History of clinical neuropsychology psychology essay

The field of clinical neuropsychology emerged in the mid-21 st century as a result of an urgent need to understand the relationship between brain, behavior and cognition, particularly abnormal brain functioning, that were lacking in other medical-based fields such as neurology (Bigler, 1991). However, the study of brain impairments and their associated behaviors had already begun in the late 1800s, long before the emergence of clinical neuropsychology. European neurologists and physicians at that time observed certain behaviors were consistently associated with focal brain lesions and these are referred to as brain-behavior relationships (Benton, 1988). As can be seen from the early work of Broca (1865) and Wernicke (1874), it was the goal to associate specific brain lesions with abnormal behavioral functioning and hence, localization became the basis of clinical neuropsychology. Of course, without the technology now that offers us non-invasive methods as well as neuropsychological assessments to study brain-behavior relationships, early neurologists and physicians alike could only rely on post-mortem brain analyses of patients. In the early 1970s however, localizations were based on electroencephalograms (EEGs), X-rays and neuropsychological assessments that were conducted before neurosurgeries were carried out (Ruff, 2003). Fortunately, with the advent of structural imaging such as x-ray computed tomography (CT) and magnetic resonance imaging (MRI), and functional imaging such as positron emission tomography (PET), single photon emission computed tomography (SPECT) and functional MRI (fMRI), more correlative and prospective research can be done to supplement the limited findings that post-mortem analyses had provided (Tramo,). This is to say that neuroimaging methods contribute a great deal to

the works in clinical neuropsychology. Although it may seem that neuropsychologists are no longer required to localize pathology, many still do and this will be evident later on in this paper. Neuroimaging techniques do not signal the beginning of the end to clinical neuropsychology but on the contrary, complement and assist the field in developing a more sophisticated and advance approach towards diagnosing, localizations and interventions.

Practice of Clinical Neuropsychology

Clinical neuropsychology is defined by the APA Commission for the Recognition of Specialties and Proficiencies in Professional Psychology (CRSPPP) as a specialty of professional psychology that is dedicated to the understanding of brain-behavior relationships and clinical applications of that knowledge to human problems, in particular to persons with brain disorders (CRSPPP, 1996). Assessment represents the bulk of clinical neuropsychologists' work. A broad-based knowledge of the different kinds of neuropsychological testing and neuroimaging is required. Neuropsychologists are involved selecting appropriate tests for administration which is dependent on the patient's history, referral question and so on. Therefore, neuropsychologists

What are the localization theories?

How has localization theory helped?

- Diagnosis
- Neurobehavioral

Neuroimaging Methods

There are many neuroimaging technologies used and as said earlier, consist of two types: structural (e. g.: CT scan and MRI) and functional imaging (e. g: MEG, SPECT, PET and fMRI). Structural imaging provides structural images of the brain as well as the surrounding bone while functional imaging allows researchers to observe electrical and metabolic activity of the brain (Gazzaniga et al., 2002). These technologies differ in terms of their availability, methods of operation, spatial and temporal resolutions, invasiveness, and ability to detect abnormalities of brain structure, metabolism, and function (de Zubicaray, 2006).

Role of Neuroimaging in Clinical Neuropsychology

- Language
- Memory

Neuroimaging cannot replace neuropsychological assessment

Being able to simultaneously assess cognitive performance and brain function, neuroimaging has fast become a complementary method to traditional clinical neuropsychological techniques. It has improved the ability to localize lesions and diagnose disorders such as epilepsy and Alzheimer's disease (AD) (de Zubicaray, 2006). However, it is erroneous to assume that neuroimaging can act as a replacement for a more comprehensive neuropsychological assessment.

Cases where neuroimaging methods have not worked

- how the cognitive process happens

- normal neuroimaging results but with cognitive impairments (individual differences)

have oftentimes failed to take into account several variables that influence the interpretation of the data: (1) interindividual differences in gross brain morphology;

(2) the inconsistent relationship of gross anatomical landmarks, which sometimes can and sometimes cannot be captured on routine imaging studies, to functional

zones, as defined by cytoarchitectonics and electrophysiologic responsiveness; (3) lesion size and the proportion of spared tissue within regions of interest; and (4)

dynamic pathophysiological factors pertaining to the etiology and onset of the lesion (Tramo,) Other areas of improvement to clinical neuropsychology treatment services; ecological testings

Neuroimaging has provided an increased ability to connect neuroanatomical structure and function with clinical presentations. This has refined the understanding of the roles neural regions and circuitry play in specific neurocognitive and behavioral tasks, which in turn has lead to improvements in clinical practice. The field of clinical neuropsychology has undergone parallel changes with the advent of the improved ability to localize and determine lesions and structural anomalies. Many of the traditional neuropsychological instruments were originally designed to localize impairment or determine the presence or extent of brain damage. The

improvements in neuroimaging have mandated change in the process of neuropsychological assessment to focus on the determination of functional implications of injury/illness and design of effective interventions and recommendations for rehabilitation. (Noggle et al., 2008)

Neuroimaging and Clinical Neuropsychological Practice.

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