

O2 and KW28 : Neuropsychological Assessment

Friday, October 5, 2012

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Overview of NP Assessment

- Goals
 - determine kind/location of brain pathology
 - *less common now due to Neuroimaging*
 - diagnose disease based on behaviors
 - *e.g. Alzheimer's Dementia*
 - establish baseline functioning before intervention
 - *e.g. before neurosurgery, lateralization of function*
 - distinguish between *organic* and *functional* disorders
 - diagnosis
 - track rehabilitation
 - research
 - *e.g. drug research to treat Alzheimer's*
 - *TBI from sports injuries*

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Trends in NP Assessment

- Functional imaging
 - largely replaced use of NP to identify brain area(s) affected
- Computerized tests & cognitive neuroscience
 - most NP tests are old (1850s) and predate neuroscience
 - newer tests under development
- Money : insurance & managed care
 - USA healthcare system's problems
 - NP assessments are expensive (\$2000+)

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Approaches to NP Assessment

- Quantitative vs. Qualitative...
- Fixed vs. Flexible Battery...

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Quantitative vs. Qualitative

- Quantitative :
 - uses standardized tests
 - statistical analysis of data
 - "normal" functioning compared with normative data tables
 - can be administered by Psychometrist
 - often with a BA or BS degree!
- Qualitative :
 - administered by trained neuropsychologist
 - informal, results interpreted on the fly
 - "Only Luria can do Luria's assessment"
 - approach seen more in Neurology than Neuropsychology

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Fixed vs. Flexible Battery

- Fixed :
 - All patients get same battery of tests
 - Pros: standardized, able to catch subtle problems
 - Cons: slow, expensive, lack of detail in some results
- Flexible :
 - tests given based on patient's status
 - interesting performance on one test : choice of a different test
 - Pros: faster, more detail in certain areas
 - Cons: may miss subtle issues

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NP Assessment Procedures

- Referral
 - typically from MDs (neurologists, psychiatrists), Clinical Psychologists (PhDs) or therapists (Masters-level)
- Clinical Interview
- NP testing
 - 3 or more hours
 - issues of motivation, cooperation, fatigue
- Interpretation of results
- NP Assessment Report
 - current status
 - diagnosis
 - prognosis
 - recommendations

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Neuropsychological Tests

- Hundreds exist
- How to choose?
 - Fixed vs. Flexible approach
- Common tests...

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Major Neuropsychological Tests

- General Intellectual Ability
 - Full-Scale IQ
 - Verbal IQ
 - Performance IQ
- Ability Areas
 - Issues
 - Lack of agreement, overlap
 - Do abilities map 1:1 to brain areas or systems?
 - Do NP tests map 1:1 to ability areas?

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NP Test Areas

- Abstract reasoning / comprehension
- Activities of Daily Living (ADLs)
- Attention
- Emotional
- Executive Control
- Language
- Memory
- Motor
- Problem Solving
- Orientation
- Reasoning
- Sensation/Perception
- Visuospatial

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Issues with NP Assessment

- Every NP test requires multiple ability areas & brain systems
 - example: HRB grooved pegboard...
- Estimating Premorbid functioning...
- Individual differences & Norms...

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Grooved Pegboard

- What abilities required?
 - verbal comprehension
 - memory
 - executive functioning
 - emotional
 - motor
 - sensory
 - others...?

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Sensitivity vs. Specificity

- Sensitivity:
 - can a test measure detect a dysfunction?
- Specificity:
 - does a low score on a test indicate general, or specific problem?
- Example:
 - very poor performance on Grooved Pegboard test
 - sensitive : to general dysfunction
 - specific ? to what?

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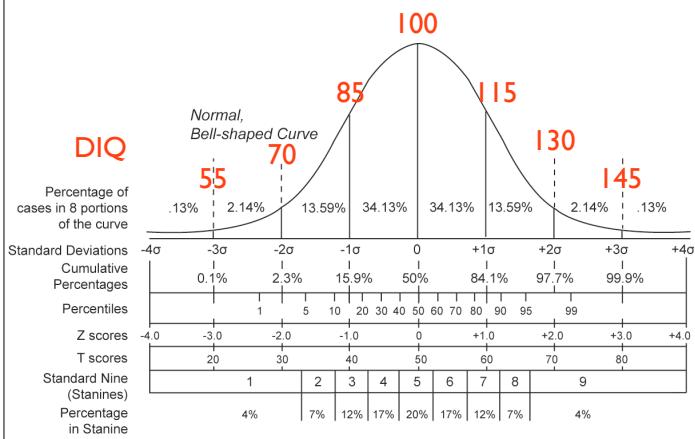
Interpreting Scores

- What is “abnormal”
- Basic Definitions
 - test score that is statistically very low compared to *expected score*
 - test score that is in the *impaired range*

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Standard Scores



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Standard Scores

	Z scores	IQ scores	T scores	Scaled Scores
Mean	0.0	100	50	10
SD	1.0	15	10	3
Example: top 3%	1.9	129	19	16
Example: top 1%	2.4	136	74	17

top 3% is 97 percentile, a Z score of approximately 1.9, IQ score of 128.5, T score of 19, and scaled score of 15.7

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Defining “Impairment”

- One approach:
 - below 15%ile
 - Z score of -1.0 or lower
 - IQ score of 85 or lower

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Premorbid Ability

- Interpretation to “expected score”
- Rarely have pre-test data
- Methods:
 - use statistical normative data
 - corrections:
 - age, gender, amount of education, ethnicity, language
 - informal - estimate by career, family members, work samples, etc.
- Problems:
 - normative data - often lacking
 - individual differences

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Individual Differences

- Many factors influence “normal” performance
- Genetics: Age, Gender, Ethnicity
- Environment :
 - language
 - education
 - career
 - family
 - etc.

Effort & Malingering

- Motivation & Effort are known to affect test performance
- Reasons for low effort?
 - attention, money, release from obligations...
- Detecting Malingering
 - Hiscock's Forced Choice Digit Memory test