Christensen, 2002). This idea had been present in medical practice for several epochs, but it has gradually diminished its presence under the influence of other beliefs. World War II prompted the growth of neuropsychology as a scientific discipline, and revival of interest in brain-behavior understanding (Camargo, Bolognani, & Zuccolo, 2008). The necessity to evaluate, diagnose and rehabilitate cognitive, emotional and behavioral disorders presented by brain injured soldiers constituted a crucial moment for clinical neuropsychological practices. It created large-scale demands for neuropsychological evaluations and rehabilitation programs, promoting the development of observational and experimental studies about brain (dys)functions, and refined examination and intervention methods. In the last decades, with the development of advanced neuroimaging techniques, the knowledge of biological and biochemical basis of brain structures has progressed the understanding of mechanisms underpinning our behaviors and thoughts. These techniques have been widely diffused and used for the detection and localization of brain damage areas (Buckner, Wheeler, & Sheridan, 2001). As a consequence neuropsychological assessment had to change its primarily goal and focus of interest away from an emphasis on helping to identify hypothesized lesion locations. It must now assist clinicians in understanding the extension and impact of cognitive, behavioral and socio-emotional consequences of brain injury on people's life in an integrated basis with current advances (Camargo et al., 2008).

Neuropsychological Assessment after Acquired Brain Injury

Acquired Brain injury (ABI) can be defined as a damage to the brain, which occurs after birth and is not related to a congenital or a degenerative disease. The deficits can be temporary or permanent and cause partial or functional disability or psychosocial maladjustment.

Neuropsychological assessment can be defined as a performance-based method used to examine the cognitive, behavioral and emotional consequences of damage to brain structures (Harvey, 2012). Damage of a brain area can affect the whole neuropsychological system and therefore evaluation must be comprehensive and investigate several domains: sensory and perceptual systems, motor functions, executive function, attention, memory, language skills, emotional state and behavior.

Assessment provides a comprehensive idea of a patients' global functioning; evaluates their actual competencies and the potential to benefit from rehabilitation programs. It also ought to help clinicians to understand the way in which a patients' central nervous system functioning is interacting with their unique psychosocial environment (Teeter & Semrud-Clikeman, 2007).

Neuropsychological assessment addresses a variety of questions, and neuropsychologists must be aware of both neurological and psychological aspects of the patient's capacities and handicaps (Lezak, Howieson, & Loring, 2004). This imposes constant challenges to examiners during the process, they are constantly balancing the need to respond to the actual purpose of the examination and at the same time to evaluate patients at levels that are suitable for their capacities and limitations.

Lezak, Howieson, and Loring (2004) argued that neuropsychological assessments may serve different objectives:

9 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/neuropsychological-assessment-from-traditional-to-ict-based-instruments/151996

Related Content

Domestic Violence Is a Significant Public Health and a Health Administration Issue in the U.S.

Allison J. Huff, Darrell Norman Burrell, Amalisha Sabie Ariediand Grace E. McGrath (2023). *International Journal of Health Systems and Translational Medicine* (pp. 1-21).

www.irma-international.org/article/domestic-violence-is-a-significant-public-health-and-a-health-administration-issue-in-the-us/315298

An Internet of Things Governance Architecture with Applications in Healthcare

Adrian Copie, Bogdan Manae, Victor Ion Munteanuand Teodor-Florin Forti (2015). *Advanced Technological Solutions for E-Health and Dementia Patient Monitoring* (pp. 322-344).

www.irma-international.org/chapter/an-internet-of-things-governance-architecture-with-applications-in-healthcare/125489

Physiotherapy Education in the Digital Era: A Roadmap of Educational Technologies for Allied Health Educators

Ana Toméand José L. Coelho (2023). *Handbook of Research on Instructional Technologies in Health Education and Allied Disciplines* (pp. 26-54).

www.irma-international.org/chapter/physiotherapy-education-in-the-digital-era/320373

Identification of Preoperative Clinical Factors Associated With Perioperative Blood Transfusions: An Artificial Neural Network Approach

Steven Walczakand Vic Velanovich (2021). *International Journal of Health Systems and Translational Medicine* (pp. 62-75).

www.irma-international.org/article/identification-of-preoperative-clinical-factors-associated-with-perioperative-blood-transfusions/270954

Assessing the Risks and Success Factors of Telehealth Development Projects in an Academic Setting

Mehmet Serdar Kilinc (2022). *International Journal of Health Systems and Translational Medicine* (pp. 1-16).

www.irma-international.org/article/assessing-the-risks-and-success-factors-of-telehealth-development-projects-in-an-academic-setting/291981