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Book Reviews: Technical Books Section

...HEARTILY RECOMMENDED TO ALL PROFESSIONALS ...This is an amazingly informative book and comes as a boon to all forensic neuropsychologists. This book should find a place in the shelves of every forensic neuropsychologist - be he a beginner or an expert. Fully and heartily recommended...

Forensic Neuropsychology - A Scientific Approach edited by Glenn J. Larrabee. Hardcover, 234x156 mm.
Oxford University Press, 198 Madison Avenue, New York, NY 10016 U.S.A., . Publication Date 2005. 496 pages, 6 line illus., ISBN-10: 0-19-515899-7, ISBN-13: 978-0-19-515899-1. Price $68.50, £42.00

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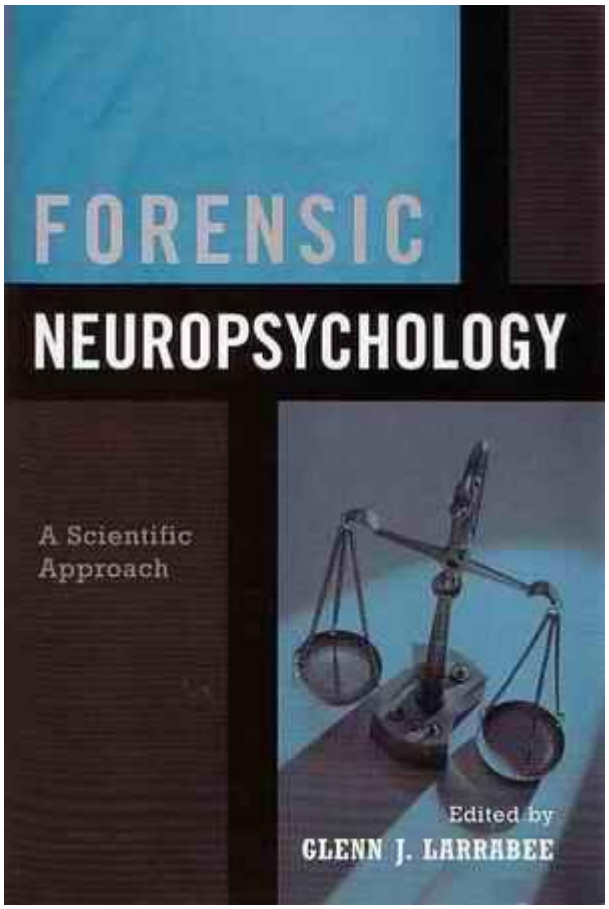

Neuropsychology is a relatively new branch of scientific enquiry, which marries several disciplines such as psychology, psychiatry, neuroscience, philosophy of mind and computer science. It aims to understand how the structure and function of the brain relate to specific psychological processes.

In recent years neuropsychology is increasingly being used in forensic settings. For instance neuropsychology is now increasingly being used for assessing the extent of traumatic brain injury (TBI) in personal injury litigations and to render expert opinions in probate courts regarding one's capacity to execute a valid last will and testament. A probate court - as we all know - determines the validity of wills, enforces the provisions of valid wills, prevents malfeasance by executors and administrators of estates, and provides for an equitable distribution of the assets of persons who die intestate (without a valid will). Forensic neuropsychology is also used in criminal matters such as assisting the court in addressing questions of whether a defendant possesses the competency to proceed to trial or whether a defendant was not responsible, as a result of neuropsychological deficit for alleged crime. In some countries, it is illegal to execute a person with mental deficit and in such matters too the opinions of a neuropsychologist may be useful.

In India, for instance, if a person with a neurological deficit has committed a crime, say murder, the opinion of a forensic neuropsychologist may be needed at least at three stages. Section 328 of the Criminal Procedure Code of India states:

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> *328.* ***Procedure in case of accused being lunatic*** *:- (1) When a Magistrate holding an inquiry has reason to believe that the person against whom the inquiry is being held is of unsound*

mind and consequently incapable of making his defense, the Magistrate shall inquire into the fact of such unsoundness of mind, and shall cause such person to be examined by the civil surgeon of the district or such other medical officer as the State Government may direct, and thereupon shall examine such surgeon or other officer as a witness, and shall reduce the examination to writing.

(2) Pending such examination and inquiry, the Magistrate may deal with such person in accordance with the provisions of Section 330.

(3) If such Magistrate is of opinion that the person referred to in sub-section (1) is of unsound mind and consequently incapable of making his defense, he shall record a finding to that effect and shall postpone further proceedings in the case.

There are equivalent laws in all countries. The law clearly states that if the accused is of unsound mind, the Magistrate shall cause such person to be examined by the civil surgeon. The civil surgeon's place is now increasingly being taken by more qualified specialists - the forensic neuropsychologists, who will determine their capacity to stand trial.

...The argument "if damage to structure X is known to produce a decline on Test T, then the subject having a relatively poor performance on T must have a lesion at X" can often lead to diagnostic error, if applied hastily without taking all factors into account. Larrabee goes on to give a good analogy: because a horse meets the test of being a large animal with four legs, its not always that any newly encountered large animal with four legs is a horse!...
If the accused is found to be mentally sound, the forensic neuropsychologist may be required to opine upon yet another matter - whether the accused was mentally sound *at the material time when he committed the crime* . The laws of most countries state that if a person was mentally unsound *at the time of committing the crime* , then he can not be held guilty of that crime. In India , section 84 of Indian Penal Code specifically states this.

Finally if the accused is found to be of sound mind even at the time of committing the murder and a sentence of execution is passed against him, the forensic neuropsychologist may be required to determine the if he is mentally sound at the time of execution. In most countries it is illegal to execute a mentally insane person!

The knowledge of forensic neuropsychology is also useful in settling claims of people complaining of vague and medically unexplained symptoms such as fibromyalgia, chronic fatigue syndrome (CFS), multiple chemical sensitivities (MCS), toxic mold syndrome and sick building syndrome (SBS). People complaining of these symptoms are often claiming disability benefits from private insurers or from government entitlement programs. Since etiology of these diseases are unknown and the symptoms are often vague and unrelated, it is extremely necessary to know if these persons are simply malingering or suffering from some real disorder.

Finally forensic neuropsychology is also useful in industry such as in the management of pharmaceutical clinical-trials research for drugs that might have a potential impact on CNS

functioning. Another other useful application is the assessment of CNS injury in neurotoxic exposures especially to those working in industries. In Bhopal gas disaster of 1984, many people suffered irreversible brain damage, but little was done to compensate them, one of the reasons being a profound lack of the knowledge of forensic neuropsychology in India .

...The book, edited by a well known forensic neuropsychologist Glenn J. Larrabee, contains a total of 13 chapters, which deal with subjects as diverse as ethical practice of forensic neuropsychology, assessment of malingering, functional neuroimaging in forensic neuropsychology, forensic aspects of traumatic brain injury and neurotoxic injury...
Despite being such an important subject, surprisingly the literature on forensic neuropsychology - especially as far as books are concerned - is not much. Extant books on forensic neuropsychology can be counted on fingers. In such a scenario the book under review, published by **Oxford University Press** is a welcome addition.

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Much of forensic neuropsychology is oriented towards a proper conduction of neuropsychological tests. In essence neuropsychological tests rely upon the fact that a specific lesion in a specific region of the brain would lead to the subject's inability to conduct a specific test properly. For example, a selective impairment in speech production with relative sparing of performance on other tests can suggest that brain injury is localized to one of several brain areas critical for speech production. But - as Larrabee warns us immediately in the opening chapter - a blind application of this logic can often lead us to problems. The argument "if damage to structure X is known to produce a decline on Test T, then the subject having a relatively poor performance on T must have a lesion at X" can often lead to diagnostic error, if applied hastily without taking all factors into account. Larrabee goes on to give a good analogy: because a horse meets the test of being a large animal with four legs, its not always that any newly encountered large animal with four legs is a horse!

In essence, neuropsychological testing evaluates cognitive function, including general intelligence, attention, memory span, judgment, and motor, sensory and speech ability. Tests can also be used to assess emotional stability, quality of language production, distractibility and other qualities. These tests can document impairments that can be used to diagnose specific neurological illness or damage.

Many test batteries are used in forensic neuropsychology. These batteries generally include measures for memory, language, visuospatial skills, executive functions, mathematical abilities, working memory, abstract reasoning, motor speed, and praxis. Within each of these domains, more distinct areas of functioning may be assessed to target specific disorders. For example, analysis for aphasia may include examination of many specialized areas of language, such as spontaneous speech, naming abilities, recognition of and response to verbal commands, repetition of phrases, reading comprehension, writing abilities, fluency, and verbal responses to printed and auditory stimuli. Detailed assessment of executive function might include measures of response inhibition, mental flexibility, novel problem solving, and conceptual reasoning. It is important that the battery collect information on a wide range of skills as well as on the patient's abilities and deficits. It is the

pattern of results, rather than the impairments, that provides insight into the type of disorder a patient may possess.

...If one wants to know which side of the brain the lesion is on, it can be done by neuropsychological tests which test both verbal and spatial memory. While verbal memory can be assessed by using a neuropsychological test which measures memory for a list of words or for a short story [such as the California Verbal Learning Test (CVLT)], spatial memory is assessed by using a neuropsychological test which requires remembering the position of items or learning how to navigate through a maze...

An example might be useful here. We all have at least two different kinds of memories - verbal and spatial . Verbal memory is the memory for words and verbal items and is dependent on a proper functioning of the **left side** of the brain. Spatial memory on the other hand is the memory for spatial information, such as the geographical layout of one's house or office or the interior of, say, a museum which one has visited. It is dependent on a proper functioning of the **right side** of the brain. Thus damage to the left side of the brain can often cause impairment in verbal memory and in the ability to generate and understand speech. On the contrary damage to the right side of the brain causes little disruption in verbal abilities but may disrupt spatial memory. If one wants to know which side of the brain the lesion is on, it can be done by neuropsychological tests which test both verbal and spatial memory. While verbal memory can be assessed by using a neuropsychological test which measures memory for a list of words or for a short story [such as the **California Verbal Learning Test** (**CVLT**)], spatial memory is assessed by using a neuropsychological test which requires remembering the position of items or learning how to navigate through a maze.

There are two main approaches to neuropsychological testing. One approach uses **fixed test batteries** like the **Halstead-Reitan Battery** (or **HRB**, developed by Ward Halstead and Ralph Reitan) or the **Luria-Nebraska Battery** for all patients. These batteries include tests of a wide range of cognitive functions, and those who advocate their use believe that **all** functions must be assessed in **each** patient in order to avoid diagnostic bias or failure to detect subtle problems. Another approach is to use a **flexible test battery** based on hypotheses generated through a clinical interview, observation of the patient, and review of medical records. Flexible test batteries are more prone to bias, but many believe they have the advantage of preventing unnecessary testing. Since patients often find neuropsychological testing stressful and fatiguing, and these factors can negatively influence performance, advocates of the flexible battery approach argue that tailoring test batteries to particular patients can provide more accurate information.

Courts have however generally preferred fixed test batteries. That is why it has been argued that fixed test batteries, such as the **Halstead-Reitan Test Battery** and the **Delis-Kaplan Test Battery** (a further development of Halstead-Reitan) must always be used in forensic settings.

In the much touted **Chapple v. Ganger** case (1994), the Daubert standard was applied for the very first time to the use of fixed (standardized) versus flexible (nonstandardized) neuropsychological test batteries in a federal court. In this personal injury case the court gave far greater weight to the results obtained from **a fixed battery** than to the results obtained from **two flexible neuropsychological test batteries** . Significantly, under the Daubert standard the District Judge noted the lack of medical and scientific evidence to support the conclusions made by the plaintiffs' two expert witnesses, a psychologist and a neuropsychologist, even though each had administered

a comprehensive and flexible neuropsychological test battery and had based their conclusions on the test results. However, the Judge accepted as scientific evidence the objective test results obtained from the fixed Halstead-Reitan Neuropsychological Test Battery for Older Children administered by the Defendants' expert witness Dr. Ralph Reitan and also accepted his scientific expert medical testimony which was closely derived from these data. Applying the Daubert standard to the neuropsychological test results and opinions of the expert witnesses, the District Judge held that *the entire reasoning process and not simply part of the reasoning process upon which the expert witness derives a conclusion must reflect scientific methodology*.[1]

One forensic neuropsychologist, Joe Reed notes:

> *Professionals who use the validated or fixed neuropsychological test batteries to obtain reliable and valid objective test results will generally find the Daubert standard an easy threshold to pass; however, professionals who use only flexible neuropsychological batteries to obtain valid and reliable objective test results will find the Daubert standard more imposing, if not impossible to pass.*

The major objections against flexible neuropsychological batteries are (i) no malingering measures (ii) unknown accuracy rates (iii) ignoring statistical limitations and (iv)not using age norms. Despite these objections however some courts (in California for example) have accepted flexible neuropsychological batteries.[2]

Facts of the case in which the court accepted flexible neuropsychological batteries are interesting. On 7 March 1997, one Charles Sebastianelli (born 17 May 1930) was hit on the head with a milk carton crate falling from an overhead storage area. Nothing abnormal was noted at that time and Mr. Sebastianelli even drove home himself. However just 20 days later - on 27 March 1997 - Sebastianelli found himself caught concocting a nasty murder plan. His conversations with the hit man planning the murder were recorded by the police and he was charged with a criminal case. He contacted a neuropsychologist, Barbara Norton, Ph.D. in August, who conducted some flexible neuropsychological tests on him and came to the conclusion that Mr. Sebastianelli couldn't form an intent because of the brain damage he had suffered 20 days previously from a hit on his head. The court - to the surprise of prosecution - accepted the testimony of Norton and released Sebastianelli.

On page 46, the book gives an interesting table listing a summary of legal settings and issues relevant to forensic neuropsychology. Readers may find it interesting.

COURT SETTING	SPECIFIC LEGAL ISSUE	NEUROPSYCHOLOGICAL ISSUES
Probate	Testamentary competence	. Postmortem analyses of cognitive state on critical legal dates . Recent and remote memory . Social perception and delusional status
	Capacity for contracts, trusts	. Vulnerability to persuasion . Recent memory

		. Delusional status
	Competency to testify	. Usually an issue with children; determine cognitive developmental stage
	Guardianship	. IQ . Functional abilities . Judgment
Administrative	Worker's compensation	. Old versus acquired cognitive deficits
	Social Security Disability	. Prediction of functional deficits
Civil	Causation	. Neurogenic versus psychosocial factors . Closed head injury . Low-dose exposure to organic solvents . Black mold causing occult central nervous system damage
	Damages	. Acquired versus old cognitive weaknesses . Post-traumatic versus premorbid psychological attributes . Primary and secondary gain, symptom validity
	Disability under Americans With Disabilities Act	. Formal diagnosis of cognition-based disability . Prediction of accommodations to remediated deficit
Criminal	*Mens rea* or Not guilty by reason of insanity	. Transient amnestic disorder . Dysexecutive syndrome
	Competent waiver of *Miranda* rights	. Auditory comprehension . Reading comprehension
	Competence to stand trial	. Attention . Comprehension . Memory

To summarize, this is an amazingly informative book and comes as a boon to all forensic neuropsychologists. This book should find a place in the shelves of every forensic neuropsychologist - be he a beginner or an expert. Fully and heartily recommended.

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(1) Reed JE. Fixed vs. flexible neuropsychological test batteries under the Daubert standard for the admissibility of scientific evidence. *Behav Sci Law*. 1996 Summer;14(3):315-22 (Back to [citation] in review)

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